Fortune Minerals Limited
NICO Cobalt-Gold-Bismuth-Copper Project

Information Request Responses

Submitted to:
Mackenzie Valley Review Board
200 Scotia Centre
PO Box 938
Yellowknife, NWT, X1A 2N7
Canada

Report Number: 09-1373-1004 **December 2011**

Golder Associates

FORTUNE MINERALS LIMITED

ATTACHMENTS

The following is a list of the attachments for the NICO Cobalt-Gold-Copper-Bismuth Project Information Request Responses.

IR #	Attachment	Title
TG_1	A	Consultation Logs from 2009 Water License Application
TG_14	A	Socio-economic Questionnaires
EC_3	A	Wildlife Risk Assessment
EC_11	A	NICO Project Camp Waste Incinerator
AANDC_14	A	Detailed Cost Comparison of the Active Versus Natural Flooding Scenarios
NRCan_1-4	A	Final Factual Report on the Geotechnical Investigation for the Seepage Collection Pond and Polishing Pond Dams
	B	NICO Tailings Dam and Process Plant Facilities: 2004 Geotechnical Site Investigation
NRCan_1-5	A	NICO Mine Access Route Evaluation
NRCan_1-7	A	Records of Laboratory Testing
NRCan_1-9	A	Technical Memorandum Monitoring Update - August 2008, Thermistor Strings and Piezometers NICO Site, Northwest Territories
	B	NICO Ground Temperature Profiles
	C	Water Level Data NICO Project
	D	Borehole Locations and Groundwater Elevations
NRCan_1-11	A	Golder 2004. Project No. 03-1117-0029. Technical Memorandum - Open Pit Slope Design Recommendations, Fortune Minerals Limited, Gold-Bismuth-Cobalt Project. November 2004
	B	Golder 2005. Project No. 03-1117-0029. Technical Memorandum - Stoping Dimensions Based on Matthews/Potvin Stability Graph Analysis. January 2005
DFO_5	A	Screen Specification – Johnsons Screens Inc.
TC_1	A	Fish and Fish Habitat Assessment of Watercourses Along the Proposed Nico All-Weather Road
TC_2	A	Supporting Environmental Report for the Marian River Bridge Crossing at the NICO Mine Site

INFORMATION REQUESTS

TŁĮCHǪ GOVERNMENT

INFORMATION REQUEST – TG_1

Source: Tłı̨chǫ Government (TG)

Request

Required Authorizations

1.1) Please identify any authorizations required from the Tłı̨chǫ Government in order for the project to proceed as currently proposed.

1.2) Please identify what progress has Fortune made in consulting with the Tłı̨chǫ Government toward these required authorizations.

Response

Response 1.1

Fortune Minerals Limited (Fortune) understanding of the term "authorization" is any permission granted by a government or regulatory body before a proposed activity can proceed and that is a requirement of legislation, regulation or, in this case, the Tłı̨chǫ Agreement. The only authorization Fortune was able to identify was an access agreement as stipulated in clause 19.3.3 which reads:

> *"Where the exercise of the right of access under 19.3.1 or 19.3.2 involves any activity of a type or in a location not authorized at the effective date, the exercise of that right of access is subject to the agreement of the Tłı̨chǫ Government or, failing such agreement, to conditions established in accordance with chapter 6. Where the person with the right of access and the Tłı̨chǫ Government do not reach agreement on conditions for the exercise of that right of access, the person with the right of access may refer the dispute for resolution in accordance with chapter 6, but may not exercise it until the dispute has been resolved."*

Fortune's interpretation of clause 19.3.3 is that it has a right of access to its minerals claims but the conditions under which that access is exercised is subject to negotiations with the Tłı̨chǫ government.

Although it is not a 'legal requirement' or 'authorization' *per se*, Fortune is aware of clause 23.4.1 of the Tłı̨chǫ Government in relation to major mining projects which states:

> *"Government shall ensure that the proponent of a major mining project that requires any authorization from government and that will impact on Tłı̨chǫ Citizens is required to enter into negotiations with the Tłı̨chǫ Government for the purpose of concluding an agreement relating to the project."*

The "agreement" referred to in clause 23.4.1 would be a participation agreement that would be negotiated between Fortune and the Tłı̨chǫ Government. Fortune has recently renewed its willingness to initiate these discussions with the Kwe Beh working group.

Response 1.2

No progress has been made in the negotiation of an access agreement with the Tłı̨chǫ Government. Fortune's efforts to engage the Tłı̨chǫ Government in negotiations for an access agreement were initiated on 19 September 2007 (see attached consultation logs from 2009 water license application). Since that time,

several attempts have been made to initiate these negotiations (see consultations logs). The position of the Tłı̨chǫ Government has been that negotiations concerning an access agreement with Fortune cannot be initiated until the moratorium on land use development has been lifted. This moratorium has been extended until 2013.

ATTACHMENT A

Consultation Logs from 2009 Water License Application

(please refer to supporting documents)

INFORMATION REQUEST – TG_2

Source: Tłı̨chǫ Government (TG)

Request

Timing of Construction of the Proposed Development

2.1) Please clarify; would Fortune begin construction of the NICO project if only the Seasonal Overland Road has been firmly committed to by the GNWT?

Response

No. The NICO Project requires an all-weather road for operations.

INFORMATION REQUEST – TG_3

Source: Tłı̨chǫ Government (TG)

Request

Scope of Development, including required accessory developments

3.1) Given the scope of development (aka the proposed Project) defined by the Review Board includes the NPAR, and the NPAR is largely if not wholly on Tłı̨chǫ Lands, please clarify the statement from section 5.1.2.1.

3.2) Please provide a map indicating land ownership status for the entire area encompassed by the scope of development, with an emphasis on the NPAR and mine site areas. Currently Figures 5.1-1 and 5.1-2 do not show this in enough detail.

3.3) Please discuss which parties have responsibilities for managing which lands in the area potentially affected by the proposed development, with reference to the above requested map.

Response

Response 3.1

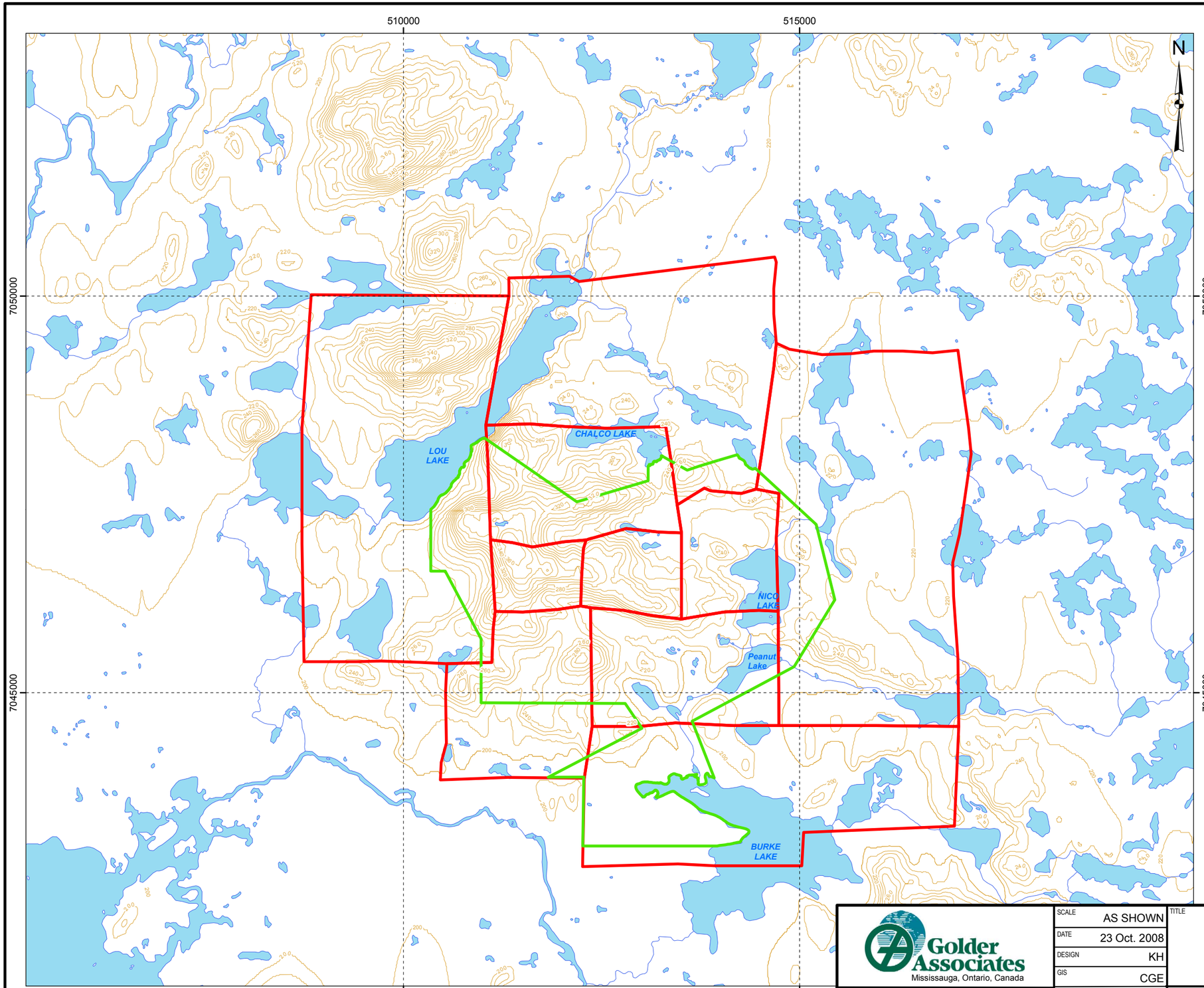
Fortune Minerals Limited (Fortune) assumes that the statement in question from Section 5.1.2.1 is "The NICO Project is located in the Wek'èezhìi Settlement Area of the NWT, and is surrounded by, but not on, Tłı̨chǫ lands (Figure 5.1-1). The Fortune mine claims are located on land that has been excluded from Tłı̨chǫ lands." For the purposes of clarity, the statement can be re-worded to read "The NICO mine and part of the NPAR are located in the Wek'èezhìi Settlement Area of the NWT, and is surrounded by, but not on, Tłı̨chǫ lands."

Response 3.2

The precise location of the NICO claim boundaries were provided in Figure 10 of Fortune's water license application in January 2009 (see attached). The NICO mine and part of the NICO Project Access Road (NPAR) are within the boundary of the mine claims. Outside of the mine claim boundary, the NPAR is on Tłı̨chǫ fee simple lands.

Response 3.3

Fortune assumes that management of lands outside of its mine claims boundary would be the responsibility of the Tłı̨chǫ Government.



LEGEND:

- CONTOURS - *10 METRES*
- LANDUSE (LEASE) BOUNDARY
- CLAIM BOUNDARY
- OPEN WATER

NOTES:

1. PROJECTION: TRANSVERSE MERCATOR DATUM: NAD 27 COORDINATE SYSTEM: UTM ZONE 11

REFERENCES:

1. BASE MAP - NTDB TOPOGRAPHIC DATA, 1:250,000 (085N) AND FORTUNE (FEBRUARY 20, 2004)
2. LANDUSE (LEASE) BOUNDARY PROVIDED BY FORTUNE (OCTOBER 8, 2008)

0 0.5 1 2 3

SCALE 1:50,000 KILOMETRES

Golder Associates
Mississauga, Ontario, Canada

FILE No.	G:\Projects\2008\08-1118-0043_Nico_Fortune_Minerals\GIS\MXDs\Draft\October2008Report\Fig10_ClaimBoundaries_rev5.mxd
PROJECT No.	08-1118-0043
REV.	0
SCALE	AS SHOWN
DATE	23 Oct. 2008
DESIGN	KH
GIS	CGE
CHECK	MR
REVIEW	DW

TITLE

NICO CLAIM BOUNDARIES

NICO PROJECT
FORTUNE MINERALS LIMITED

FIGURE 10

INFORMATION REQUEST – TG_4

Source: Tłı̨chǫ Government (TG)

Request

Fortune's New Proposal to Use the Whati Airstrip as it's Main Fly-in Transportation Hub

4.1) Did Fortune notify the Tłı̨chǫ Government or the community government of Whati ahead of its September 30, 2011 submission to the Review Board, about its intentions to make the Whati airport its main air transportation hub? If the answer for either party is no, please identify what rationale was used to not consult with these groups in advance.

4.2) How much is the demand on the Whati airport expected to increase as a result of it becoming the main air transport hub for the proposed development?

4.3) Please describe all physical improvements and staffing requirements the Whati Airport will require if it becomes the main air transport hub for the proposed development, and list any additional permits, authorizations or license required by the Airport or any other party in order to facilitate these improvements.

4.4) Please identify how and when Fortune will seek information about the potential adverse and beneficial impacts of any required expansion of the capacity and use of the Whati Airport, including but not limited to:

4.4.1) Increased flow of transient (i.e., mineworker) populations through the community of Whati itself;

4.4.2) Impacts on public safety of increased air traffic near the community;

4.4.3) Increased aural and visible disturbance within the community from increased air traffic; and

4.4.4) Potential for increased disturbance of wildlife that resides near the community or travels nearby during annual migrations.

4.5) Please list all further studies the developer will be conducting on the potential for impacts from this new development component prior to the end of the environmental assessment, and:

4.5.1) Identify the proposed timelines for these assessments; and

4.5.2) When and how the developer plans to start including the Tłı̨chǫ Government and the community of Whati in the assessment of this proposed change to the development.

4.6) Please clarify with maps and estimated hectares whether and how the removal of the NICO airstrip and terminal reduces the local study area and direct footprint of the proposed development.

Response

Response 4.1

No. Before making a final decision on the fate of the airstrip for the NICO Project, Fortune Minerals Limited (Fortune) first needed to know if use of the airstrip at Whatì was possible. The Government of the Northwest

Territories (GNWT) Department of Transportation owns and operates the public airport at Whatì. Fortune representatives had an informal discussion with staff from the GNWT Department of Transportation (DOT) on 28 September 2011 to discuss Fortune's potential use of the Whatì airport and the possibility of Fortune's development of a lease site at the Whatì airport. Fortune was advised that the planning process for a proponent interested in developments on airport lands would start with contacting on the GNWT DOT Airport Division's Commercial Development officers to discuss land needs, land availability, and the lease application process (see GNWT DOT information request response to the Tłįchǫ Government dated 10 November 2011).

Now that Fortune has decided to reduce its footprint and environmental impact by using the existing Whatì airport in lieu developing and airstrip at the mine site, Fortune will invite the Tłįchǫ government and the community government of Whatì to participate in the discussions. This will have a positive result but increasing the serviceability at the Whatì airport by construction a multi-purpose facility that can be used by all users of the Whatì airport to load, unload and hanger aircraft, as well as facilitate the movement of Tłįchǫ workers to the community for job opportunities. The facility shall be equipped with the equipment required to support the movement of cargo, such as lift equipment, making it a useful addition to the property creating local employment to support and manage the operation. The proposed operation will be a support to Fortune's activities and only a secondary option to the movement of cargo or staff. The main mode of transportation will always be the all-weather road. Through joint discussions with the transportation authorities, this will be considered a welcome addition to the airport services and require basic and standard leasing arrangements with the airport authority to provide space for the proposed structure.

Response 4.2

The airport at Whatì will not be the main transportation hub for the NICO Project. The vast majority of supplies and staff will be mobilized on the all-weather road. The airport at Whatì will only be used for emergencies and for the transportation of workers in remote location such as Wekweètì. Fortune anticipates that its use of the Whatì airport will results in a maximum of four flights per week using small aircraft.

Response 4.3

See responses to items 4.1 and 4.2.

Response 4.4.1

That information is already under consideration. It is Fortune's intention to keep transient workers at the airstrip, and not into the community, for as short a duration as possible. Community accommodation business owners will be advised and assisted where possible to make provision for guest and worker layovers in cases of adverse weather.

Response 4.4.2

Public safety will be under the control of the airport operator.

Response 4.4.3

The aural and visual disturbance corridor at the Whatì airport is well established, as this airport has been in operation for a considerable length of time. Fortune believes that a small increase in air traffic at the Whatì public airport is preferable to aircraft flying over Hislop Lake, a know site of cultural importance to the Tłįchǫ people.

Response 4.4.4

Potential impacts to wildlife due to the operation of the airstrip at the NICO site were assessed in the Developer's Assessment Report (DAR). Fortune expects that potential impacts to wildlife at the public airstrip in Whatì will be equal and most likely less than those predicted for the NICO site which would have seen

construction and operation of an airstrip in a previously remote location. For wildlife, the disturbance corridor at the Whatì airport is well established as this airport has been in operation for a considerable length of time.

Response 4.5 and 4.5.1

As stated in response 4.1, the multi-purpose facility will be constructed within the airport lands. There will be no additional ground disturbance due to this facility. Consequently, no additional studies are required.

Response 4.5.2

As stated in response 4.1, Fortune will invite the Tłįchǫ Government and the community government of Whatì to participate in discussions with the GNWT DOT concerning expansion of facilities at the Whatì airport. The exact timeline for these discussions is not known at this time.

Response 4.6

The removal of the airstrip for the NICO Project will result in an 11 hectare reduction in the NICO Project footprint. Figure 3.2-1 in Section 3 of the DAR, shows the location of the former airstrip. The remainder of the NICO Project footprint will be the same as shown but without the airstrip.

INFORMATION REQUEST – TG_5

Source: Tłı̨chǫ Government (TG)

Request

The Location and Assessment of the Project NPAR

5.1) How many hectares will the NPAR and its right-of-way clearing require?

5.2) Please provide an estimate of the total costs that the developer anticipates bearing in order to upgrade the NPAR to the level that is needed to operate a mine, and maintain it until it is no longer required for the mining operation.

5.3) Please provide a map indicating the full range of possible "starting points" for the NPAR in terms of distance from the mine site.

5.4) Does Fortune require authorizations from the Tłı̨chǫ Government prior to being allowed to proceed with the development of the NPAR? To Fortune's knowledge, what information does the Tłı̨chǫ Government require prior to issuing any such authorization?

5.5) Please detail progress to date in gaining any required access agreements with the Tłı̨chǫ Government for development and use of the NPAR.

5.6) Has Fortune sought Tłı̨chǫ Government input in the identification of the best routing options for the NPAR? Please identify in detail all these opportunities for Tłı̨chǫ input.

5.7) Is Fortune open to alternative routing alignments for NPAR? What criteria did Fortune use in determining the currently proposed NPAR alignment?

Response

Response 5.1

Fortune Minerals Limited (Fortune) estimates the NICO Project Access Road (NPAR) and its right-of-way will cover 40 to 50 hectares. The exact number will be known once the final routing has been approved by the Tłı̨chǫ Government.

Response 5.2

Fortune estimates it will cost $2M to build the NPAR. It would be built as an all-weather road from the start. Fortune estimates it will cost $30K to maintain the NPAR on a yearly basis, exclusive of snow removal.

Response 5.3

Only one starting point for the NPAR was considered. It is shown in Figure 3.2-2, in Section 3 of the Developer's Assessment Report (DAR).

Response 5.4

Please refer to Information Request response TG_1 for the answer to the first question. Fortune is confident the DAR provides the Tłı̨chǫ Government with the necessary information for issuance of the access agreement.

Response 5.5

See Information Request response TG_1.

Response 5.6

On 6 August 2009, Fortune sent the Tłı̨chǫ Government a series of maps detailing the proposed route for the Government of the Northwest Territories Department of Transportation (GNWT DOT) proposed all-land winter road and the NPAR with the goal of initiating discussions on possible alternatives available. These maps were also provided to the Mackenzie Valley Review Board. No response has been received by Fortune to the submission of these maps. Details on Fortune attempts to engage the Tłı̨chǫ Government on this and other topics are presented in Appendix 4.I of the DAR.

Response 5.7

The original offer to discuss potential alternatives to the route proposed for the NPAR still stands. The overall design criteria for the NPAR is to keep it as straight and short as possible to minimize ground disturbance. Given the location of the proposed GNWT DOT road, the location of the proposed mine site, and the 3 large lakes (Tumi, Rabbit, and Hislop) between these 2 locations and the variable physical features of the Marian River, alternatives routes for the NPAR would likely entail a much longer road with considerably greater ground disturbance. Fortune is open to suggestions on minor routing changes for the proposed NPAR.

INFORMATION REQUEST – TG_6

Source: Tłı̨chǫ Government (TG)

Request

Proposed Marian River Bridge

6.1) Were Tłı̨chǫ citizens or the Tłı̨chǫ Government consulted in the determination of the location, type, structure, visibility and/or impacts of the building of a permanent structure bridge over the Marian River?

6.2) Has there been any on-territory mapping or other fieldwork with traditional knowledge holders about the proposed site for building this bridge?

6.3) Please provide details on what alternative locations and bridge construction types have been considered for the Marian River crossing, and what criteria were used to decide the preferred option, with discussion of the pros and cons of the different alternatives.

6.4) Will the bridge affect navigability?

6.5) Will the bridge affect fish and aquatic habitat?

6.5.1) If so, what are the developer's plans for compensation for potential habitat loss?

Response

Response 6.1

The location, type, and potential impacts of the bridge over the Marian River was presented in all Tłı̨chǫ communities during the Developer's Assessment Report (DAR) scoping sessions and during the NICO site visits (see Appendix 4.I of the DAR for dates and details). On 12 August 2010, Fortune Minerals Limited (Fortune) participated in a road workshop in Whatì in the presence of the Tłı̨chǫ Government. Details on the NICO Project Access Road (NPAR) and bridge were given at that time. No comments on the bridge have been received to this date.

Response 6.2

No. Fortune is expecting the bridge location to be covered by the traditional knowledge study it has funded, being completed by the Tłı̨chǫ Government.

Response 6.3

The specific location for the bridge was determined using the following criteria:

- The location had to be in line with the proposed route for the NPAR;
- The location had to be narrow enough to allow for the construction of a span bridge that would not affect fish habitat in the Marian River;
- The location had to have bedrock on both banks to allow for the span bridge construction; and

- The bank bedrock had to be high enough off the high water mark so that the bridge would not affect navigation.

Given this list of criteria, there were very few alternative sites available other than the one chosen.

Response 6.4

No.

Response 6.5

No. The bridge will span the Marian River and not affect fish habitat.

Response 6.5.1

Habitat compensation will not be required.

INFORMATION REQUEST – TG_7

Source: Tłı̨chǫ Government (TG)

Request

Locations of, and Potential Impacts of, Proposed Borrow Sources

7.1) One concern about borrow sites is always the potential for damage to cultural heritage resources, physical or otherwise. What steps would the developer take to assess the potential for these type of effects at each borrow site, and who would be involved?

7.2) When is consultation on the issue of actual locations of borrow sites planned with the Tłı̨chǫ Government? What sort of information about proposed sites will be provided for Tłı̨chǫ Government consideration?

Response

Response 7.1

If requested, Fortune Minerals Limited (Fortune) would complete a heritage resource survey on proposed borrow sources with the assistance of the Tłı̨chǫ, as it did for the Developer's Assessment Report baseline studies.

Response 7.2

Consultation on the issues of actual borrow site locations will occur prior to construction, once approvals for the NICO Project have been received. Fortune will provide the location of the proposed borrow sites and the estimated amount of material that will be removed from each site.

INFORMATION REQUEST – TG_8

Source: Tłı̨chǫ Government (TG)

Request

Avoidance/Alienation of Tłı̨chǫ Citizens from the Tłı̨chǫ Land Base and Risk Communication

8.1) Were any questions asked during the Golder/Fortune TK Study about areas harvesters currently avoid due to "perceived" contamination or other environmental risks?

8.1.1) If yes, what areas were identified and what risks raised?

8.2) What efforts has the developer made to communicate about historic, current, and potential future contamination and other environmental risks associated with the local and regional study area?

8.3) What commitments does or has the developer made to ensure that Tłı̨chǫ citizens have access to accurate, credible, and comprehensive information about the absolute and relative health risks of continuing the Dene mode of life in the local and regional study area?

Responses

Response 8.1

During the Traditional Knowledge studies, interview participants were provided an opportunity to identify any issues or concerns they had about the proposed NICO Project, as well as any perceived effects of existing developments on their traditional activities.

Response 8..1.1

Section 5.3.1 of the Developer's Assessment Report (DAR) indicates that interview participants had perceived there were problems with previous mining projects. Section 5.3.2.6 indicates that the Tłı̨chǫ generally believe the former Rayrock Mine may have damaged the land, possibly causing animals and several Tłı̨chǫ who worked in or near the mine to become ill. Elders also reported fears about possible changes in the animals, or contamination as a result of mine areas, such as the former Colomac Mine site outside the regional study area, or the former Rayrock Mine. Elders questioned if any of the animals hunted around the proposed NICO Project would be safe to eat.

Section 5.3.3.4 indicates that interview participants from Whatì and Gamètì expressed concern about perceived contamination from the site of the old Rayrock Mine, and its effects on fish and water quality. Whatì Elders said that fish from the Behchokǫ̀ area were soft and affected by drainage from the former Rayrock Mine. They added that they have noticed dead fish in the rivers downstream from the site. Similarly, Gamètì interview participants reported that they take water upstream from the site of the old Rayrock Mine because the downstream water quality is suspect. Gamètì participants added that many people do not fish near mine areas now since they have concerns about mine pollution.

Section 5.3.3.4 of the DAR also listed the following water-related concerns raised by Elders:

- water in the Gamètì area is not good;

- mining may negatively affect healthy fish in locations, such as Lou Lake; and
- mercury has been found in the trout from Rae Lakes.

In addition to the above concerns, one interview participant provided contradictory evidence. He reported that people are not able to drink the water in the area of the NICO Project, but further reported that fishing is good in the area around the NICO Project.

Gamètì Elders also questioned if it will be possible to continue fishing along the Marian River if the NICO Project is developed as planned.

Response 8.2

As discussed in Section 7.7.3 of the DAR, an aquatic risk assessment was completed for the NICO Project to determine the potential impacts on aquatic life (including aquatic plants, plankton, benthic invertebrates, and fish) from NICO Project-related discharges to surface waterbodies. Overall, for all water quality parameters and all phases of the NICO Project, the NICO Project-related risks to aquatic life are considered to be either negligible, or low and likely negligible. Negligible risk indicates that there is unlikely to be adverse health impacts to aquatic life as a result of the NICO Project. Low and likely negligible risk indicates a possibility of adverse health impacts to the most sensitive aquatic species.

Of the reasonably foreseeable projects identified in the DAR, none are expected to result in changes to water quality in the NICO Project local study area or regional study area. Particular concern has been expressed by the Tłı̨chǫ Government, Tłı̨chǫ citizens, and in the TOR (MVRB 2009) with respect to the potential cumulative effects due to the Rayrock and Colomac mines. However, given that impacts to aquatic health from the NICO Project are considered negligible downstream of Burke Lake and the former Rayrock mine site is located at least 15 km downstream of Burke Lake, the cumulative effects on aquatic life are considered negligible. The former Colomac mine is located 120 km to the northeast in another drainage system, which eliminates the potential for a cumulative effect with the NICO Project.

Similarly, Section 15.3.2.1 of the DAR indicates a wildlife health risk assessment was completed to evaluate the potential adverse effect to individual animal health associated with exposure to chemicals from the NICO Project. Based on the calculated exposure ratios it is anticipated that atmospheric depositions and surface water discharges from the NICO Project will result in negligible health risks to wildlife. A copy of the wildlife health risk assessment is provided in response to Environment Canada IR 3 (EC_3).

Response 8.3

Fortune was not in a position to have detailed discussions on absolute or relative health risks of the NICO Project until the DAR was complete. Now that the DAR has been submitted, Fortune would welcome the opportunity to present its findings on risk to the Tłı̨chǫ people. Initial discussions have already taken place that would see Fortune join with the Kwe Beh working group on a tour of the communities to present the findings of the DAR which would include a section on risk. Beyond these community tours, Fortune will make company representatives available to discuss risk issues at the request of the Tłı̨chǫ Government or Tłı̨chǫ communities.

References

MVRB (Mackenzie Valley Review Board). 2009. Terms of Reference for the Environmental Assessment of the Fortune Minerals Ltd. NICO Cobalt-Gold-Bismuth-Copper Project. EA 0809-04.

INFORMATION REQUEST – TG_9

Source: Tłı̨chǫ Government (TG)

Request

Unimpeded Access to Land for Tłı̨chǫ Citizens

9.1) Please identify what objects Fortune feels are most likely to be targeted by would-be thieves, and why there is such a concern about loss-prevention at this development.

9.2) Please define “authorized persons” or the reverse “unauthorized persons” as it is used in the above statement.

9.3) What allowances will the mine make for Tłı̨chǫ elders, harvesters and travellers who are making their way through their traditional territory, if any? How will safe passage in or around the area be accommodated?

9.4) As proposed, the security system and infrastructure being set up appears designed to create an industrial bubble which may also have an associated avoidance zone for Tłı̨chǫ harvesters. Does the developer have any predictions about how large this “avoidance zone” might be, based on dialogue with Tłı̨chǫ citizens, the Tłı̨chǫ Government, or any case studies?

9.5) The Security Policy seems very strongly worded, and could impact on elders, or harvesters or family feeling comfortable coming to site. It may be useful to have the policy reviewed with the NWT Human Rights Commission (HRC)? If this is done, please provide the comments to the public record of the discussion with the HRC.

Response

Response 9.1

The concern is not about loss-prevention but the security and safety of people in the area.

Response 9.2

Authorized persons are those persons who have had the training and knowledge to understand the risks associated with proximity to open pit mine workings and have permission from the mine to be within that potentially hazardous area.

Response 9.3

Tłı̨chǫ citizens wishing to come close to the mine site will be given direction on what areas to avoid. With a description of these restricted areas, a safe travel option can be developed.

Response 9.4

A safety buffer from the mine site will be developed and communicated to the Tłı̨chǫ Government or any Tłı̨chǫ citizens that wish to access the property. The exact dimensions of this safety zone will be known once the final configuration of the mine site has been determined.

Response 9.5

Fortune Minerals Limited will have areas of the mine site that will be inaccessible to the general public for health and safety reasons. The security policy will be in place to ensure their protection.

INFORMATION REQUEST – TG_10

Source: Tłı̨chǫ Government (TG)

Request

Wildlife Harvesting and Access Management

10.1) Please identify all policies, plans and commitments Fortune has for the development, implementation and funding of an access management program which specifically addresses use of the NPAR and Proposed Tłı̨chǫ Road Route by wildlife harvesters.

10.2) Please identify all of the developer's commitments for monitoring and managing use of the roads by wildlife harvesters throughout the lifetime of the project.

10.3) Please identify all relevant sources (and/or assumptions) used to estimate current levels of harvesting in the potentially affected area.

10.4) Please identify how the developer's access management plan will incorporate local and traditional knowledge, including about land use patterns.

10.5) Please identify what parties the developer will work with or is working with in the development and implementation of the access management program.

Response

Response 10.1

The Tłı̨chǫ Government requested all policies, plans, and commitments for access management on the NICO Project Access Road (NPAR). Unfortunately, Fortune Minerals Limited (Fortune) will have no jurisdiction or authority to manage access. This jurisdiction lies with the Wek'èezhii Renewable Resources Board, the Tłı̨chǫ Government, and the Government of the Northwest Territories (GNWT). As stated in the Developer's Assessment Report (DAR), should harvesting on the proposed Tłı̨chǫ Road Route and NPAR reach a level of concern, the Tłı̨chǫ Government or the Wek'èezhii Renewable Resources Board could enact regulations to control the harvest. For example, a no-hunting corridor could be implemented, similar to that currently in place for the Ingraham Trail.

Fortune contends that that there already exists good access for harvesters through waterways, lakes, and existing roads, winter roads, and trails, accessed by aircraft, power boat, and snowmachine. Traditional land use studies (DAR Annex B) indicated that most of the study area is already used for hunting, trapping, fishing, and travel.

Fortune has never been approached about developing an access management program. Presumably, consideration of such an agreement would be part of the negotiations for an access agreement with the Tłı̨chǫ Government. Fortune would encourage the Tłı̨chǫ Government to engage in these negotiations with Fortune so that the issues listed in the information request can be discussed.

Response 10.2

Fortune proposed in the DAR to enforce a “no hunting, trapping, harvesting, or fishing” policy at the proposed mine site, and to prohibit the use of recreational all-terrain vehicles at the mine. This is the limit of Fortune’s jurisdiction with regards to monitoring and managing harvesting activity. Fortune’s position is based on clause 12.1.2 of the Tłı̨chǫ Agreement which reads: “A board to be known as the Wek’èezhìi Renewable Resources Board is hereby established, as an institution of public government, to perform the functions of wildlife management set out in the Agreement, in Wek’èezhìi. The Board shall act in the public interest.” Fortune’s interpretation of this clause is that management of wildlife harvesters on Tłı̨chǫ Lands should fall under the direction of the Wek’èezhii Renewable Resources Board. However, Fortune commits to assisting communities with monitoring use of the proposed Tłı̨chǫ Road Route and NPAR, if requested to do so by the Tłı̨chǫ Government.

Response 10.3

There is little or no direct monitoring of wildlife harvesting in the wildlife regional study area, nor are General Hunting Licence holders required to report their harvest. The available information presented in the DAR was obtained from a variety of sources, primarily from the GNWT. Much of the harvest information can only be ascribed to a community or hunting zone; particulars of the exact location are not available. The available information on harvesting is presented in the DAR, in particular see Sections 8.3.2.3, 15.2.2, and 15.2.5. Information on harvesting activities (but not harvesting levels) are presented in the Traditional Land Use Baseline (DAR Annex B).

Response 10.4

As mentioned above, there are no proposed plans by Fortune to develop an access management plan. Fortune will work with the Tłı̨chǫ Government and the Kwe Beh working group to incorporate local and traditional knowledge into monitoring plans once the Tłı̨chǫ traditional knowledge study has been completed.

Response 10.5

An access management plan would presumably be developed and implemented cooperatively between the Tłı̨chǫ Government, the Wek’èezhii Renewable Resources Board, the GNWT, and affected communities. Fortune would cooperate with any such plan implemented.

INFORMATION REQUEST – TG_11

Source: Tłı̨chǫ Government (TG)

Request

Measurable Endpoints for Caribou

11.1) Given the current context of a low and rapidly declining herd, please provide a re-evaluation of the potential impact of mine development, operation, and closure of the NICO Mine, on the potential for recovery of the Bathurst herd and associated harvest levels.

11.2) Please identify how the developer will include the Tłı̨chǫ Government in any re-evaluation of the potential impacts of the mine on barrenground caribou

Response

Response 11.1

The effects of the NICO Project are assessed not in the context of the current low caribou population; they are assessed in the context of a population that undergoes natural cycles over decades. The assessment considers both the low and high phases of the caribou cycle.

The importance of caribou to the Tłı̨chǫ is recognized, as is the effect of harvest reductions to their way of life. The impacts of this reduction to traditional and cultural use and economies are recognized. Fortune Minerals Limited (Fortune) is cognizant of these issues, and intends to proceed in the most respectful manner considering the sacrifices the Tłı̨chǫ and Yellowknives have made.

The available information suggests that harvesting may have accelerated the recent decline of the Bathurst herd: there is no level of calf recruitment that can compensate for current estimated cow survival rates (Adamczewski et al. 2009, Boulanger et al. 2011). While mining activity in the Bathurst range has likely caused some displacement and disturbance to caribou, the effects from development are not predicted to significantly influence caribou populations. In the Developer's Assessment Report (DAR), most of the incremental and cumulative impacts from development were predicted to be negligible to low in magnitude, and reversible. According to Adamczewski et al. (2009), the impact of the mines to caribou is unlikely a major contributing factor in the decline of the Bathurst caribou herd, relative to other environmental variables.

The current level of development within the caribou study area is very low, and is unlikely to constrain caribou population growth. Table 8.5-1 of the DAR indicates that there are approximately 155 historic and existing developments within the study area. Of these, 50 are contaminated sites (few of which have any activity associated with them), 35 are mineral exploration camps (of which only six had active permits in 2010) with only seasonal and irregular activity, and 28 are campgrounds or tourism lodges with very little activity in winter. Habitat-specific incremental changes from the NICO Project footprint were less than 0.1% of the study area. The cumulative direct disturbance to the study area from the NICO Project and other previous, existing, and future developments is predicted to be less than 0.5% relative to reference (no development) conditions (negligible magnitude effects). The application of the NICO Project is expected to decrease good and high quality habitat by 0.4% relative to 2010 baseline conditions. The habitat suitability modelling presented in the DAR indicates a

decrease by only 6.1% of preferred habitats in the study area in the future scenario (i.e., including all development, the NICO Project, the Taltson Project, and the Tłı̨chǫ Road), when considering a zone of influence around each development and other conservative assumptions. This constitutes an effect of low magnitude (i.e., 1 to 10% change).

Caribou herds fluctuate naturally, and this cycle has been documented for barren-ground herds (for examples, see Messier et al. 1988, Bergerud et al. 2008; Vors and Boyce 2009; Tyler 2010). This has also been documented for the Bathurst herd through several sources, including traditional knowledge (Dogrib Treaty 11 Council 2001), population counts (Figure 8.3-3, in the DAR), the historical record (Sandlos 2007), and from scars on black spruce roots (Zalatan et al. 2006). This is the natural range of baseline conditions for any development within the range of the Bathurst herd. The analysis and assessment in the DAR provides ecologically relevant and confident impact predictions that are applicable to all phases of the population cycle.

Response 11.2

The impacts presented in the DAR do not need to be re-evaluated for caribou as shown above. Fortune has provided a Conceptual Wildlife Effects Monitoring Program (Appendix 18.II of the DAR), that includes continued monitoring of caribou throughout the construction, operation, and closure phases of the NICO Project. Fortune will engage the Tłı̨chǫ Government in discussions on their involvement in the monitoring of caribou in the region of the NICO Project. Annual reports from this monitoring will be made available to the Tłı̨chǫ Government for review and discussion.

References

Adamczewski, J., J. Boulanger, B. Croft, D. Cluff, B. Elkin, J. Nishi, A. Kelly, A. D'Hont, and C. Nicholson. 2009. Decline in the Bathurst caribou herd 2006-2009: a technical evaluation of field data and modelling (DRAFT). Technical Report. Yellowknife, NWT. 105 p.

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Bergerud, A.T., S.N. Luttich, and L. Camps. 2008. The return of caribou to Ungava. McGill-Queen's University Press, Montreal, QC.

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Sandlos, J. 2007. Hunters at the Margin. Native People and Wildlife Conservation in the Northwest Territories. UBC Press, Vancouver, BC.

Vors, L.S., and M.S. Boyce. 2009. Global declines of caribou and reindeer. Global Change Biology. doi: 10.1111/j.1365-2486.2009.01974.

Zalatan, R., A. Gunn and G.H.R. Henry. 2006. Long-term abundance patterns of barren-ground caribou using trampling scars on roots of *Picea mariana* in the Northwest Territories, Canada. Arctic, Antarctic and Alpine Research, 38: 624-630.

INFORMATION REQUEST – TG_12

Source: Tłı̨chǫ Government (TG)

Request

Boreal Caribou

12.1) Please reconsider the dismissal of boreal caribou in the DAR, and provide an overview of potential impacts and associated mitigation strategies the developer proposes to undertake with respect to boreal caribou if encountered in the vicinity of the NICO mine.

12.2) Given the lack of scientific information on woodland caribou provided in the DAR, what additional scientific studies need to be completed to ensure Fortune is aware of the possible presence of and impacts on this species at risk?

Response

Response 12.1

It is likely that woodland caribou are present in the study area, but infrequently and in low densities. The most direct means of identifying woodland caribou would be to observe caribou in the summer or early fall, when barren-ground caribou are not normally present. Difficulties in detecting woodland caribou are compounded by the presence of barren-ground caribou in the study area during winter.

Wildlife baseline studies in the Mine and NICO Project Access Road (NPAR) study areas have been ongoing since 2004. This included many aerial and ground surveys in the summer and fall. During these surveys, no evidence of woodland caribou was observed. Woodland caribou tend to be dispersed and in low densities, making them difficult to detect and monitor. John Mantla (Behchokǫ̀, 2003, pers comm.), Pierre Beaverho (Whatì, 2011, pers comm.), Jimmy Nitsiza (Whatì, 2011, pers comm.), and Jimmy B. Rabesca (Whatì, 2011, pers comm.) indicated that they knew of no traditional hunting of woodland caribou in the area, and believed that they were not commonly present in the study area. Traditional knowledge indicates that woodland caribou tend to be more common to the west of the regional study area, beyond the community of Whatì (Dogrib Treaty 11 Council 2001).

It is anticipated that the NICO Project will likely alter the behaviour and movement of a few woodland caribou; however, because of the low frequency of presence and the low number of individuals influenced, the NICO Project is predicted to have a negligible effect on the population size and distribution of the herd.

Response 12.2

All mitigation to reduce effects to caribou will be equally effective for woodland and barren-ground caribou. Increased woodland caribou abundance in the study area will be detected by continual environmental monitoring; observations of caribou during the summer and early fall will be assumed to be woodland caribou. Should this occur, the observations will be reported and adaptive management may be implemented through the Environmental Management System.

References

Beaverho, P. 2011. Whatì, Northwest Territories. Personal Communication. Communicated to Charlie Jim Natsiza of Fortune Minerals Limited. November, 2011.

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Rabesca, J.B. 2011. Whatì, Northwest Territories. Personal Communication. Communicated to Charlie Jim Natsiza of Fortune Minerals Limited. November, 2011.

INFORMATION REQUEST – TG_13

Source: Tłı̨chǫ Government (TG)

Request

Cumulative Effects for Bathurst Caribou

Please re-evaluate the cumulative effect of the NICO Mine at the annual range scale of the Bathurst herd, rather than a geographic scope that is focused on just the winter range distribution in the Northwest Territories

Response

It was appropriate to assess the incremental and cumulative effects of the NICO Project within the Bathurst caribou herd winter range, and there is no value to re-assessing effects within the annual range. In fact, to do so would reduce the relative contribution of the NICO Project to overall effects.

The 211 821 square kilometre caribou study area is not unsubstantial; it represents approximately 2% of the land mass of Canada, and is almost as large as the United Kingdom. Although a larger study area could have been used, there are many reasons why the study area of the Bathurst herd winter range south of the treeline was the most appropriate scale of analysis.

1) It is appropriate to establish geographic boundaries on the area of effects assessment (i.e., effects study area). For example, the assessment of effects to raptors, waterbirds, and upland birds does not include the full migration range, which extends to Central and South America. The use of seasonal ranges to assess effects to Bathurst caribou is the same approach used in the environmental assessments for the Gahcho Kue and Taltson projects, and considers the overlap of each seasonal range with a project. The NICO Project primarily overlaps the winter range of the Bathurst herd, and has less or no influence on the northern migration, calving, post-calving, summer, and autumn ranges. Therefore, assessing the incremental and cumulative changes from the NICO Project to Bathurst caribou in the winter range is the most conservative approach for not underestimating effects.

2) The impacts from a development diminish with distance. As the study area is increased, the relative effects of a particular development become diluted. The scale of assessment therefore has implications to the assessment conclusions (see Section 6.3.1 of the Developer's Assessment Report [DAR] for a discussion of how spatial scales were selected for the effects assessment). A larger study area would reduce the incremental effects of the NICO Project.

3) Caribou habitat selection differs in boreal and tundra environments. Part of the analysis focuses on how caribou habitat selection and habitat quality may be changed by the NICO Project. Habitat selection in a tundra setting will not be affected by the NICO Project. Resource selection functions were only available for Bathurst caribou in the tundra environment (see Johnson et al. 2004), so it was necessary to develop an resource selection functions for Bathurst caribou in the boreal environment for the purposes of this analysis (see Appendix 8.II of the DAR).

4) Caribou behaviour likely varies between summer and winter, due to factors such as a forested rather than open tundra environment, the presence of deep snow, diet, predation risk, and calves becoming independent. For example, movement rates are substantially lower in winter than other seasons (Gunn et al. 2002). Limiting the study area to a boreal region allows a more precise estimation of the effects of the NICO Project on caribou, in the environment and season when they may encounter the NICO Project.

5) The caribou study area included approximately 155 developments, including winter roads, all-season roads, transmission lines, hydro plants, decommissioned mines, and 7 communities. The overall level of development was comparable to other parts of the Bathurst caribou range, but the developments are of a different character than the developments found within the Bathurst range north of the treeline where there are operating mines, few all-season roads, caribou hunting camps, and no communities.

6) The caribou study area contains the core areas of the Bathurst winter range (i.e., the 95% fixed kernel home range) (see also core areas identified in Figure 3.2 in Adamczewski et al. 2009). In addition, and 89% of collar locations in winter were in boreal areas (Appendix 8.II of the DAR), indicating that the study area is an ecologically relevant representation of the area used by Bathurst caribou during the winter season.

Limiting the study area to a boreal region allows a more precise estimation of the effects of the NICO Project to caribou, in the environment and season when they may encounter the NICO Project. In this way, the assessment could consider the particular developments caribou are exposed to during the winter and the effects of these developments in a boreal environment, the unique habitat selection, and snow and ice conditions. Expanding the study area would tend to reduce the relative contribution of the NICO Project to the effects, and would add uncertainty to the assessment. The use of this study area is therefore ecologically relevant and provides confident impact predictions.

References

Adamczewski, J., J. Boulanger, B. Croft, D. Cluff, B. Elkin, J. Nishi, A. Kelly, A. D'Hont, and C. Nicholson. 2009. Decline in the Bathurst caribou herd 2006-2009: a technical evaluation of field data and modelling (DRAFT). Technical Report. Yellowknife, NWT. 105 p.

Gunn, A., J. Dragon, and J. Boulanger. 2002. Seasonal movements of satellite-collared caribou from the Bathurst Herd. Final Report to the West Kitikmeot Slave Study Society. 72 p + figures.

Johnson, C.J., M.S. Boyce, R. Mulders, A. Gunn, R.J. Gau, H.D. Cluff, and R.L. Case. 2004. Quantifying patch distribution at multiple spatial scales: applications to wildlife-habitat models. Landscape Ecology 2004: 869-882.

INFORMATION REQUEST – TG_14

Source: Tłı̨chǫ Government (TG)

Request

Socio-economic Impact Assessment - General

14.1) Please identify why pre-construction socio-economic impacts not included in the DAR's considerations.

14.2) Please provide information on what socio-economic impacts may occur prior to the beginning of construction, and what conditions might contribute to these development-related changes.

14.3) Please provide a copy of the socio-economic portion of the Golder/Fortune TK Study's questions.

Response

Response 14.1

An impact cannot be assessed if construction has not yet occurred. The "pre-construction phase" is considered in the Developer's Assessment Report (DAR) Terms of Reference to be the existing environment, or baseline conditions. As stated in the Terms of Reference in Section 3.2.4, "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 existed in the environmental assessment study area prior to any industrial activity occurring. This must consider the current state of the baseline conditions and the natural range of background conditions" (p. 10). Fortune Minerals Limited has complied with this requirement. For socio-economic baseline conditions, please refer to Annex K, as well as DAR Section 16.2.2 Existing Environment.

Response 14.2

See response to question 14.1. For socio-economic baseline conditions (which have taken into account existing and previous mining developments), please refer to Annex K, as well as DAR Section 16.2.2 Existing Environment.

Response 14.3

Similar to questions 14.1 and 14.2, please refer to Annex K, as well as DAR Section 16.2.2 Existing Environment. Attachment A of this response, provides questionnaires used for group interviews, as well as for individual interviews with key informants.

ATTACHMENT A

Socio-economic Questionnaires

(please refer to supporting documents)

INFORMATION REQUEST – TG_15

Source: Tłı̨chǫ Government (TG)

Request

History of Maximizing Tłı̨chǫ Employees

15.1) Please provide a record of:

15.1.1) The number of Tłı̨chǫ citizens hired to work onsite in the exploration program and related environmental work,

15.1.2) What positions these Tłı̨chǫ citizens filled, and

15.1.3) What percentage of total jobs were filled by Tłı̨chǫ citizens during these early stages of the mine life cycle.

15.2) Please identify any factors that constrained Fortune from hiring even more Tłı̨chǫ citizens during exploration and baseline data collection, and any efforts made by the developer to mitigate them.

Response

Response 15.1.1

This record has been provided in Annex K, Section 4.1.1. As stated, “From 2007 to 2009, during the exploration and environmental baseline assessment phases of the NICO Project, Fortune (Fortune Minerals Limited) contracted out several positions to Tłı̨chǫ residents (Table 4.4-1). Positions included cook’s helpers, housekeepers, general labourers, environmental assistants and a heritage survey assistant. A total of 15 Tłı̨chǫ residents (9 women, 6 men) were seasonally employed on various NICO programs between 2007 and 2009. Between 1996 and 2008, a total of 10 Tłı̨chǫ, 3 Métis, and 3 Yellowknives Dene contractors worked on the NICO Project doing line cutting, core splitting, site preparation and maintenance work, claim staking, and winter road maintenance”.

Response 15.1.2

These positions were varied and included cook’s helpers, housekeepers, general labourers, environmental assistants, and a heritage survey assistant. From 1996 to 2007, other positions filled by Tłı̨chǫ citizens included line cutting, core splitting, site preparation and maintenance work, claim staking, and winter road maintenance. In all cases the unskilled labour was recruited from Tłı̨chǫ communities. The roles of camp manager, heavy vehicle mechanic, and medic were not.

Response 15.1.3

From 2007 to 2011, almost (100%) of these unskilled positions were filled by recruitment from Tłı̨chǫ communities. Highly technical and specialized roles such as geologist and drilling were contracted out.

Response 15.2

Fortune maximized recruitment of Tłı̨chǫ citizens by utilizing the Career Development Coordinators in Behchokǫ̀, Whatì, and Gamètì when recruiting for summer or winter camps. The vacant jobs were provided to the Career Development Coordinators who provided the resumes of available and qualified Tłı̨chǫ citizens. Due to the short duration of the summer and winter camps, the long periods of time between camps, and the small number of people required to run each camp, there was very little sustained opportunity for skill and career development.

INFORMATION REQUEST – TG_16

Source: Tłı̨chǫ Government (TG)

Request

Employment Opportunities and Hurdles for Tłı̨chǫ Citizens

16.1) How many of the above-noted jobs might reasonably be expected to be filled by Tłı̨chǫ citizens?

16.1.1) How was this prediction arrived at?

16.2) What are factors constraining Tłı̨chǫ citizens' employability at the mine during construction and operations?

16.3) Please identify what commitments, plans or policies Fortune has to proactively assist in the removal of barriers to maximizing Tłı̨chǫ citizens' employment in its NICO mine site.

16.4) Does Fortune have any targets for Tłı̨chǫ hiring? If not, please identify why, especially in light of the assertion made that labour requirements for the mine and concentrator can "easily be sourced from the existing NWT labour pool".

16.5) Has Fortune entered into any dialogue with the Tłı̨chǫ Government or its representatives about hurdles experienced by the Tłı̨chǫ in recruitment, retention and advancement in the diamond mining sector in the NWT?

16.6) Has Fortune held discussions with the other mining companies in the region to understand current hurdles to hiring, the labour pool, and the difficulties experienced with hiring in the current economic climate?

16.7) Describe any lessons learned from the Tłı̨chǫ Government or the mining sector that Fortune is incorporating into project planning for the NICO mine.

16.8) How did the developer determine that labour requirements for the mine and concentrator can "easily be sourced from the existing NWT labour pool".

16.8) What percentage of staffing may be "easily sourced" from the Tłı̨chǫ region?

16.9) Why is high school graduation considered a minimum requirement for what appears to be every job available at the mine site?

16.9.1) Has the company considered doing competency assessments and considering work experience in place of requiring grade 12 educations for Tłı̨chǫ citizens or Aboriginal workers in general?

Response

Response 16.1

In total, Fortune Minerals Limited (Fortune) estimates that about 50 to 60 positions will be filled annually by contractors during the operational phase of the NICO Project, plus another 20 to 30 positions during construction. Fortune's hiring goal is that the majority of these contract positions (60 to 80%) be filled by

Northerners, with the additional goal of 30 to 50% of these being Aboriginal. The socio-economic study area (see Section 16; Figure 16.1-2 in the Developer's Assessment Report [DAR]) has capacity in most of these required businesses; thus, it is a reasonable goal that local businesses will fill many of these contracts. Expanding to the broader Northwest Territories (NWT) business sector will increase capacity to cover all contracts. However, it is difficult to predict how many jobs will be filled by Tłı̨chǫ citizens because much will depend on Tłı̨chǫ community members' skill set and interest in the available contract work, as well as the number of local people that Aboriginal and northern businesses can support hiring (i.e., if they have enough internal capacity to manage new staff). Fortune and other mining companies in the NWT recognize that a strong long-term need exists for skilled labour. As stated in the DAR Section 16.2.2, "it has become increasingly challenging to meet these needs in the North. Key informants suggest that those employable are already employed, and that, as a result, companies are hiring outside the NWT to fill skilled and professional level positions in their workforce".

Response 16.1.1

In general, Fortune did not make a distinction between Tłı̨chǫ citizens as opposed to Aboriginal employees for number of jobs expected to be obtained. This distinction is not possible to determine at this time due to several unknowns, such as size and availability of the Tłı̨chǫ labour pool, current skills and education, level of interest in working for the NICO Project, and needed training to ensure employability and success. Throughout the NWT as the other mines have been experiencing, there is a lack of northerners including Tłı̨chǫ citizens and Aboriginal people more generally, with the required mining and related trades and technical skills. Fortune recognizes this dilemma, and will complete a labour skills survey in the communities to help answer these questions. As part of Fortune's commitment to provide employment and business opportunities to Northerners (see Section 16.2.4 in the DAR), priority will be given to the residents of local northern and Aboriginal residents, and priority will be given to residents of Tłı̨chǫ communities. A Tłı̨chǫ human resources manager will be hired to lead the recruitment process from an office in Behchokǫ̀ to facilitate the ability to recruit people from the area. All job postings will be given to the Tłı̨chǫ community employment co-ordinators to give them first opportunity to source an appropriate candidate from their communities.

Response 16.2

The main factors constraining Tłı̨chǫ citizens' employability at the mine during construction and operations are described in detail in the DAR Section 16.2.4. One barrier to recruiting workers with the required education and skills for each position is the small population of the study area. For example, the Tłı̨chǫ's total population is under 3000 people. Few opportunities exist for training and personal/ professional development without leaving the community. For several reasons such as isolation, the lack of road transportation, and expensive air travel, many Aboriginal people lack formal education or higher levels of training and education. Still, the level of education is improving overall. Several Government of the Northwest Territories educational programs have been implemented over the past several years to provide a high school education in the communities; this is partly due to the motivation for students to seek higher paying jobs in the mining industry while continuing to reside in their home community and commuting to work. Another barrier is that the remote work in often isolated and various conditions which may not appeal to some women. One of the key barriers for (potentially) working mothers is the inability to secure appropriate childcare for the 2 week in-out work rosters that are the norm in the mining industry. Mitigation strategies for these and other barriers have been described in the relevant sections of Section 16 of the DAR.

Response 16.3

Fortune is proactively implementing plans to assist in the removal of barriers to maximizing Tłı̨chǫ citizens' employment in its NICO mine site. All employees will receive on-the-job training in their workplace to enhance their knowledge, skills, and competencies. All employees will have opportunities for advancement through further training, work experience, performance review, and coaching to determine their interests and abilities. Tłı̨chǫ employees (along with all employees) will be offered opportunities for on-the-job training to advance to a different role and also opportunities to upgrade their skills and qualifications. This on-the-job training is provided during the NICO Project life. In some areas, such as heavy equipment where workers have had experience in other industries or the communities, they will be provided with on-the-job training to adapt their skills to the mining industry. While employed with Fortune, there will be a policy to define the process for career development for employees. Professional development will be encouraged and financially supported by Fortune to the extent possible. These opportunities may include attendance at professional conferences or seminars, membership in professional associations, on-line training, and webcasts. Access to internet on-site will facilitate the employees' ability to pursue much of the development.

Response 16.4

It is Fortune's goal to encourage the employment of Tłı̨chǫ and northern hiring because it is the right business decision. Based upon the life cycle of the current diamond mines, Fortune believes, through discussions with Tłı̨chǫ citizens, that there will be Tłı̨chǫ citizens who are looking for an opportunity at another mine site with a longer life expectation than where they are currently working. Fortune believes there will be an attraction to work at the NICO Project because of the proximity to the surrounding Tłı̨chǫ communities.

Response 16.5

No. Fortune has just had the first official meeting with the Kwe Beh working group and Fortune expects that this will be a topic of discussion in the near future.

Response 16.6

Yes. Fortune has had discussions with staff from the diamond mines in the NWT to gain an understanding of the issues surrounding employment.

Response 16.7

Fortune is incorporating into project planning for the NICO mine many lessons learned from other mine sites and Tłı̨chǫ citizens. Since the closure of the Giant and Con mines, which were close to Yellowknife, other mines in the NWT have not been located within short driving distance to nearby communities. Since flexibility with shift rotation and time for cultural traditions will be considered for reasons related to this proximity, some Aboriginal and northern residents are expected to benefit. More women will also be able to participate in the NICO Project due to its closeness to their home communities. Additional training will be available and this will create opportunity for residents to become more employable for this and other projects through increased skills and work experience. On the other hand, many of the workers will already have the requisite education and training from their experience on other mines. Also, the advantage of the NICO Project is that it will extend opportunities for local workers and contractors into the 2030s, and will help mitigate against job and contract losses as other mines begin to shut down in the 2020s.

Response 16.8

As stated in 16.4, Fortune believes that labour requirements for the NICO Project can "easily be sourced from the existing NWT labour pool" based upon the life cycle of the current diamond mines. Fortune believes, through discussions with Tłı̨chǫ citizens, that there will be Tłı̨chǫ citizens who are looking for an opportunity at another

mine site with a longer life expectation than where they are currently working. Due to the proximity of the NICO Project to Tłı̨chǫ communities, Fortune believes there will be an attraction to work on the NICO Project.

Response 16.8

As stated in 16.4, Fortune cannot determine what percentage of staffing may be “easily sourced” from the Tłı̨chǫ region but believes that there will be Tłı̨chǫ citizens who are looking for an opportunity at another mine site with a longer life expectation than where they are currently working. Due to the proximity of the NICO site to Tłı̨chǫ communities the Company believes that Fortune will be able to attract these workers.

Response 16.9

High school graduation is considered a minimum requirement for most jobs available at the mine site because a minimum literacy level or skill set is required to perform the work safely. Low levels of literacy or relevant skills may restrict some community members from accessing and participating in opportunities if they do not have the capacity to perform the work, or cannot perform the work safely. Fortune will value work experience and general knowledge for candidates who do not have the level of formal education.

Response 16.9.1

While high school graduation is considered a minimum requirement for most jobs available at the mine site, Fortune will conduct competency assessments and consider work experience in place of requiring grade 12 education for Tłı̨chǫ citizens or Aboriginal workers in general. Fortune will value work experience and general knowledge for candidates who do not have the level of formal education.

INFORMATION REQUEST – TG_17

Source: Tłı̨chǫ Government (TG)

Request

General Employment Issues

17.1) What bereavement leave for Aboriginal workers is being considered to accommodate custom adoption and extended family bereavement?

17.2) Section 3.13.6 states that "Fortune is committed to providing opportunities for career advancement for employees hired for the NICO Project, as well as providing opportunities for Aboriginal workers." What specific measures will be adopted to ensure that there is career advancement?

17.3) Given the proximity to the communities, what policies (if any) will be in place to allow visits by family and elders without undue security authorization being required?

17.4) What measures will be in place for counselling to be done in traditional ways?

17.5) What measures will be in place to allow for healing, grieving and prayer in ways that are considered appropriate?

17.6) The company suggests that exit interviews will be done to understand why workers are leaving. What measures are being considered to ensure that the Tłı̨chǫ Government is involved in planning for use of these results?

17.7) What sort of grievance mechanism for Tłı̨chǫ workers is being considered, or has been committed to, by the developer, for example to ensure that people are not wrongfully dismissed for reasons related to cultural misunderstandings.

Response

Response 17.1

The bereavement leave for Aboriginal workers being considered to accommodate custom adoption and extended family bereavement is based upon the recognition that Aboriginal workers may require more time away from work for bereavement than non-Aboriginal workers. Fortune Minerals Limited (Fortune) recognizes that Aboriginal families often include not just the immediate but also the extended family dependants. All employees will be eligible for the same number of paid leave days for bereavement but Fortune will be flexible to allow Aboriginal workers additional time off without pay to attend funerals or associated arrangements. Each case will be reviewed by the worker's supervisor on an individual basis prior to approval being granted.

Response 17.2

Fortune will adopt several measures to ensure that there is career advancement. All employees will receive on-the-job training in their workplace to enhance their knowledge, skills, and competencies. All employees will have opportunities for advancement through further training, work experience, performance review, and coaching to determine their interests and abilities. Employees will be offered opportunities for on-the-job training to advance

to a different role and also opportunities to upgrade their skills and qualifications. On-the-job training is provided during the NICO Project life. In some areas, such as heavy equipment where workers have had experience in other industries or the communities, they will be provided with on-the-job training to adapt their skills to the mining industry.

Response 17.3

Fortune recognizes that the NICO Project is in close proximity to the communities and as such will need to manage the safety of visitors. Fortune is committed to maintaining a safe, healthy, and productive work environment for all of our employees, contractors, visitors, and customers. Handling explosives, operating machinery, working below ground, and ensuring that the workplace is free from the harmful effects of substance abuse pose significant logistical and safety challenges, which demand rigorous planning and efficient management, as well as ongoing process and system improvements. Fortune's security systems are designed to protect the people who work at the site. Safety and security will come before anything else, which means that unannounced or unscheduled visits will be the exception.

Response 17.4

For centuries the Aboriginal people of the Northwest Territories (NWT) have used the land responsibly to sustain and nourish their families and their traditional lifestyle. At Fortune we value and honour this special knowledge and recognize the need for multiple approaches to discipline and corrective actions. Counselling done in traditional ways is an option that could be utilized to correct behaviour. Each case would be reviewed by the worker's supervisor on an individual basis prior to approval for counselling in a traditional way being granted.

Response 17.5

To allow for healing, grieving, and prayer in ways that are considered appropriate, Fortune will have rooms available on-site for this use. These rooms could be used for singles or groups of people who are seeking a spiritual time out from their work day.

Response 17.6

Fortune will collect and publicly report annually on total number of NWT resident employees who resigned or who were laid off, fired, or otherwise terminated in the previous year. Fortune anticipates forming a Tłı̨chǫ advisory board, or being subject to a board formed by the Tłı̨chǫ Government, that will become the primary conduit for the communication of information between Fortune and the Tłı̨chǫ people. In this way the Tłı̨chǫ Government will be involved in planning for use of the results of exit interviews.

Response 17.7

To ensure that people are not wrongfully dismissed for reasons related to cultural misunderstandings, Fortune will provide training to all workers on-site. Cultural awareness and diversity training will be part of the initial orientation for employees. Opportunities will be sought to bring Elders and community members to the site for cultural events to further support the First Nations employees to share their culture and also to support diversity for employees from other cultures. This training will be provided on an annual basis for all employees. Local Elders and cultural experts will be engaged to design and provide the training. Cultural awareness and diversity training will be part of the supervisors' training and orientation. Additionally, Fortune recognizes the need for multiple approaches to discipline and corrective actions. Counselling done in traditional ways is an option that could be utilized to correct behaviour. Each case would be reviewed by the worker's supervisor on an individual basis prior to approval for counselling in a traditional way being granted.

INFORMATION REQUEST – TG_18

Source: Tłı̨chǫ Government (TG)

Request

Socio-economic Effects on the Tłı̨chǫ Government

18.1) Please provide analysis of the tax revenue implications to the Tłı̨chǫ Government of this proposed development.

18.2) Please describe all costs is it anticipated the Tłı̨chǫ Government will bear for infrastructure, education or other ancillary developments to support this proposed development.

Response

Response 18.1

Local or regional impacts of any kind, including tax revenues, were not part of the requirements for the Developer's Assessment Report (DAR) Terms of Reference. The economic analysis was done at the territorial (Northwest Territories) level (see Appendix 16.I of the DAR).

Response 18.2

Estimating specific costs to Tłı̨chǫ Government was not required in the DAR Terms of Reference. However, impacts to public infrastructure and services were assessed in the DAR Section 16.2.11. The NICO Project and existing and potential future projects are anticipated to have mainly positive and significant cumulative effects on public infrastructure and services.

INFORMATION REQUEST – TG_19

Source: Tłı̨chǫ Government (TG)

Request

Shift Scheduling during Construction and Operations

19.1) Please identify all other alternative shift schedules considered by Fortune, their strengths and weaknesses, and why the construction shift schedule was chosen.

19.1.1) What percentage of the construction phase workforce is predicted to be from the Tłı̨chǫ communities?

19.1.2) Was input sought from the Tłı̨chǫ Government or Tłı̨chǫ citizens, communities or businesses on the construction phase shift rotation?

19.1.3) Has there been any consideration of how this kind of shift schedule might impact on worker's families in Tłı̨chǫ communities?

19.2) What case study evidence, if any, of the effects of different operations stage rotational schedule were reviewed before identifying the preferred shift rotation option?

19.3) In light of the proximity of the mine to Tłı̨chǫ and Gameti, commitments made by the developer to transportation of workers to and from the mine site and their home communities, and the stated requirement for an all-season road to be in place at least to Whati for the project to proceed, has the developer considered alternative work schedules combined with daily or weekly bus commuting that might alleviate pressures on families associated with some fly-in, fly-out operations? What are the pros and cons of options considered?

19.4) Please identify any plans Fortune has to review its proposed shift schedule with the Tłı̨chǫ Government against other options and flexible variations?

Response

Response 19.1.1

Fortune Minerals Limited (Fortune) does not have a definitive number for the makeup of the construction workforce. All efforts will be made to maximize Tłı̨chǫ employment.

Response 19.1.2

Yes, discussions were held with staff from the Tłı̨chǫ Investment Corporation. Fortune expects this will be discussed closer to the mine construction period.

Response 19.1.3

Both negative and positive impacts related to rotational effects on worker's families have been noted and assessed. For example, in the Developer's Assessment Report (DAR) Section 16.2.4, under Retention, Fortune notes that "Some turnover may be attributed to the work rotations and the anxiety of being absent from home and family for extended periods", and the fact that the 2 week in and out shifts may make it difficult to maintain

family responsibilities. Under Women in Section 16.2.4, it is noted that there is potential for shorter shift rotations which may offer more opportunities for women with young children to enter the workforce. In Section 16.2.7, it is noted that there are challenges experienced by employees who have to commute and are absent from their families for extended periods of time (rotations), especially if they have young children or are looking after elder family members. In Section 16.2.4, Fortune commits to doing more to liaise with the communities to support the issues with shift rotations and the difficulties of home life, such as through its Employee and Family Assistance Program.

Response 19.2

Fortune considered rotation alternatives in its NICO Project design. The assessment of alternative rotation schedules revealed that the 2-week on/off rotation provided the greatest amount of time at home. Fortune acknowledges that shift rotations will remove individuals from their communities for a 2 week period, every 2 weeks. In Annex K, Section 4.6, Fortune referenced Gibson and Klinck (2005) who remarked that for people employed by a mine, and who work long daily hours and a 2-week on/off schedule, less time may be available to spend on the land hunting and fishing (Gibson and Klinck 2005). However, several sources were consulted that have shown this is the same rotation pattern that NWT mines have used since 1998. Since the establishment of the first diamond mine, studies on the effect of rotation were undertaken by the companies and the GNWT, including the Communities and Diamonds reports. In all cases, support systems have been put in place to assist employees with the periods of adjustment. Surveys of mine employees in the NWT indicate that they have adjusted to the rotation and that participation in the wage economy has allowed them to pursue activities on the land such as hunting and fishing, which they might not have been able to do without wage employment.

Response 19.3 and 19.4

Please refer to responses provided in GNWT_7 and _8.

References

Gibson, G., and J. Klinck. 2005. Canada's resilient north: the impact of mining on Aboriginal communities. Pimatisiwin: A Journal of Aboriginal and Indigenous Community Health 3(1): 116-139.

INFORMATION REQUEST – TG_20

Source: Tłı̨chǫ Government (TG)

Request

Commuting and Other Worker Transportation Issues

20.1) Will all transportation options identified be provided free of charge, including Yellowknife transport?

20.2) What is the distance and estimated travel time for the workers on bus from each of the three noted Tłı̨chǫ communities?

20.3) It is unclear whether Whatì resident workers at the mine will be transported to and from home every day or not. Please clarify.

20.3.1) If Whatì -based workers are not being transported to and from work every day, please provide a rationale for why not and identify potential impacts on families and proposed mitigations.

20.3.2) If Whatì -based workers are being transported to and from work every day or on a schedule shorter than two weeks in-two weeks out, please discuss whether there may be inmigration effects to the community of Whatì from Gameti and Wekweeti, and potential beneficial and adverse impact outcomes

20.4) What is Fortune's policy toward workers who would like to self-commute to and from the mine site?

20.4.1) What will the site parking policy be and how many spots will be made available?

Response

Response 20.1

Bus routes will be free of charge, as are rotational work fly-ins from Tłı̨chǫ communities not linked by road. Please refer to responses in GNWT_7 and _8 for a description of the bus routes considered.

Response 20.2

The estimated travel time and distances from each of the below communities are as follows:

- Behchokǫ̀ – 2 hours, 120 kilometres,
- Gamètì – 1.5 hours, 100 kilometres,
- Whatì – 30 minutes, 50 kilometres.

Distances are estimates, as the final road route has not been chosen.

Response 20.3 and 20.3.1

Whatì resident workers at the mine will be transported to and from home every day according to the job they are employed to do (see Section 16.2.4 of the Developer's Assessment Report). Operational roles will work 12-hour shifts, which would not be conducive to going back and forth to Whatì on a daily basis. However, there will be

administrative jobs of shorter duration (i.e., 10-hour shifts); for these individuals the daily commute will be available. In addition, the relative closeness of Whatì to the mine site is expected to generate work and business opportunities there. This creation of NICO spinoff work (e.g. laundry service) opportunities in Whatì will allow more people to gain employment without having to leave their families, and as such would increase opportunities for women.

Response 20.3.2

There may be in-migration effects to the community of Whatì from Gamètì and Wekweètì, but more likely from Behchokǫ̀ or Yellowknife because it would significantly decrease the transportation time to and from the mine site. In-migration to Whatì from aboriginal NICO employees has the potential to significantly benefit the local population through the creation of direct and indirect employment, skills transfer, enhancing the capacity of health and education services, improved infrastructure, and small and medium business opportunities. The NICO Project also will provide “close-to-home” employment and business opportunities for Whatì residents, as well as the other communities in the area, offering incentives to continue to live in their home communities. Potential negative impacts could include the community becoming overly dependant on mining, making it vulnerable to changes in the industry’s fortunes and a social and income divide between mining and non-mining families. Wage injections into the local economy may improve purchasing power, trade in consumer goods and entrepreneurial opportunities, but at the same time could raise inflation, exacerbate inequalities and facilitate health-threatening behaviours such as drug and alcohol abuse. Also, as mentioned in Section 16.2.7 of the DAR, there may be a need to use labour imported from the southern provinces. Typically during construction, a large influx of skilled contract workers will move from project to project; these workers generally do not intend to relocate and make a permanent home in the area.

Response 20.4

Self-commute will not be allowed.

Response 20.4.1

There will be no site parking and no spots available.

INFORMATION REQUEST – TG_21

Source: Tłı̨chǫ Government (TG)

Request

Temporary Accommodation Issues

21.1) What is the maximum number of workers who many need to be "temporarily accommodated" in Whatì and for what maximum length of time?

21.2) Have any discussions been held with Whatì about temporary accommodations in their community during construction and if so, what concerns have been raised?

21.3) What are the potential impacts to Whatì residents and the developer's plans for mitigation, if any?

21.4) How will the community of Whatì and Tłı̨chǫ Government be involved in any decision on whether to allow temporary accommodations for workers to be in the community?

21.5) What alternatives were or are being considered to temporarily accommodating construction workers in Whatì? What criteria were/are being used to make decisions on the best alternative?

Response

Response 21.1

There will be no need for temporary accommodations in Whatì. It is Fortune Minerals Limited's intention to keep transient workers at the airstrip, and not base them in the community. The workers would be at the airstrip for as short a duration as possible.

Response 21.2

Not required.

Response 21.3

There will be no impact, as workers will not be housed in Whatì.

Response 21.4

Not required.

Response 21.5

One alternative considered was a temporary construction camp to be established at junction of main road and NICO Project Access Road. This had since been dismissed as an option.

INFORMATION REQUEST – TG_22

Source: Tłı̨chǫ Government (TG)

Request

Temporary Accommodation Issues

Closure and Reclamation

22.1) Please describe what policies, regulations and standards have been drawn on to this point in developing the conceptual closure and reclamation plan.

22.1.1) Specifically, has the developer considered the following guidance documents as tools for best practice, and if not (for any of them) please provide reasons why:

- International Council on Mining & Metals (ICMM). (No date). Planning for Integrated Mine Closure.
- Cowan, Mackasey & Robertson. (2010). The policy framework in Canada for mine closure and management of long-term liabilities: A guidance document prepared for National Orphaned/Abandoned Mines Initiative (NOAMI).

22.1) What has the company done to engage the Tłı̨chǫ Government in the discussion of closure?

22.2) What is the company committed to doing to involve Tłı̨chǫ Government and citizens in closure and reclamation planning and implementation from this point forward?

22.3) How was traditional knowledge included in the development of the conceptual closure and reclamation plan for the mine to this point?

23.4) What is the company committed to doing to incorporating Tłı̨chǫ traditional knowledge input into closure and reclamation planning and implementation from this point forward?

23.5) Please identify all “indigenous values” the developer has thus far identified that it seeks to protect through its Closure and Reclamation Plan, and the means and parties by which they have been identified.

23.6) Has the developer sought Tłı̨chǫ Government input in the development of conceptual levels end land use objectives to this point in time? If not, please identify when this is planned to occur and why efforts have not started yet.

23.7) What commitments has/does the developer make to preferentially involve Tłı̨chǫ citizens and the Tłı̨chǫ Government in environmental monitoring?

23.8) How will the Tłı̨chǫ Government be consulted about materials, machinery and other construction materials that might be useful to the communities, prior to a determination being made on their fate?

23.9) Regular updating of mine closure plans has been shown to be vital to developing workable solutions.

23.9.1) What are the plans or commitments of the developer for timing of closure and reclamation updates and reporting to the Tłı̨chǫ Government and communities?

23.9.2) Does the developer plan to have funding, plain language materials and other resources available to facility community engagement in closure planning?

24.1) Did the developer consider socio-economic endpoints in its preliminary Closure and Reclamation Plan?

24.2) How will the developer work respectfully with the communities to develop strategies and plans for workforce transition before, during and after closure?

24.3) Section 9.4.2.2 of the DAR states that "Specific recommendations as to the standards and methods for reclamation were rarely discussed or brought forward [by community members]." Please identify any instances where communities were asked to identify specific recommendations as to the standards and methods for reclamation.

24.4) Section 9.4.4.2 refers to progressive reclamation ongoing from early in the mine's operating phase.

24.4.1) Will monitoring for compliance, success and environmental impact occur on areas subjected to progressive reclamation? By whom?

24.4.2) How will the results of progressive reclamation be reported, to whom, at what intervals, and with what feedback mechanisms?

Response

Response 22.1

A Preliminary Closure and Reclamation Plan (PCRP) is being developed according to the requirements of the Mackenzie Valley Land and Water Board (MVLWB) and the Wek'èezhìi Land and Water Board (WLWB). The main reference is "Closure and Reclamation Plans – Preparation Guidelines for Mines within the Mackenzie Valley", Draft, 2009 (MVLWB 2009). These guidelines also reference INAC (2006) and MSRG-NWT (2006).

Response 22.1.1

Fortune Minerals Limited (Fortune) is aware of the ICMM's 2008 publication entitled "Planning for Integrated Mine Closure: Toolkit". This publication is only for guidance. It is too vague for planning specific closure measures.

Fortune is also aware of the publication Cowan et al. (2010); however, it was not known that the time of the Developer's Assessment Report (DAR) submission. This is an excellent document; however, it is intended primarily as a policy framework and therefore does not address specific technical issues that need to be addressed in the NICO closure and reclamation plan. The publication will be considered when we finalize and later update the PCRP.

Response 22.1

Fortune made several attempts to engage the Tłı̨chǫ Government in discussions on closure and other issues (see Appendix 4.I of the DAR). Unfortunately, the Tłı̨chǫ Government was not able to meet with Fortune to initiate these discussions.

Response 22.2

In the short-term, Fortune has recently received approval from the Kwe Beh working group to complete a community consultation tour in the Tłįchǫ communities. With the aid of the 3D models developed for the NICO Project, Fortune will seek input from the communities on closure objectives and concerns.

In the longer term, as the NICO Project moves into operations, the closure plan will be a living document that will be periodically revisited and updated with input from the communities. Traditional knowledge will be incorporated into the closure planning, where practical, with the aid of Tłįchǫ citizens and elders.

Response 22.3

Section 2 of the DAR details how input from the communities influenced both the design of the co-disposal facility and the relocation of the downstream processing. Both of these changes will have a direct influence on the closure and reclamation plans for the NICO Project.

Response 23.4

Fortune has commissioned a Tłįchǫ traditional knowledge study which will be used in the development of a more detailed closure and reclamation plan. In addition, as detailed in response 22.2, Fortune will continue to seek traditional knowledge and other sources of information as the NICO Project moves forward and the closure and reclamation plan is updated.

Response 23.5

This is the first time the concept of “indigenous values” has been brought to Fortune attention. There has been no discussion of “indigenous values” with Fortune in the past. Fortune will require a discussion with the Tłįchǫ Government on these values to understand how they might be developed and incorporated into the closure and reclamation plan.

Response 23.6

Please refer to response 22.1

Response 23.7

Fortune has publically stated on many occasions that it would involve Tłįchǫ citizens in environmental monitoring programs at the NICO Project. This commitment is also stated in Appendix 1.III of the DAR.

Response 23.8

Fortune assumes this question is related to closure. As suggested by MVLWB (2009), the PCRP will be updated to an Interim Closure and Reclamation Plan (ICRP) and that in turn will be reviewed and updated every 3 years during operations. Input from the Tłįchǫ Government will be sought prior to closure once Fortune has an understanding of what might be available for use by the communities.

Response 23.9.1

As suggested by MVLWB (2009), the PCRP will be updated to an Interim Closure and Reclamation Plan (ICRP) and that in turn will be reviewed with the Tłįchǫ Government and communities and updated every 3 years during operations.

Response 23.9.2

Details of engagement logistics for closure planning will be developed in cooperation with the Tłįchǫ Government.

Response 24.1

No. These can be discussed along with other closure and reclamation endpoints suggested by the Tłı̨chǫ Government.

Response 24.2

Please refer to information request GNWT_11.

Response 24.3

Specific input into the closure and reclamation plan was sought during the NICO Project elder tours (see Appendix 4.I of the DAR). Response was limited and Fortune has already stated its commitment in these information request responses to consulting further with the communities on closure and reclamation endpoints and objectives.

Response 24.4.1

Monitoring of areas subjected to progressive reclamation will be carried out annually by Fortune. In the early stages of reclamation, such monitoring will form an important part of the development and refinement of reclamation techniques.

Response 24.4.2

The results of progressive reclamation monitoring will be reported to the Tłı̨chǫ Government and communities on an annual basis with opportunity for discussion.

References

INAC (Indian and Northern Affairs Canada). 2002. Mine Site Reclamation Policy for the Northwest Territories.

INAC. 2006. Mine Site Reclamation Guidelines for the Northwest Territories.

MVRB (Mackenzie Valley Land and Water Board). 2009. Closure and Reclamation Plans – Preparation Guidelines for Mines within the Mackenzie Valley. Draft 15 July 2009.

INFORMATION REQUEST – TG_25

Source: Tłı̨chǫ Government (TG)

Request

Long-term Closure Management

25.1) Please identify what the developer predicts the year by year and sum total long-term care and maintenance costs will be for the closure period up until the time it is predicted that no monitoring is required.

25.2) What assurances can the developer provide that it will be financially able to bear the costs of site maintenance 118 years or more into the future?

Response

Response 25.1

Section 9 of the Developer's Assessment Report discusses closure and reclamation because it was identified as a key line of inquiry in the Terms of Reference. Nonetheless, this Section is not the Preliminary Closure and Reclamation Plan (PCRP), which is required to be submitted as a separate document to the Mackenzie Valley Land and Water Board and the Wek'èezhìi Land and Water Board. A preliminary cost estimate is being prepared as part of the preparation of the PCRP; however, the cost estimate has not yet been completed.

Response 25.2

Once the cost estimate is completed, a Financial Assurance will be proposed. The form and amount of the Financial Assurance will be subject to the acceptance of government. The form of the financial assurance will be such that it does not rely upon the existence of Fortune Minerals Limited over the 120 year plus period of active closure. Possible examples include a fund or line of credit vested in government.

INFORMATION REQUEST – TG_26

Source: Tłı̨chǫ Government (TG)

Request

Re-vegetation

26.1) Please identify any scientific or traditional knowledge about results of revegetation at other mines in the Tłı̨chǫ Region considered in development of plans for revegetation.

26.1.1) If any have been reviewed, please identify “lessons learned” that will be incorporated into revegetation planning at NICO.

26.1.2) If none have been reviewed, please clarify why these relevant case studies have not been considered.

26.2) On what basis does the developer suggest that passive (little or no planting) vs. active re-vegetation is the most appropriate management activity?

26.3) Does this strategy have implications for the amount of dust moving around and off the site over time?

Response

Response 26.1

Fortune Minerals Limited (Fortune) is aware of vegetation monitoring at other mines in the taiga shield area of the Northwest Territories, including the Rayrock, Colomac, and Discovery sites. The details of these monitoring programs will be considered as Fortune refines the Closure Plan. In reference to traditional knowledge, Fortune has already commissioned a Traditional Knowledge Study to ensure the involvement of the Tłı̨chǫ Government and citizens in the development of a closure and reclamation plan that protects indigenous values and incorporates traditional knowledge.

Response 26.1.1

The proposed revegetation plan considers standard and current practices. Lessons learned from on-going reclamation programs will be incorporated into NICO revegetation planning.

Response 26.1.2

Fortune is aware of relevant case studies showing successful revegetation in the Tłı̨chǫ region.

Response 26.2

Fortune will consider both passive and active revegetation strategies. These approaches will be evaluated in revegetation trials that Fortune will initiate once the mine start operating.

Response 26.3

Since northern environments re-vegetate slowly, whether active or passive revegetation strategies are used, there is not expected to be implications for dust movement.

INFORMATION REQUEST – TG_27

Source: Tłı̨chǫ Government (TG)

Request

Co-mingling of Tailings and Waste Rock, Management of CDF

27.1) Please provide reference to research that identifies the successful use of co-mingling in other mines in the circumpolar North and whether this technology has ever been used in the NWT or like environments and outcomes to date of any relevant comparable disposal/management systems.

27.2) Please show the efforts made to learn about the operational controls used in other sites, as well as what accidents and risks have been encountered in other co-disposal facilities.

27.3) Please discuss how or whether this option (co-disposal) has proven to be a lesser geochemical risk at other existing operations than other options considered.

27.4) Given the traditional and local environmental knowledge of area land users, was representation sought from the Tłı̨chǫ Government or Tłı̨chǫ citizens in the identification and review of the eleven candidate sites for tailings and mine rock disposal?

27.4.1) Were the eleven candidate sites ever presented to the Tłı̨chǫ Government or any of its representatives prior to the decision-making process?

27.4.2) Please identify whether and when the developer intends to have the two sites being considered for co-disposal toured by Tłı̨chǫ Government representatives

27.5) What is the basis for the estimate that 35.5% of the thickened tailings will enter the void space in the mine rock?

27.5.1) Is this based on research in a sub-arctic environment?

27.5.2) Are there environmental issues that may reduce the amount of thickened tailings that enters the void space?

27.6) Please identify what type/category of rock was used in the co-disposal test blocks that were created in July of 2011?

27.7) Section 9.4.1.3.3 states that a program will be undertaken to optimize the design of the CDF covers. Please provide a more in-depth description of the planned program, including what plans will be made to test the CDF for stability and long term viability in the environment.

27.8) Please identify whether and how Fortune envisions the Tłı̨chǫ people will be involved in the determination of the vegetation cover for the CDF, and any associated commitments.

Response

Response 27.1

Co-disposal is a relatively new technique for mine waste management. Fortune Minerals Limited (Fortune) is not aware of any Co-disposal Facilities (CDF) that are actually in operation in the circumpolar north. Canadian Royalties is in the advanced stages of design of a form of co-disposal at their Nunavik Nickel Project in far northern Quebec, a site in permafrost which has a mean annual temperature which is significantly colder than that at the NICO Project. The mine rock will be used to construct the containment dykes for tailings disposal cells. The excess mine rock will be disposed in a standalone cell adjacent to the tailings disposal cells. Both the tailings and the mine rock have acid generating and metal leaching potential. The tailings disposal cells will be fully lined and the tailings will be dewatered to thickened tailings-paste consistency before deposition. The facility is proposed to go into production in mid-2012.

Response 27.2

There are a number of co-disposal operations in operation internationally, and the experience at these operations influenced the design of the NICO CDF. A case history document on co-disposal is currently underway and will be provided for review when it is available.

Response 27.3

One of the most relevant papers in the literature on this subject is Wilson et al. (2008), "Design and Performance of Paste Rock Systems for Improved Mine Waste Management", in Rock Dumps, 2008. Based on large column tests and field scale lysimeter cells, it is demonstrated that co-disposal greatly reduces infiltration of rain water and air entry, compared to mine rock alone. Both of these physical aspects will considerably reduce acid generation.

In July of 2011, Fortune constructed 3 field cells on the NICO site to test the physical and geochemical effects of co-disposal. The 3 cells are described as follows:

- FC-11 Mine rock, which will serve as a control for he co-disposal tests;
- FC-12: Co-disposed mine rock and tailings, intimately blended to ensure good contact between the tailings and mine rock,; and
- FC-13: Co-disposed mine rock and tailings, constructed using a layered approach.

The volume and chemistry of the leachate from the 3 cells will be monitored over the next few years. The interim results will be reported when they are available.

Geochemical benefits from co-disposal result from a reduction in potential atmospheric interaction with waste rock. This is expected to reduce the potential for ARD and reduce the metal leaching potential from the waste rock materials relative to other potential disposal options. Each mine site will have different site specific characteristics which make it difficult to compare technologies for one relative to another. The reader is referred to the GARD guide (2009) for a more thorough discussion of factors which influence geochemical conditions on various mine sites, including a discussion of various technologies and strategies for reducing ARD/ML.

Response 27.4

No, the siting study referred to was a screening level exercise based on topographic mapping alone. The screening produced a short-list of potentially suitable sites based solely on topography, engineering considerations, and potential fish habitat impacts.

Response 27.4.1
Yes, the report was sent to the Tłı̨chǫ Government for review; however, no comments were received.

Response 27.4.2
A large number of Tłı̨chǫ Government representatives, Tłı̨chǫ elders, and Tłı̨chǫ citizens have had the chance to tour the NICO site and the proposed location of the CDF. Details on attendance and dates were provided in Section 4.I (Engagement) of the DAR. Numerous attempts were made to get the members of the Kwe Beh working group to the NICO site. However, they were unable to attend due to scheduling conflicts.

Response 27.5
The number derives from the assumption that tailings will penetrate into 50% of the voids in the mine rock. At this stage the 50% penetration rate is simply an estimate based on the planned co-disposal procedures. The initial years of operation will involve field trials to help optimize the co-disposal process to increase the penetration of tailings into the mine rock void space.

Response 27.5.1
No, as discussed above.

Response 27.5.2
Yes, it is expected that the penetration rate will be reduced in the winter due to freezing effects. Tailings deposited in the winter can only penetrate into the underlying mine rock layer before they freeze. The switch from multi-point spigotting in the summer to end discharge in the winter will help delay the onset of freezing. As part of adaptive management, it is expected that winter deposition procedures will be optimized in the first winter or 2. The objective of 50% penetration should be taken as an annual average.

Response 27.6
Recent test cells constructed on-site in July, 2011 were comprised of tailings and waste rock. The waste rock was that was collected from available materials on-site and is expected to be composed of either Type 2 rock or Type 3 rock, subject to confirmation through laboratory analyses. During operations routine laboratory testing of rock samples will be used to confirm rock types on an ongoing basis such that it can be disposed of appropriately.

Response 27.7
The field cell program that was initiated in July of 2011 is a first step in testing to optimize the cover design. Further steps include the following:

- A test pitting program will be carried out to identify the sources, quantity and quality of borrow materials (i.e., till and sand) that will be used to construct the covers.
- Samples from the test-pitting program will be tested in a soils laboratory to identify the relevant material properties (i.e., gradation, water content, saturated permeability, and soil-water characteristic curves).
- Predictive modelling of the soil cover performance will be carried out (using SVFlux), considering the expected range of climatic conditions, as well as vegetation effects. The results of the modelling will be used to define the technical specifications for acceptable cover materials.
- Once pre-stripping of the Open Pit begins, samples of mine rock will be available with a representative gradation. At that stage, large scale lysimeters cells will be constructed on site using representative mine rock and tailings from the process development work as the substrate and representative samples of sand

and till as the cover material. The water content in the till layer will be monitored over time by means of instrumentation and direct sampling. Leachate will be collected from the cells for measurement of infiltration amounts and chemistry. The results of the lysimeters cell testing will help to optimize the cover design.

- It is expected that additional lysimeters cell tests will be set up and monitored after full scale mining begins. This will allow for use of run-of-mine rock and full scale tailings.
- Test plots will be set up in the early stages of mining to select the most suitable revegetation techniques for the soil covers. This will involve testing of various seed mixtures, fertilizers, and organic amendments.

The physical stability of the CDF will be monitored by direct observation throughout the operating life. The protocols for the observations and the keeping of records will be codified in a formal Operation, Maintenance and Surveillance (OMS) System manual, which will be put in place by the start of operations. The surveillance will range from shift by shift inspections by mine personnel to periodic review by geotechnical engineers. The OMS manual will also address the monitoring of the environmental performance of the CDF. In addition to the visual inspections, the environmental monitoring will include a protocol of frequent sampling and testing of the water quality of the toe seepage/Seepage Collection Pond water, as well as tracking of the results. The post-closure surveillance program will be specified in Preliminary Closure and Reclamation Plan.

Response 27.8

Fortune will involve Tłı̨chǫ people in the determination of the vegetation cover for the CDF. This will be part of the overall development of the closure and reclamation plan which was discussed in response TG_22.

References

GARD Guide (Global Acid Rock Drainage Guide). internet site http://www.gardguide.com/ (INAP 2009)

Wilson, G.W., B. Wickland, and J. Miskolczi. Design and Performance of Paste Rock Systems for Improved Mine Waste Management.

INFORMATION REQUEST – TG_28

Source: Tłı̨chǫ Government (TG)

Request

Wastewater Management

28.1) Please provide more details as to why the developer selected reverse osmosis as the water treatment method, including more description of the background data and science that led the developer to believe this would be the most successful treatment.

28.2) How long will it take to determine the effectiveness of the wetland management system for long term management with a high degree of certainty?

28.3) Please identify why the wetlands management system is not being developed earlier in the life of the mine, when manpower, equipment and time are readily available in case the system does not work as planned.

Response

Response 28.1

In the "Update for the Developer's Assessment Report (DAR)" (MVRB 2011, internet site) the decision to utilize reverse osmosis technology rather than the ion exchange technology is described as follows:

> "In section 2.3.6 of the DAR, Fortune stated that it was considering the use of a reverse osmosis system for effluent water treatment instead of the currently proposed Ion Exchange (IX) system. Fortune can now confirm it will be using a RO/chemical treatment/biological treatment system combined with chemical treatment and biological treatment for effluent water treatment at the NICO Project. The RO system provides the best available technology for removing contaminants from water and concentrates the contaminants into a brine stream. The proposed system depends on chemical precipitation to remove the majority of the metals and then on active biological treatment in a 2 step process that achieves selenium removal anaerobically and ammonia removal aerobically. The aerobic step is also included to provide polishing of the anaerobic effluent for parameters that may be added as nutrients (carbon source and phosphorus and nitrogen if required) and also to remove any sulfide generated in the anaerobic treatment step."

This description also includes the reasoning as to why the reverse osmosis (RO) was considered to be beneficial over the ion exchange system as follows:

> "The RO/chemical treatment/biological treatment option produces an effluent quality that is projected to meet all limits, is more robust to changes in influent water quality than the IX system, and produces secondary waste form that is more stable and compatible for disposal at the site."

Response 28.2 and 28.3

As described in Section 3, Appendix 3.III.8.4 of the DAR, "Wetland treatment has been selected as the base case for post-closure treatment of water that accumulates in SCP (Seepage Collection Ponds) No. 1, 2, 3, and 5,

and the Surge Pond. Passive treatment may also be implemented to treat Flooded Open Pit overflow if it is necessary and appropriate. Passive treatment options could include anaerobic treatment in biochemical reactors (BCRs), and/or aerobic wetlands. Passive treatment options have been developed for the purpose of initial evaluation. Conceptual design of the post-closure passive treatment options will take place prior to the detailed design stage of the NICO Project and will be submitted during water licensing. Fortune will have a better estimate of the potential length of time needed to confirm the effectiveness of post-closure passive treatment options at that time. Field trials, based on actual site conditions and detailed from conceptual designs, will take place during mine operations. The detailed engineering design will be completed following scale-up of the field trial cells, using design criteria and operating parameters optimized from those trials.

Process water generated during pilot plant operations was concentrated into a brine using a reverse osmosis system, and this concentrated brine is currently being treated in a bench-scale passive treatment system. Approximately 400 litres of brine will be treated in the bench-scale system to provide the initial “proof of principal” test to demonstrate that the background water quality matrix and expected contaminants are amenable to treatment by the proposed passive treatment mechanisms. There are several types of treatment systems that are classified as "passive" and they typically all rely on similar mechanisms for metals removal, which includes a combination of both anaerobic and aerobic biotreatment. Evaluation of a wetlands type system on a bench-scale with limited quantities of water is not feasible. Thus, an alternate method for the “proof of principal test” is being used for bench-scale testing and includes using a passive biochemical reactor as the anaerobic step and a passive aerobic polishing system as the aerobic step due to space constraints, time constraints, and limitations on the water available for testing. The anaerobic and aerobic biological treatment mechanisms are the same mechanisms that provide metals removal in wetlands systems. This “proof-of-principle” testing is the first step in the development of passive treatment as described in Section 3, Appendix 3.III.8.4 of the DAR. Timelines for the initiation of field trials will be further evaluated once the conceptual designs have been completed.

Preliminary results are shown on the attached table and includes both total and dissolved metals results for the anaerobic (BCR) and aerobic (APC) bench cells. Through the third sampling event on 4 November 2011 the system had been operational 5 weeks after a 2 week incubation period. After treatment of approximately 300 litres of water reductions of an order of magnitude for the metals present has been achieved. Observations regarding this data are as follows:

- The arsenic removal is likely limited based on the amount of iron in the water but increased aeration may increase the arsenic removal in the APC. As discussed previously, the engineering parameters will be determined during pilot testing and increased aeration requirements can be engineered into passive systems. For this bench testing the aeration will be increased to evaluate the impact on arsenic removal.
- Good removal of aluminum is occurring in the BCR; however, it appears that there is some residual aluminum in the APC from the materials used to construct and start-up the system. It is not unusual for passive systems to have a “flushing” period and it is expected that the aluminum levels in the APC effluent will also decrease.

References

MVRB (Mackenzie Valley Review Board). DAR Update Letter. Available at http://www.reviewboard.ca/registry/project_detail.php?project_id=72&doc_stage=5. Accessed November 2011.

Table 1: Summary of Bench-Scale Passive Effluent

Constituent	Units	Effluent Treatment Goals based on Site Specific Water Quality Objectives for End-of-Pipe Feb 2011	Brine Used as Influent for Passive Bench-Scale Test		BCR Effluent 19-Oct-11		APC Effluent 19-Oct-11		BCR Effluent 3-Nov-11		APC Effluent 3-Nov-11		BCR Effluent 9-Nov-11		APC Effluent 9-Nov-11	
			Total Metals	Dissolved Metals	Total Metals	Dissolved Metals	Total Metals	Dissolved Metals	Total Metals	Dissolved Metals	Total Metals	Dissolved Metals	Total Metals	Dissolved Metals	Total Metals	Dissolved Metals
Pore Volumes																
pH	s.u.	6.5 to 9														
Aluminum	mg/L	0.410	0.420	0.029	0.14	0.05	1.2	0.056	0.045	<0.018	0.19	0.074	0.034	<0.018	0.11	0.063
Antimony	mg/L	0.03	0.019	0.018												
Arsenic	mg/L	0.05	0.1	0.095	0.034	0.032	0.026	0.023	0.038	0.037	0.034	0.038	0.038	0.033	0.038	0.037
Barium	mg/L	-	0.017	0.018												
Beryllium	mg/L	-	0.000091	<0.00008												
Boron	mg/L	-	0.098	0.096												
Cadmium	mg/L	0.00015	<0.00004	0.0001	0.00014	0.0001	0.00013	0.000062	0.00011	<0.00004	0.000095	0.00004	0.000045	0.00011	0.000045	0.000089
Calcium	mg/L	-	32	30												
Chloride	mg/L	353														
Chromium	mg/L	-	0.0012	<0.0005												
Cobalt	mg/L	0.01	0.030	0.0220	0.0089	0.0068	0.0059	0.0048	0.005	0.0036	0.0022	0.0039	0.0037	0.0022	0.0016	0.004
Copper	mg/L	0.022	0.0068	0.0079												
Iron	mg/L	1.5	1.9	0.051	1.1	0.72	0.8	0.19	0.18	0.093	0.15	0.08	0.12	0.042	0.08	0.043
Lead	mg/L	0.0076	0.00088	<0.00018	0.00069	0.00039	0.00100	0.00023	0.00031	0.00023	0.00025	0.0002	0.00022	0.00018	0.00023	0.0002
Magnesium	mg/L	-	16	15												
Manganese	mg/L	-	0.077	0.061												
Mercury	mg/L	-	<0.000027													
Molybdenum	mg/L	-	0.160	0.170												
Nickel	mg/L	-	0.0037	0.0033												
Phosphorous	mg/L	-	0.019	<0.014												
Potassium	mg/L	-	170	160												
Selenium	mg/L	0.005	0.020	0.021	0.0062	0.0041	0.0059	0.0036	0.0022	0.0023	0.0022	0.0025	0.0026	0.0022	0.0023	0.0024
Silver	mg/L	-	<0.000015	<0.000015												
Sodium	mg/L	-	59	55												
Strontium	mg/L	-	0.077	0.073												
Sulfate	mg/L	500														
Thallium	mg/L	-	0.00017	0.000038												
Tin	mg/L	-	<.0.0058	<.0.0058												
Uranium	mg/L	0.027	0.043	0.044	0.0043	0.0016	0.0033	0.0029	0.0031	0.00096	0.0024	0.0023	0.0023	0.00073	0.0021	0.002
Vanadium	mg/L	-	0.00085	0.00016												
Zinc	mg/L	0.11	0.043	0.044												

Note: Yellow highlighted values exceed the treatment goals for the Effluent Treatment Facility, which are the SSWQO values.

INFORMATION REQUEST – TG_29

Source: Tłı̨chǫ Government (TG)

Request

Acid Rock Drainage (ARD) and Metals Leaching (ML) Potential

29.1) What type of rock will be placed outside of containment? What is the predicted ARD and metals leaching potential of this 400,000 m^3 and how was this determined?

29.2) Given the potential for Type 2 rock to be acid bearing, why is it proposed for use on site for construction purposes? Are any other alternative rock sources that present a lower risk of ARD or metals leaching available for construction purposes?

29.3) The discussion in section 3.4.2.2 suggests visual inspection of uncovered rockpiles will be sufficient to make an assessment that the stockpile of ore in the mineral processing plant will not generate acids. Please provide a rationale for why visual inspection is sufficient to ensure acid rock generation is not a risk.

Response

Response 29.1 and 29.2

Appendix 3.1, Section 3.I.5.1 of the Developer's Assessment Report (DAR) outlines the measures that will be taken to control ARD and ML.

As discussed in this section of the DAR, materials with a low potential for acid generating and metal leaching (Type 1 rock, or overburden) would be used for construction of surge pond dams, Seepage Collection Pond dams, roads, laydown areas, or for other areas outside that are outside of containment.

Type 2 rock will not be used for general site construction purposes. Type 2 rock would be used within the perimeter dykes of the Co-Disposal Facility, which are contained by the Seepage Collection Ponds. Available rock for present that has a lower risk of ARD or metals leaching that will be used for general site construction include the Type 1 rock or overburden.

Response 29.3

Visual inspection of uncovered rockpiles is sufficient to verify acid rock generation is not a risk, because it takes time for acid generation to occur in fresh ore, in addition, Fortune Minerals Limited (Fortune) expects to process the materials within a short time period of mining. Fortune will be able to anticipate, and plan for how long the stockpile of ore is to sit (only a matter of days). If production were to stop and/or signs of acid generation were to be observed (e.g., ferric hydroxide staining) then given the relatively small volume of material contained in the ore stockpile, there would be time to appropriately manage the material.

INFORMATION REQUEST – TG_30

Source: Tłı̨chǫ Government (TG)

Request

Effluent Treatment Facility

30.1) Please provide estimates of the cost of maintaining the Effluent Treatment Facility for a year and the range of expected variation depending on potential expected fluctuations in water volumes and solute concentrations.

Response

The upper end of the annual operations and maintenance cost projection for the average flow of 525 cubic metres per day is approximately $980 000. It is expected that over the life of the mine that the flows will vary; however, over the life of the mine using the average flow is appropriate for the cost estimate. Of this annual cost approximately 80% of the cost is attributed to categories that are not as impacted by changes in flow and water quality. Approximately 40% of the annual operating cost is attributed to labour, which is less impacted by flow and water quality changes than any other category. Another 25% of the annual operating costs is projected to be from the power charges. Power requirements will be minimally impacted by flow and concentration changes. The other major cost category is the maintenance costs, which at this level are projected as a percentage of the equipment costs. Since the reverse osmosis equipment is higher cost than other options evaluated the maintenance cost is projected to be higher and is not based on fluctuations in flow or concentration. While maintenance costs will increase with increasing flow or concentration, it is not a linear increase as it would be with a chemical consumption or other similar cost component. The treatment efficiency and cost of the reverse osmosis-based treatment system are impacted to a lesser extent by projected flow and concentration changes that other treatment options evaluated.

INFORMATION REQUEST – TG_31

Source: Tłı̨chǫ Government (TG)

Request

Air Quality

31.1) What lessons learned from other mines in similar environments to control dust were considered by Fortune? Which of these mitigation measures are committed to by Fortune for this mine?

31.2) In the developer's opinion, what is the potential for seasonal "flushing" of metal laden dust into area waterways during spring freshet as dust laden snow melts, and what are potential impact outcomes on the receiving environment? Has this possibility been included in the developer's modeling and impact predictions, and how?

31.3) What alternative energy generation technologies have been considered for use at NICO whether as a replacement or complement to diesel generation? Please provide analysis of the pros and cons of each technology versus diesel generation.

31.4) In section 16.4.2.3, the developer suggests that mitigation measures will be used to reduce dust in the summer. What specific mitigation measures are being considered?

31.5) Will TSP and PM2.5 particles be accumulating on the ground in certain areas over time? If so, will they require active management and using what methods?

31.6) What steps will the developer take to make sure Tłı̨chǫ travellers on the land are aware of any air quality issues outside the mine lease area?

31.7) What sort of reporting of air quality monitoring will be provided to the Tłı̨chǫ Government?

31.8) What commitments does the developer make to having Tłı̨chǫ citizens involved in air quality monitoring?

31.9) What adaptive management steps would be taken in cases where there are air quality parameter exceedences that extend beyond the mine site? At what point would these steps be taken and at what point would they no longer be required?

31.10) What sort of prevention mechanisms and health monitoring of workers will occur to minimize long-term health risks from working at the mine site?

31.11) It is not intuitively evident why 24-hour PM2.5 concentration, 24-hour TSP concentration, and annual TSP concentration, though listed as having a high cumulative magnitude, have only a moderate significance rating, rather than a high significance rating. The developer states that these concentrations are "reversible", because "once mine emissions cease, the air quality effects due to air emissions from the NICO Project will stop immediately; therefore, even though some of the magnitude ratings are high, they are, on their own, not sufficient to result in a high significance rating" (section 10.7.2).

31.11.1) Is there a requirement that a impact be an extremely long-term high magnitude impact before it is deemed significant? Are local and medium-term (say 20 years) impacts automatically low, moderate or insignificant under the assessment method utilized by the developer?

31.11.2) Would it not be more reasonable to state that these concentrations will create a significant adverse impact for the life of the mine?

31.11.3) Most importantly, what proactive mitigation measures will the developer adopt to ensure that this impact, which from all appearances will have significant local effects over at least a 20 year span, will be reduced to acceptable levels?

Response

Response 31.1

Every mining project must be assessed on its own merit; however, experience in other similar environments indicates that certain dust mitigation measures should be implemented. Based on Fortune Minerals Limited (Fortune) knowledge of the area including the terrain and meteorology surrounding the NICO Project, Fortune is committed to the following dust mitigation:

- spraying water on haul roads to maintain sufficient surface moisture during summer months;
- establishing and enforcing speed limits on unpaved surfaces to minimize dust from vehicle operations;
- equipping construction equipment with upswept exhausts to enhance dispersion of exhaust;
- equipping the fleet and other equipment with industry-standard emission control systems;
- constructing the NICO Project Access Road as narrow as possible, while maintaining safe construction practices;
- enclosing conveyance systems and processing facilities;
- limiting the height from which material is dropped;
- using high efficiency bag houses for point sources of releases;
- watering ore stockpiles and the primary crusher;
- revegetating the parts of the mine site that will not be disturbed in the future; and
- controlling dumping or transfer rates of materials.

Response 31.2

The potential for seasonal “flushing” of metal laden dust into area waterways during spring freshet as dust laden snow melts was included in the water quality modelling and impact predictions. The methods and assumptions used to incorporate this pathway in the modelling and assessment were described in Section 7.6.2.2 for lakes in the Air Quality regional study area other than Nico, Peanut, and Burke lakes, and in Section 7.6.3.2 for Nico, Peanut, and Burke lakes.

The potential impact outcomes on waters in the receiving environment due to the NICO Project, including those related to deposition of dust and associated metals, were described in the Residual Impact Classification and Environmental Significance sections of the Water Quality Key Line of Inquiry (Sections 7.11 and 7.12). The environmental significance of potential changes to water quality in the receiving environment due to deposition of dust and associated metals was determined to be not significant, as the potential impacts are not likely to increase the risk to aquatic health.

Response 31.3

Alternative energy generating technology includes line power and compressed natural gas powered generators.

Line Power

- Pro's: cheaper, less environmental risk, and not dependant on fuel supply disruptions;
- Con's: insufficient capacity at the present time. Significant infrastructure required.

Compressed Natural Gas

- Pro's: lower cost of power over the life of the mine;
- Con's: higher initial capital cost, trucking not readily available, more trucks per day of fuel required, engines more sensitive to load changes and inlet air temperatures.

Response 31.4

Mitigation strategies are listed in the response for Request 31.1. For safety reasons, the spraying of water on haul roads, as well as ore stockpiles and the primary crusher, will be limited to summer months; all other mitigation measures listed in Request 31.1 will be maintained throughout the year.

Response 31.5

Modelling results indicate that particulate matter may be deposited on the ground in certain areas. This is illustrated in Table 10.4-10 and Figure 10.4-13 in the Developer's Assessment Report (DAR).

The modelling results in Table 10.4-10 and Figure 10.4-13 are conservative. Natural mitigation of dust, such as precipitation and snow accumulation during the winter months, was not included in the modelling due to the lack of publicly available data on the effect of precipitation and snow accumulation on dust control. The impact of the NICO Project on the air quality is best determined through a comprehensive ambient air quality monitoring program. The development and implementation of an ambient air quality monitoring program is outlined in the response for Environment Canada Information Request 8.3 (EC_8.3). The measurement of the following compounds will be included in the proposed ambient air quality monitoring program:

- total suspended particulate (TSP);
- particulate matter with a mean aerodynamic diameter of 10 micrometres (PM_{10});
- particulate matter with a mean aerodynamic diameter of 2.5 micrometres ($PM_{2.5}$); and
- dustfall.

Section 10.9 of the DAR outlines the sections that will be included in the mitigation and adaptive strategies and the best management practices plan to control fugitive dust emissions. These plans will be developed if the

NICO Project progresses to the permitting stage as agreed upon with Environment Canada (D. Fox, Environment Canada, 2010, pers.comm.).

Response 31.6

Fortune does not anticipate any air quality issues outside the mine lease area. If an issue were to occur, Fortune would notify the Tłı̨chǫ Government and community governments and request assistance in identifying individuals that might be in the area.

Response 31.7

Fortune will provide the Tłı̨chǫ Government with their annual report on environmental monitoring results, which will include air quality data.

Response 31.8

Fortune has made the commitment that Tłı̨chǫ people will be hired at the mine site as environmental monitors, whenever possible.

Response 31.9

If the NICO Project progresses to the permitting stage, Fortune will develop and implement appropriate management plans that will include a systematic process to mitigate exceedances of air quality standards beyond the NICO Project Lease Boundary, should they occur. Section 10.9 of the DAR outlines the sections to be included in the adaptive strategies and management plan.

Response 31.10

While working on-site, all required personal safety equipment will be supplied as a method of prevention. All required environmental testing will be periodically completed, including dust suppression, where and as required. There are no known long-term health risks associated with mine or processing plant.

Response 31.11.1 and 31.11.2

Although the magnitude was moderate for predicted annual nitrogen dioxide (NO_2) concentrations and high for predicted $PM_{2.5}$ and TSP concentrations, the geographic extent of the exceedances from applicable ambient air quality standards was localized and limited to within 2 kilometres of the NICO Project Lease Boundary as discussed in Section 10.4.2.3 of the DAR. The local geographic extent in combination with the moderate magnitude, medium-term duration and reversibility resulted in the low environmental significance for predicted annual NO_2 concentrations. The local geographic extent in combination with the high magnitude, medium-term duration and reversibility resulted in the moderate significance for predicted $PM_{2.5}$ and TSP concentrations.

The environmental significance assessment in Section 10.7 is limited to air quality endpoints (i.e., compliance with applicable ambient air quality standards). Although ambient air quality criteria were developed to be protective of human health or other ecological endpoints, such as vegetation or wildlife, the ultimate determination of the environmental significance of the NICO Project is the analysis of the effect of air quality on human health or other ecological endpoints. The environmental significance of air quality resulting from the NICO Project on human health, vegetation, and wildlife is presented in other Key Lines of Inquiry or Subjects of Note within the DAR (refer to Sections 14 and 15).

Response 31.11.3

Mitigation strategies are listed in the response for Request 31.1. It is important to note that the modelling results for particulate matter are conservative. Natural mitigation of dust, such as precipitation and snow accumulation, during the winter months was not included in the modelling due to the lack of publicly available data on the effect of precipitation and snow accumulation on dust control. The impact of the NICO Project on the air quality is best determined through an ambient air quality monitoring program. The development and implementation of an ambient air quality monitoring program is outlined in the response for Environment Canada Information Request 8.3 (EC_8.3).

References

Fox, D. 2010. Air Pollution Management Analyst (North). Environment Canada, Yellowknife, NWT. Telephone conversation and email. 18 May and 25 May 2010.

INFORMATION REQUESTS

NORTH SLAVE MÉTIS ALLIANCE

INFORMATION REQUEST – NSMA_1-1

Source: North Slave Métis Alliance (NSMA)

Request

HRIA - Heritage Resource Identification

Please explain why “relatively recent” trails, mining claim posts, hunting camps and other cultural use sites have been designated as having limited or no heritage value, specifically with respect to the Métis heritage values? How was the Métis perspective on site importance, interest or significance relative to age and type of site determined?

Response

The heritage values that are discussed in Section 16.3.2.2.4 were identified as sites having low scientific heritage resources significance. Sites that are labelled as low scientific significance often have little physical evidence that can be used to further evaluation regarding the past activities which were undertaken at a site, its age, or the heritage of those who created it. Fortune has, where possible, tried to solicit direct input from members of Métis, Tłı̨chǫ, and other groups on the importance of specific sites. This is further detailed in the baseline reports of Ronaghan (2003), Paquin (2005), and Murphy (2010; Annex M of the Developer’s Assessment Report). Further details on efforts to determine the importance of specific sites to the Métis can be found in information request response NSMA_1-4.

The Métis perspective on site importance, interest, and significance was determined through consultation and participation in the field programs, particularly through the discussions during the 2004 field program with NSMA member Marcel Lafferty (Annex M of the Developer’s Assessment Report).

References

Paquin, T.A. 2005. Heritage Resources Impact Assessment Fortune Minerals NICO Mine All-weather Access Road, Northwest Territories Archaeologists Permit #2004-963. Ms. on file, Prince of Wales Northern Heritage Centre. Yellowknife, Northwest Territories.

Ronaghan, B.M. 2003. Heritage Resources Impact Assessment Fortune Minerals Nico Gold Prospect, Northwest Territories Archaeologists Permit #2003-942. Ms. on file, Prince of Wales Northern Heritage Centre. Yellowknife, Northwest Territories.

INFORMATION REQUEST – NSMA_1-2

Source: North Slave Métis Alliance (NSMA)

Request

HRIA - Cultural Context

- Please expand section 3.1 to include a discussion of the Contact Period, particularly the important role that the Métis played in the transition from the Taltheilei Shale Tradition to the Reliance Complex 220-160 years ago, and the ethno genesis of an indigenous Métis community. This discussion should highlight the differences in material culture, land use, and resource use between the D`ene' and the Métis, and outline the diagnostic features used to differentiate a Métis site from a D`ene' site.
- Please expand section 3.1 to describe the current status of aboriginal claims, including the disputed property rights, in the area of the project. Please include a review of the resulting differential levels of involvement in heritage resource assessment and management between Métis and D`ene' groups, with and without land claims processes or settlements.
- Please expand section 2.4 to discuss how the incorrect or incomplete attribution of sites, in an environment of disputed land and resource ownership, potentially impacts the involvement of the disadvantaged or excluded group (the Métis) in the identification, assessment and management of their cultural and heritage resources.
- Please explain how the known or suspected ethnological or historical importance, interest or significance to the North Slave Métis community was evaluated for each of the sites located?
- Please review the list of archaeological sites that have been identified, so far, and comment on how many of them might be Métis sites instead of, or as well as, Tłįchǫ heritage resources. Please justify why all the sites relating to indigenous historic activities have so far been ascribed to the Tłįchǫ.
- Please explain why the Tłįchǫ requirement to use a Tłįchǫ field assistant was honoured, while the requirement of the North Slave Métis to use a Métis field assistant was ignored.
- Please explain why no specialist in subarctic Métis heritage resources was included on the research team to discover, identify, locate, and interpret Métis heritage resources
- Please explain the failure to include Métis experts in pre-field and field studies.
- Please comment on the possibility that Métis sites remain undiscovered and unrecorded due to the lack of Métis expert involvement in the field and pre-field studies.
- Please explain how interactions between Fortune and the North Slave Métis Alliance influenced survey locations, identification of locations and heritage resource management plans.
- Please describe how Métis residents of Wek'eezhii will be involved in assessments and monitoring of impacts on culture and heritage resources.

- Please describe the efforts made to meet with or interview Tom Andrews and to get a copy of his 1992 archaeological research report.

Response

Section 3.1 of Annex M in the Developer's Assessment Report (DAR) is meant to be a very high level summary of the cultural context of the study area. A more detailed discussion of the Contact/Historic Period is presented in the Archaeological Permit Reports for the NICO Project that are on file with the North Slave Métis Alliance (NSMA) and the Prince of Wales Northern Heritage Centre (PWNHC). These reports give more detail on the role of the Métis. While the Archaeological Permit report does go into some more detail on the distinguishing characteristics of different site and culture types, the distinction between Métis and historic Dené sites is often difficult to discern.

The current status of aboriginal claims in the regional study area was not a factor in the completion of the heritage resource component. The communities to be consulted for the archaeological permit are identified by the PWNHC during the permit application stage. As the status of aboriginal claims is a federal process it is outside of the scope of the archaeological cultural context. A brief synopsis of the different stake holder Nations and organizations are included in the Sub-sections in 16.2.1.3 of the DAR. Involvement in field programs was based on availability at the time of the field program and not on land claim status.

This heritage resource assessment was completed in an effort to identify the archaeological sites that may be affected by the NICO Project, not to identify sites of one cultural group or another. To speculate on the impact of this investigation is outside of the scope of the Terms of Reference.

The ethnological or historical importance, interest, or significance to the different cultural groups was based on discussions with crew members on field programs and comments provided on archaeological permit reports which form the baseline for the DAR. Full workplan descriptions are also provided in the Archaeological Permit Applications that are circulated to the community organizations as identified by the PWNHC.

There are only 2 sites that were recorded within the NICO Project area, KjPo 44 and KiPo 4. The original site form on file with the Canadian Museum of Civilization states that the cultural affiliation attributed to site KjPo 44 is for Dogrib/Athapaskan. As the site has seen extensive use it is possible that the site has been utilized by Métis and other cultural groups as well. KiPo 4 is also a multiple use site and was recorded as Dogrib/Athapaskan on the site form. It is possible that this site was also used by the Métis and other cultural groups. An NSMA field assistant was used on one of the field programs. Marcel Lafferty was involved in the 2004 assessment of the all-weather access road. See information request response NSMA_1-4 for further details on Fortune's attempts to work with the NSMA.

The field programs did include the advice and field direction of Mr. Todd Paquin. Mr. Paquin completed his Masters thesis at the University of Saskatchewan in Subarctic Archaeology relating to a time period that is right around the point of contact for local aboriginal groups. Mr. Paquin subsequently worked for several years for the Gabriel Dumont Institute of Native Studies and Applied Research in Saskatchewan. Mr. Paquin was available to the archaeological crew for prefield, field, and analysis/report preparation stages of the program. All of the permit applications, including work plans and final Archaeological Permit reports were submitted to the NSMA for review and comment. Opportunity for pre-field meetings and involvement in the field program was also offered.

While it is possible that heritage resource sites remain undiscovered and unrecorded in any archaeological investigation, the heritage resource programs were conducted in a thorough fashion and to the industry standards for a program such as this.

Interactions between Fortune and the NSMA did not directly influence the archaeological survey locations or the identification of locations and heritage resource management plans. The field methodology and the selection of survey locations were completed based on standard archaeological procedures and discussions with local assistants (Tłı̨chǫ and Métis) while in the field. Consultations between the NSMA and Fortune did have an influence on the location of proposed development components and the shape and size of the NICO Project footprint. As the archaeological field programs were developed to assess the lands to be included in these project developments these discussions did indirectly influence the location of field investigations.

Should any future archaeological investigation, including assessment, monitoring, or mitigation be required, permit applications will be submitted to the PWNHC and community members from within the Tłı̨chǫ communities and from the NSMA would be asked to participate.

Discussions were held with Tom Andrews were held in 2003 (Brian Ronaghan and Tom Andrews) and 2004 (between Todd Paquin and Tom Andrews) regarding the field work that he had completed in the region. Information regarding the Idaa Trail, as well as the portages in the area, were also reviewed in print and on the internet. All of the site data forms for the sites identified and recorded during this investigation were reviewed from the files of the Archaeological Survey of Canada.

INFORMATION REQUEST – NSMA_1-3

Source: North Slave Métis Alliance (NSMA)

Request

Baseline Description of Human Environment

- Please provide a break-down of the aboriginal population and changes in population in each settlement (geographic community) which includes the number of indigenous Métis, Tłı̨chǫ, Yellowknives and other (non-indigenous) Aboriginal Peoples (cultural communities).
- Please provide a break-down of the baseline education, employment, business, income, and wellness conditions for each settlement (geographic community) which includes specific information for each potentially affected cultural community, including indigenous Métis and D`ene' .

Response

As described in Annex K, Section 4.2.1 of the Developer's Assessment Report, most residents of the Tłı̨chǫ communities and Detah (over 90%) self-identify as Aboriginal. Yellowknife is the only study area community with a higher proportion of non-Aboriginals (77%) than Aboriginals (23%) in the population (NWT Bureau of Statistics 2010). About half of the Northwest Territories (NWT's) population is Aboriginal. Table 4.2.3 in Annex K shows changes from 1986 to 2006 in the aboriginal populations of each study area community. For the Métis population, there is no publicly available data.

Again, there is no publicly available data regarding the Métis population. Section 4.0 in Annex K does provide a break-down of the baseline education, employment, business, income, and wellness conditions for each affected community in the NICO Project study area, including the Tłı̨chǫ and Yellowknives Dene communities. Whenever possible, these figures have been compared to the City of Yellowknife and the rest of the NWT.

References

NWT Bureau of Statistics. 2010. Summary of NWT Community Statistics 2010. Yellowknife, NWT.

INFORMATION REQUEST – NSMA_1-4

Source: North Slave Métis Alliance (NSMA)

Request

Baseline Description of Human Environment - Language

- Please report the available statistics about the use of Michiff and other Aboriginal languages in Métis households in each of the settlements potentially affected by the NICO Project.
- Please comment on the lack of formal recognition for the Michiff language in the NWT.

Response

In the Developer's Assessment Report (DAR) Terms of Reference, Fortune Minerals Limited (Fortune) was required to examine language retention and other key indicators of cultural maintenance. In the DAR Section 16.2.7, Fortune considered whether to include the potential for change on Aboriginal languages in the impact assessment. It was determined that the continued use of traditional languages in communities is not a direct function of the presence of the NICO Project. While some reports show a noticeable and statistical decline in certain languages, this decline is not attributed to mining or employment but on English media and mobility. Although Fortune considered language as a secondary pathway and did not carry it through the effects assessment, mitigation measures for language retention and other key indicators of cultural maintenance were developed and detailed in Section 16.2.7 of the DAR.

The question regarding the lack of formal recognition for the Michiff language in the Northwest Territories is outside the scope of the DAR Terms of Reference. However, Fortune has made attempts to collect Métis knowledge relevant to the DAR. On 17 November 2009, an agreement between Fortune and the North Slave Métis Association (NSMA) was signed to undertake socio-economic baseline, traditional land use, occupancy, and knowledge studies. The workplan included literature research, presentation of findings to members with Fortune presenting the NICO Project, development of a questionnaire with the assistance of Golder Associates Ltd., site visits by members, interviews of members using the questionnaire, preparation of a draft report, presentation of the findings to the members, and finalization of the report. Literature research was complete during the winter and spring of 2010 and results were presented, along with a presentation on the NICO Project, on 4 May 20210 to members for the NSMA. The presentation by Fortune included a 3-dimensional physical model of the NICO Project and was left at the NSMA offices for convenience for a couple of weeks. Site visits were also completed with members for the NSMA on 16 August 2010. Fortune is still awaiting completion of the report on socio-economic baseline, traditional land use, occupancy, and knowledge studies.

INFORMATION REQUESTS

YELLOWKNIVES DENE FIRST NATION

INFORMATION REQUEST – YKDFN_1.1

Source: Yellowknives Dene First Nation (YKDFN)

Request

Submission of Management Plans – General

YKDFN would like the company to submit all required plans for review. As an example, this includes (but is not limited to) 'the fugitive dust and metals emissions' plan discussed in section 10.9.2 for the DAR. With regard to this example, a concatentated plan would be the submission of an adaptive management plan that links the monitoring of emissions and the local environment to triggers for actions. Selected other plans include a waste management plan, an incineration management plan, and a conceptual closure plan.

Response

Fortune Minerals Limited (Fortune) provided the management plans listed in the Terms of Reference issued by the Mackenzie Valley Review Board within the Developer's Assessment Report (DAR), (i.e., the Waste Management Plan was provided in Section 3, Appendix 3.IV).

In regards to the air quality management plan, based on communication with Environment Canada (D. Fox, Environment Canada, 2010, pers. comm.) in May 2010, it was agreed that management plans for the NICO Project will be developed when the NICO Project progresses to the permitting stage. Fortune will develop and implement appropriate adaptive management plans that will include a systematic process to mitigate exceedances of emission standards, should they occur. Section 10.9 of the DAR outlines the adaptive strategies in the way of headings.

References

Fox, D. 2010. Air Pollution Management Analyst (North). Environment Canada, Yellowknife, NWT. Telephone conversation and email. 18 May and 25 May 2010.

INFORMATION REQUEST – YKDFN_1.2

Source: Yellowknives Dene First Nation (YKDFN)

Request

Wildlife Management and Road Access

Given the examples provided throughout the rest of the country and the Tibbit to Contwoyto road, the company should develop an access plan to limit the ease with which harvesters can reach the area.

Response

The YKDFN has requested an access plan for the NICO Project Access Road (NPAR). Fortune Minerals Limited (Fortune) will have a policy prohibiting hunting, trapping, or fishing by staff working at the NICO Project site, but has no jurisdiction over access or land use by other people not working at the proposed mine site. Similarly, other private winter roads can be and are used by the public (including the Tibbitt-to-Contwoyto Winter Road, the winter roads to Snare Hydro, Discovery Mine, and Colomac Mine). It is the responsibility of the Wek'èezhìi Renewable Resources Board, the Tłı̨chǫ Government, and the Government of the Northwest Territories to implement regulations regarding public use of the NPAR. Fortune will work with these agencies to address access management concerns, and will adhere to any regulations implemented.

INFORMATION REQUEST – YKDFN_1.3

Source: Yellowknives Dene First Nation (YKDFN)

Request

Security Bond

The YKDFN would like the company and AANDC to discuss how they see this extreme amount of time effecting the amount of security bond that is required. This should further consider that this company only has a single producing property. The residents of the NWT, including YKDFN have no desire to pay for another abandoned mine in the future.

Response

Fortune Minerals Limited (Fortune) will complete during operations, to the extent possible, reclamation including the construction of infrastructure and systems required for future reclamation while equipment and personnel are on-site to reduce future work required and associated costs with final closure. Fortune will also post security during the life of the mine to address 2 issues. The first is the reclamation required immediately at the end of the mine life. The second is for dealing with potential water quality issues once the open pit overflows, if required, subsequent to the mine closure. As such, security will be posted to cover planned and unforeseen costs associated with reclamation and long-term monitoring. The amount of the security required will be agreed upon with Aboriginal Affairs and Northern Development Canada during the regulatory period. The security will be deposited at agreed upon dates and milestones to ensure that the funds required for future reclamation will be available.

The security will be held in-trust and deposited in low-risk investments intended to meet or exceed the cost of inflation over time so that additional funds will not be required in the future. Fortune will not be able to access the funds held in-trust and only the designated beneficiary, currently the Receiver General for Canada, will be able to release any funds. Criteria will be established and will need to be met prior to release of any security held by the beneficiary. Funds may be released by the beneficiary back to Fortune, only if Fortune has satisfied its reclamation obligations. To the extent funds are held in-trust to cover unforeseen future reclamation costs or in the event that certain reclamation activities are not completed the regulatory authorities will have the right to use the security funds to fulfill any necessary obligations. Fortune currently has posted a letter of credit in favour of the Receiver General for Canada for existing environmental liabilities. The letter of credit is secured by investment accounts held with a large Canadian financial institution. Under this arrangement, the security currently held is in excess of the amount required by regulatory authorities for future reclamation.

INFORMATION REQUEST – YKDFN_1.4

Source: Yellowknives Dene First Nation (YKDFN)

Request

Controlling Land

- Explain what else this might include (i.e., 'not restricted to')
- Explain what land Fortune believes that is directly controls versus what it is borrowing

Response

Fortune Minerals Limited (Fortune) does not understand the nature of the first questions. Fortune will contact the YKDFN for a clarification.

Fortune will have direct control over the lease area for the mine site which will be within the excluded mine claims block for the NICO Project for the life of the NICO Project. Once closure and reclamation objectives for the mine have been reached after closure, Fortune will relinquish those leases. The NICO Project Access Road will be on Tłı̨chǫ Land. Fortune will require an access agreement from the Tłı̨chǫ Government but it will remain Tłı̨chǫ Land.

INFORMATION REQUEST – YKDFN_1.5

Source: Yellowknives Dene First Nation (YKDFN)

Request

Alternatives

YKDFN request that the company explain how they valued the degradation of the natural environment (given that the closure plan is effectively to allow the site to reclaim itself), the cost of depositing waste within the range of the Bathurst Caribou, and the magnitude of the environmental liabilities within their economic decision making framework.

Response

The requested information for this information request are not requirements defined in the Terms of Reference (MVRB 2009).

Reference

MVRB (Mackenzie Valley Review Board). 2009. Terms of Reference for the Environmental Assessment of the Fortune Minerals Ltd. NICO Cobalt-Gold-Bismuth-Copper Project. EA 0809-04.

INFORMATION REQUEST – YKDFN_1.6

Source: Yellowknives Dene First Nation (YKDFN)

Request

Human Resources – Trade Skills Development

YKDFN request that the company provide discussion on any activities the company will undertake to develop skilled trades.

Response

Please refer to Information Request GNWT_2, for a detailed outline of Fortune Minerals Limited approach to develop skills for the NICO Project.

INFORMATION REQUEST – YKDFN_2.1

Source: Yellowknives Dene First Nation (YKDFN)

Request

Caribou Assessment Endpoints & Concepts

YKDFN request an explanation as to why the assessment endpoint amounts to threatening the extinction of the Bathurst Caribou herd and not some point appropriate.

Secondly, YKDFN request that the company analyze the herd's demographic projections to analyze what impacts this (and other projects) will have on the population of the herd over the span of operations.

Response

The YKDFN requested why 'persistence of the caribou population' was selected as an assessment endpoint, and not a more conservative measure. In the Developer's Assessment Report (DAR), assessment endpoints represent the key properties of the valued component (VC) that should be protected for their use by future human generations. In contrast, measurement endpoints represent attributes of the environment or a population that, when changed, could result in or contribute to a effect on an assessment endpoint. Measurement endpoints may be quantitative (e.g., habitat quantity and quality) or qualitative (e.g., wildlife behaviour in relation to a stimulus such as changes in movement and behaviour).

The assessment endpoint of population persistence was applied to each wildlife VC. Long-term population persistence is the outcome of maintaining viable populations, and is central to the ecological concepts of conservation biology and resource management (Shaffer 1981; Ruggiero et al. 1994; Fahrig 2001; Nicholson et al. 2006). Therefore, population persistence is an appropriate and conservative assessment endpoint for caribou and other wildlife VCs in the DAR. Minimum viable populations are defined by the smallest number of individuals achieving a set probability of persistence (e.g., 99%) over a specified period of time (e.g., 100 years). By definition, minimum viable populations are not populations on the brink of extirpation; they are healthy, robust populations capable of withstanding environmental change and accommodating stochastic population processes (Reed et al. 2003).

A persistent population is one that will be maintained into the future with low risk of extirpation. Persistence is the outcome of population properties such as resilience, growth rate, and stability. Resilience includes the ability of the population to adapt to change (e.g., rate and degree of fluctuation in population abundance and distribution after a disturbance). Stability is determined by the trajectory of a population and stable populations exhibit no long-term increasing or declining trend outside of natural population fluctuations and cycles (e.g., long-term cycles in caribou populations, predator-prey cycles). Resilience and stability are properties of a population that influence the amount of risk to persistence from development (Weaver et al. 1996).

The wildlife assessment did not consider non-scientific value judgments as assessment endpoints (e.g., desired population size to maximize opportunity for subsistence or recreational hunting and trapping). Value-based perspectives about wildlife are important, and were considered for VC selection. However, competing values

about wildlife population size or trend may be held by different groups. Addressing value-based perspectives with respect to effects to wildlife is more appropriately left to the agencies responsible for making public interest decisions. However, a focus on persistence of populations often will result in the continued opportunity for the traditional and non-traditional use of wildlife by people that value these resources as part of their culture and livelihood (the second assessment endpoint for wildlife).

The DAR used multiple approaches to assess changes in measurement endpoints (including habitat quantity and fragmentation, habitat quality, behaviour and movement, and energy balance and calf production) and the subsequent effects to caribou population persistence. The assessment considered incremental and cumulative effects from the NICO Project and other developments for a duration of 5 to 10 years post-closure even though sources of sensory disturbance from the NICO Project will no longer be operating. Many conservative assumptions were used throughout the assessment so that effects would not be underestimated.

Assessment of impacts to demographic projections is beyond the scope of the Terms of Reference. The measurement endpoints assessed in the DAR are within the scope of the Terms of Reference and provide ecologically relevant and confident predictions on the effects to caribou from the NICO Project.

References

Fahrig, L. 2001. How much habitat is enough? Biological Conservation 100:65-74.

Nicholson, E., M.I. Westphal, K. Frank, W.A. Rochester, R.L. Pressey, D.B. Lindenmayer, and H.P. Possingham. 2006. A new method for conservation planning for the persistence of multiple species. Ecology Letters 9:1049-1060.

Reed, D.H., J.J. O'Grady, B.W. Brook, J.D. Ballou, and R Frankham. 2003. Estimates of minimum viable population sizes for vertebrates and factors influencing those estimates. Biological Conservation 113:23-34.

Ruggiero, L.F., G.D. Hayward, and J.R. Squires. 1994. Viability analysis in biological evaluations: Concept of population viability analysis, biological population, and ecological scale. Conservation Biology 8:364-372.

Shaffer, M.L. 1981. Minimum population size for species conservation. Conservation Bioscience 31:131-134.

Weaver, J.L., P.C. Pauquet, and L.F. Ruggiero. 1996. Resilience and conservation of large carnivores in the Rocky Mountains. Conservation Biology 10:964-976.

INFORMATION REQUEST – YKDFN_2.2

Source: Yellowknives Dene First Nation (YKDFN)

Request

Caribou Zone of Influence

YKDFN request that the company explain how they derived the disturbance coefficients. In the work done at Diavik and Ekati, the actual decay curves for the Zone of Influence provide significantly different results than what is found in this submission. The company should explain this significant difference that exists between their study and the real world observations.

Secondly, YKDFN request that the company explain how the ZOI observations at other mine sites show that this extends to only a few individuals and explain what the cycle of periodicity is.

Response

The Zone of Influence (ZOI) is based on the probability distribution of occurrence, or the distance around a development at which the probability of caribou presence returns to background levels. It should be noted that a ZOI does not mean that the area within a ZOI is devoid of caribou, but rather there is a change in the chance that a caribou will occupy a unit of space (i.e., change in how caribou are distributed spatially). Unless the probability of occurrence is zero, caribou are expected to be present within a ZOI.

The disturbance coefficient (DC) is a parameter used to model reduced habitat quality within a ZOI. For example, the Developer's Assessment Report (DAR) assumed a DC of 0.05 within 0 to 1 kilometre (km) of an operating mine, which reduces habitat quality by 95% for all habitat within 1 km of the mine. Within the 1 to 5 km range, the DC was 0.5, or a 50% reduction, and within 6 to 15 km, the DC was 0.75, or a 25% reduction in habitat quality, respectively. Similarly, the DCs used for other disturbances (such as communities, contaminated sites, and mineral exploration) used conservative values so that reduction in habitat quality would not be underestimated.

The disturbance coefficients for each development type followed values suggested in Johnson et al. 2005, which included Ekati and Diavik. The ZOI described for the Bathurst herd fluctuates annually and in some years indicates patterns of attraction (Boulanger et al. 2009; Golder 2011), so there is evidence that the ZOI is not fixed through time during construction and operation and, more importantly, there is uncertainty in its spatial extent (and magnitude). Other research indicates that ZOIs for caribou and other wildlife species are likely less than 5 km from development infrastructure (Weir et al. 2007; Vistnes and Nelleman 2008; Benítez-López et al. 2010; Polfus et al. 2011), which is 3 times smaller than what was used in the assessment. The approach used in the DAR provided confident and ecologically relevant impact predictions. The DCs and ZOIs used in the assessment are consistent with current understanding of the effects of development to caribou, and were conservative so that effects would not be underestimated.

The prediction that few individuals from the Ahiak and Bluenose East herds would be affected by the NICO Project was based on observations of satellite collar data for these herds and the proximity of the NICO Project

to their historical ranges. The NICO Project is located outside the historical annual or winter ranges of the Ahiak and Bluenose East caribou herds described by locations of satellite collared individuals (see Figures 8.3-5 and 8.3-6, in the DAR). Over the period of 1995 to 2010, no collared caribou from either the Ahiak or Bluenose East herds were present in the NICO Project regional study area, and only one individual from the Bluenose East herd was recorded within 50 km of the NICO Project from 1996 through 2010. The ranges used in the assessment are conservative because they reflect maximum distributional extent from periods when these herds were at higher population levels (and thus with larger ranges) than they are currently.

References

Benítez-López, A., R. Alkemade, and P.A. Verweij. 2010. The impact of roads and other infrastructure on birds and mammals; a meta-analysis.Biological Conservation 143:1307-1316.

Boulanger, J, K.G. Poole, A. Gunn, and J. Wierzchowski. 2009. The zone of influence for migratory tundra caribou around Canada's Arctic diamond mines: estimation and implications. DRAFT Technical Report.

Golder (Golder Associates Ltd.). 2011. Analysis of environmental effects from the Diavik Diamond Mine on wildlife in the Lac de Gras Region. Prepared for Diavik Diamond Mines Inc. by Golder Associates Ltd., Yellowknife, NWT.

Johnson, C.J., M.S. Boyce, R.L. Case, H.D. Cluff, R.J. Gau, A. Gunn, R. Mulders. 2005. Cumulative effects of human developments on arctic wildlife. Wildlife Monographs 160:1-36.

Polfus, J.L., M. Hebblewhite, and K. Heinemeyer. 2011. Identifying indirect habitat loss and avoidance of human infrastructure by northern mountain woodland caribou. Biological Conservation 144:2637-2646.

Vistnes, I. and C. Nellemann. 2008. The matter of spatial and temporal scales: a review of reindeer and caribou response to human activity. Polar Biology 31:399-407.

Weir, J.N., S. P.Mahoney, B. McLaren, and S. H. Ferguson. 2007. Effects of mine development on woodland caribou Rangifer tarandus distribution. Wildlife Biology 13:66-74.

INFORMATION REQUEST – YKDFN_2.3

Source: Yellowknives Dene First Nation (YKDFN)

Request

Caribou Cumulative Effects - Cumulative Study Extent

YKDFN request that the CE study be completed in a manner that truly reflects the full range of impacts to caribou across their range, rather than some haphazard approach which puts the predictions in danger of being unsound. In addition to the developments foreseen both in this CE study and the Gaucho Kue study, YKDFN request that the following developments foreseeable developments from Nunavut be included in the analysis (No Nunavut developments were included in previous studies):

- Bathurst Inlet Port and Road (Currently in EA),
- Xstrata's Hackett River (recently purchased for $50M)
- Sabina's Back Lake development (detailed exploration ongoing, company is well financed)
- Shear's Jericho (reopening hearing on Oct.12th, 2011)
- MMG's High Lake (Comprehensive Update due Jan 2012)
- Elgin Mining's Ulu/Lupin (1st steps of [re]opening are ongoing, company is well financed)

Response

Selection of Reasonably Foreseeable Developments

The selection of reasonably foreseeable future projects for the Developer's Assessment Report (DAR) followed a transparent and consistent method, whereby possible future projects were included if they met the following criteria (as outlined in Section 6.5.2.4 of the DAR).

- The future project is currently undergoing regulatory review, or may be induced by the NICO Project (such as roads or transmission lines to the Project).
- The future project has been proposed and scoped to a reasonable level of detail.
- The future project has the potential to change the NICO Project or the impact predictions (i.e., it must be a sufficiently large project to warrant consideration).

A further criteria is that the reasonably foreseeable future project must be within the study area. None of the projects suggested by the YKDFN meet this criteria. A discussion of why the caribou study area was selected is provided below. Section 6.5.2.4 of the DAR provides a summary of the projects which were included as reasonably foreseeable future projects when the DAR was prepared.

Selection of the Caribou Study Area

It was appropriate to limit the analysis and assessment of the incremental and cumulative effects from the NICO Project and other developments to the winter range, and there is little to no value in re-assessing effects over the annual range. In fact, to do so would reduce the relative contribution of the NICO Project to overall effects. Although a larger study area could have been used, there are many reasons why the study area of the Bathurst herd winter range south of the treeline was the most appropriate scale of analysis.

1) It is appropriate to establish geographic boundaries on the area of effects assessment (i.e., effects study area). For example, the assessment of effects to raptors, waterbirds and upland birds does not include the full migration range, which extends to Central and South America. The use of seasonal ranges to assess effects to Bathurst caribou is the same approach used in the environmental assessments for the Gahcho Kue and Taltson projects, and considers the overlap of each seasonal range with a project. The NICO Project primarily overlaps the winter range of the Bathurst herd, and has less or no influence on the northern migration, calving, post-calving, summer, and autumn ranges. Therefore, assessing the incremental and cumulative changes from the NICO Project to Bathurst caribou in the winter range is the most conservative approach for not underestimating effects.

2) The impacts from a development diminish with distance. As the study area is increased, the relative effects of a particular development become diluted. The scale of assessment therefore has implications to the assessment conclusions (see Section 6.3.1 of the DAR for a discussion of how spatial scales were selected for the effects assessment). A larger study area would reduce the incremental effects of the NICO Project.

3) Caribou habitat selection differs in boreal and tundra environments. Part of the analysis focuses on how caribou habitat selection and habitat quality may be changed by the NICO Project. Habitat selection in a tundra setting will not be affected by the NICO Project. Resource selection functions (RSF) were only available for Bathurst caribou in the tundra environment (see Johnson et al. 2004), so it was necessary to develop an RSF for Bathurst caribou in the boreal environment for the purposes of this analysis (see Appendix 8.II of the DAR).

4) Caribou behaviour likely varies between summer and winter, due to factors such as a forested rather than open tundra environment, the presence of deep snow, diet, predation risk, and calves becoming independent. For example, movement rates are substantially lower in winter than other seasons (Gunn et al. 2002). Limiting the study area to a boreal region allows a more precise estimation of the effects of the NICO Project on caribou, in the environment and season when they may encounter the NICO Project.

5) The caribou study area included approximately 155 developments, including winter roads, all-season roads, transmission lines, hydro plants, decommissioned mines, and seven communities. The overall level of development was comparable to other parts of the Bathurst caribou range, but the developments are of a different character than the developments found within the Bathurst range north of the treeline where there are operating mines, few all-season roads, caribou hunting camps, and no communities.

6) The caribou study area contains the core areas of the Bathurst winter range (i.e., the 95% fixed kernel home range) (see also core areas identified in Figure 3.2 in Adamczewski et al. 2009). In addition, and 89% of collar locations in winter were in boreal areas (Appendix 8.II of the DAR), indicating that the study area is an ecologically relevant representation of the area used by Bathurst caribou during the winter season.

Limiting the study area to a boreal region allows a more precise estimation of the effects of the NICO Project to caribou, in the environment and season when they may encounter the NICO Project. In this way, the assessment could consider the particular developments caribou are exposed to during the winter and the effects of these developments in a boreal environment, the unique habitat selection, and snow and ice conditions. Expanding the study area would tend to reduce the relative contribution of the NICO Project to the effects, and would add uncertainty to the assessment. The use of this study area is therefore ecologically relevant and provides confident impact predictions.

References

Adamczewski, J., J. Boulanger, B. Croft, D. Cluff, B. Elkin, J. Nishi, A. Kelly, A. D'Hont, and C. Nicholson. 2009. Decline in the Bathurst caribou herd 2006-2009: a technical evaluation of field data and modelling (DRAFT). Technical Report. Yellowknife, NWT. 105 p.

Gunn, A., J. Dragon, and J. Boulanger. 2002. Seasonal movements of satellite-collared caribou from the Bathurst Herd. Final Report to the West Kitikmeot Slave Study Society. 72 p + figures.

Johnson, C.J., M.S. Boyce, R. Mulders, A. Gunn, R.J. Gau, H.D. Cluff, and R.L. Case. 2004. Quantifying patch distribution at multiple spatial scales: applications to wildlife-habitat models. Landscape Ecology 2004: 869-882.

INFORMATION REQUEST – YKDFN_2.4

Source: Yellowknives Dene First Nation (YKDFN)

Request

Caribou and Roads

YKDFN request that the company complete an analysis on the impacts associated with roads and caribou movements.

Response

The effect of roads on caribou was integrated into all assessment approaches to meet the Terms of Reference, including changes to habitat quantity and fragmentation, habitat quality, behaviour and movement, and increased harvesting from improved access. The NICO Project Access Road (NPAR) is part of the NICO Project and should not be assessed separately because both the NPAR and mine infrastructure are components of a single development, both causing noise, dust, smells, light, and other potential disturbances. The proposed Tłı̨chǫ Road Route was included as a reasonably foreseeable future project. Both the NPAR and the proposed Tłı̨chǫ Road Route were evaluated for their possible effects to caribou populations from increased access for hunting.

INFORMATION REQUEST – YKDFN_2.5

Source: Yellowknives Dene First Nation (YKDFN)

Request

Assessment Methodology

YKDFN request that the company complete the impact analysis using caribou generations instead of lifespans.

Response

The YKDFN have requested that the caribou effects assessment consider the use of caribou generations rather than caribou lifespans. Most effects to caribou from the NICO Project are activities that are expected to be reversible within 5 to 10 years following closure (i.e., duration of effect is 26 to 31 years). This duration was presented in terms of the number of caribou life spans and human generations that may be influenced to provide context. The estimated life span for a caribou is 11 to 15 years (Boulanger and Gunn 2007). Therefore, the duration of the long-term impact is 26 to 31 years or about 2 to 3 life spans for caribou, or about 1.5 human generations (assuming human generation time is 20 years). According to Bergerud et al. (2008), caribou may first become pregnant at 22 months of age if conditions are suitable. The duration of the NICO Project could therefore span up to approximately 13 to 16 caribou generations.

References

Bergerud, A.T., S.N. Luttich, and L. Camps. 2008. The return of caribou to Ungava. McGill-Queen's University Press, Montreal, QC.

Boulanger, J. and A. Gunn. 2007. Exploring possible mechanisms for the decline of the Bathurst Herd of barren-ground caribou using demographic modeling. Manuscript Report No. 175. Department of Environment and Natural Resources, Government of the Northwest Territories. 66 p.

INFORMATION REQUEST – YKDFN_2.6

Source: Yellowknives Dene First Nation (YKDFN)

Request

YKDFN request that the company submit appropriate research/evidence substaining the assertion that the zone of influence is greater in tundra environments than in forested environments.

Response

The NICO Project is located within a boreal environment and approximately 180 kilometres (km) from the treeline and within the winter range of the Bathurst caribou herd and the core winter range of this herd is below the treeline (Adamczewski et al. 2009). Collar data from the Bathurst herd from 1996 to 2009 indicated that 89% of caribou locations were below the treeline (Appendix 8.II of the Developer's Assessment Report [DAR]). Boulanger et al. (2009) estimated a zone of influence of 11 to 14 km around mining activities in an open tundra setting. Other studies on boreal and mountain caribou indicate that animals may be affected within less than 6 km from a mine (Weir et al. 2007; Polfus et al. 2011), and effects to distribution from other disturbances likely do not extend beyond 10 km (reviewed in Vistnes and Nellemann 2008; Polfus et al. 2011). In addition, a resource selection function during winter was completed as part of the NICO Project assessment (Appendix 8.II of the DAR), which detected no avoidance of development (including communities). However, a 15 km zone of influence was applied to the NICO Project in the assessment (see DAR Table 8.5-6), which is greater, and thus more conservative, than evidence from most research. The presence of trees may reduce the spatial extent of sensory disturbance by restricting visibility and muffling sounds.

References

Adamczewski, J., J. Boulanger, B. Croft, D. Cluff, B. Elkin, J. Nishi, A. Kelly, A. D'Hont, and C. Nicolson. 2009. Decline in the Bathurst caribou herd 2006-2009: A technical evaluation of field data and modeling. DRAFT Technical Report, Government of the Northwest Territories, Department of Environment and Natural Resources, Yellowknife, NT.

Boulanger, J, K.G. Poole, A. Gunn, and J. Wierzchowski. 2009. The zone of influence for migratory tundra caribou around Canada's Arctic diamond mines: estimation and implications. DRAFT Technical Report.

Polfus, J.L., M. Hebblewhite, and K. Heinemeyer. 2011. Identifying indirect habitat loss and avoidance of human infrastructure by northern mountain woodland caribou. Biological Conservation 144:2637-2646.

Vistnes, I., and C. Nellemann. 2008. The matter of spatial and temporal scales: a review of reindeer and caribou response to human activity. Polar Biology 31:399-407.

Weir, J.N., S. P.Mahoney, B. McLaren, and S. H. Ferguson. 2007. Effects of mine development on woodland caribou Rangifer tarandus distribution. Wildlife Biology 13:66-74.

INFORMATION REQUEST – YKDFN_2.7

Source: Yellowknives Dene First Nation (YKDFN)

Request

Caribou Study Area Relative to the Regional Study Area

YKDFN request that the company modify their survey area to ensure that they collect appropriate data for long-term analysis of environmental impact analysis.

Response

As described in the response to question 2.6 from the YKDFN, the current study area of 15 kilometre (km) radius is of sufficient size to capture the likely zone of influence from the NICO Project. The regional study area was increased from a 10 to 15 km radius in 2007 to accommodate new evidence regarding zone of influences for boreal environments (see Developer's Assessment Report Table 8.3.1). Although smaller than aerial survey areas for mines in the tundra environment, the existing study area for the NICO Project regional study area is adequate to capture effects within a boreal environment.

Caribou are less visible in the forest than in the tundra environment. The survey swath used for aerial surveys at mines on the tundra is generally 600 metres from either side of the aircraft. The presence of trees makes such a wide swath impossible in a boreal setting, and the survey swath used at the NICO Project area is 200 metres. This requires that the transects be spaced closer together (2 km apart at NICO, compared to 6 to 8 km at most tundra mines). However, the overall ground coverage within the survey area is higher at NICO (50% ground coverage) than most that of most tundra mines (approximately 20%). This is likely to result in detecting changes in caribou distribution at a finer scale at the NICO Project.

Further, there are limitations to the area that may be surveyed within a day. Considering the ferry time to and from Yellowknife, it has proven difficult to complete the NICO Project aerial survey for wildlife within a single day during the short winter days. Spanning the survey over 2 days introduces further problems, such as delays due to weather and the possibility of missing or re-counting caribou that have moved.

Expanding the study area must be balanced with the corresponding loss of ground coverage and logistical constraints. The current study area of 15 km is anticipated to contain most mine-related effects to wildlife in a boreal environment. Noise from the mine is expected to attenuate to background levels within 3.3 km, and within 0.9 km for noise from the road. The maximum predicted dust concentration rate will occur within 1.7 km of the NICO Project.

INFORMATION REQUEST – YKDFN_2.8

Source: Yellowknives Dene First Nation (YKDFN)

Request

YKDFN request that the company provide discussion on the impact level in light of the restrictions that are in place, the critical role of the caribou to both the physical and cultural health of the people and how they evaluated the impact of continued/extended harvesting restrictions that could partly be attributed to the cumulative effects of industry.

Secondly, we request that the company explain how they incorporated the costs associated with lost opportunity and per unit increased harvesting effort into their economic feasibility modeling. For example, if each caribou harvested is worth approximately $1000 (from Economic Valuation and Socio-Cultural Perspectives of the Estimated Harvest of the Beverly and Qamanirjuaq Caribou Herds, BQMB), then what is the expected loss to communities over the life of this development?

Response

The effects of the NICO Project are assessed not in the context of the current low caribou population; they are assessed in the context of a population that undergoes natural cycles over decades. The assessment considers both the low and high phases of the caribou cycle.

The importance of caribou to Aborignal people in the north is recognized, as is the effect of harvest reductions to their way of life. The impacts of this reduction to traditional and cultural use and economies are recognized. Fortune Minerals Limited (Fortune) is cognizant of these issues, and intends to proceed in the most respectful manner considering the sacrifices the Tłı̨chǫ, Yellowknives, and other Aboriginal groups have made.

The available information suggests that harvesting may have accelerated the recent decline of the Bathurst herd: there is no level of calf recruitment that can compensate for current estimated cow survival rates (Adamczewski et al. 2009, Boulanger et al. 2011). While mining activity in the Bathurst range has likely caused some displacement and disturbance to caribou, the effects from development are not predicted to significantly influence caribou populations. In the Developer's Assessment Report (DAR), most of the incremental and cumulative impacts from development were predicted to be negligible to low in magnitude, and reversible. According to Adamczewski et al. (2009), the impact of the mines to caribou is unlikely a major contributing factor in the decline of the Bathurst caribou herd, relative to other environmental variables.

The current level of development within the caribou study area is very low, and is unlikely to constrain caribou population growth. Table 8.5-1 of the DAR indicates that there are approximately 155 historic and existing developments within the study area. Of these, 50 are contaminated sites (few of which have any activity associated with them), 35 are mineral exploration camps (of which only 6 had active permits in 2010) with only seasonal and irregular activity, and 28 are campgrounds or tourism lodges with very little activity in winter. Habitat-specific incremental changes from the NICO Project footprint were less than 0.1% of the study area. The cumulative direct disturbance to the study area from the NICO Project and other previous, existing, and future developments is predicted to be less than 0.5% relative to reference (no development) conditions (negligible

magnitude effects). The application of the NICO Project is expected to decrease good and high quality habitat by 0.4% relative to 2010 baseline conditions. The habitat suitability modelling presented in the DAR indicates a decrease by only 6.1% of preferred habitats in the study area in the future scenario (i.e., including all development, the NICO Project, the Taltson Project, and the Tłı̨chǫ Road), when considering a zone of influence around each development and other conservative assumptions. This constitutes an effect of low magnitude (i.e., 1 to 10% change).

Caribou herds fluctuate naturally, and this cycle has been documented for barren-ground herds (for examples, see Messier et al. 1988, Bergerud et al. 2008; Vors and Boyce 2009; Tyler 2010). This has also been documented for the Bathurst herd through several sources, including traditional knowledge (Dogrib Treaty 11 Council 2001), population counts (Figure 8.3-3, in the DAR), the historical record (Sandlos 2007), and from scars on black spruce roots (Zalatan et al. 2006). This is the natural range of baseline conditions for any development within the range of the Bathurst herd. The analysis and assessment in the DAR provides ecologically relevant and confident impact predictions that are applicable to all phases of the population cycle.

The NICO Project is not anticipated to reduce the availability of caribou for harvesting (Section 8.5.5 in the DAR). Availability of caribou for harvesting is a function of caribou presence and access. The NICO Project will not significantly affect caribou presence, and will likely improve access. Harvesting of caribou within the NICO Project footprint will be prohibited for safety reasons, but this is a small area. As the availability of caribou to hunters is not predicted to be reduced by the NICO Project, no reduction in hunting opportunities is anticipated, and there is no associated economic loss due to lost hunting opportunities.

References:

Adamczewski, J., J. Boulanger, B. Croft, D. Cluff, B. Elkin, J. Nishi, A. Kelly, A. D'Hont, and C. Nicholson. 2009. Decline in the Bathurst caribou herd 2006-2009: a technical evaluation of field data and modelling (DRAFT). Technical Report. Yellowknife, NWT. 105 p.

Boulanger, J., A. Gunn, J. Adamczewski, and B. Croft. 2011. A data-driven demographic model to explore the decline of the Bathurst caribou herd. Journal of Wildlife Management. 75:883-896.

Bergerud, A.T., S.N. Luttich, and L. Camps. 2008. The return of caribou to Ungava. McGill-Queen's University Press, Montreal, QC.

Dogrib Treaty 11 Council. 2001. Caribou migration and the state of their habitat final report. Prepared for the West Kitikmeot Slave Study Society. Yellowknife, NWT.

Messier, F., J. Huot, D. Lehenaff, and S. Luttich. 1988. Demography of the George River caribou herd: evidence of population regulation by forage exploitation and range expansion. Arctic 41:279–287.

Sandlos, J. 2007. Hunters at the Margin. Native people and wildlife conservation in the Northwest Territories. UBC Press, Vancouver, BC.

Vors, L.S., and M.S. Boyce. 2009. Global declines of caribou and reindeer. Global Change Biology. doi: 10.1111/j.1365-2486.2009.01974.

Zalatan, R., A. Gunn, and G.H.R. Henry. 2006. Long-term abundance patterns of barren-ground caribou using trampling scars on roots of Picea mariana in the Northwest Territories, Canada. Arctic, Antarctic and Alpine Research, 38: 624-630.

INFORMATION REQUEST – YKDFN_2.9

Source: Yellowknives Dene First Nation (YKDFN)

Request

Energetic Modeling

YKDFN request that the company and ENR collaborate to ensure that the modeling efforts result in similar conclusions. Few parties, YKDFN included, have appropriate resources to verify or meaningfully review this modeling effort, but as ENR has completed a similar project, they should be ideally positioned to derive results that either effectively confirm the companies statement or require further research.

Response

The energetic model used in the assessment was based on a suite of supporting peer-reviewed scientific literature. The general approach in calculating energetic costs was consistent with a well-cited study on caribou in Alberta (Bradshaw et al. 1998). Similarly, the energetics model followed the best-available information on metabolic rates in the peer-reviewed literature (see Blaxter 1962; McEwan 1970; Boertje 1985; Fancy and White 1987).

A number of ecological conservatisms were incorporated into the assessment so that effects were not underestimated. Conservative assumptions that would overestimate energetic costs included the following.

- When an animal responds to a sensory disturbance event, it's response is to run, become excited, and lose body weight.
- Energetic model included a cost of excitement and assumed that animals are excited for a 12-hour period following a sensory disturbance event.
- Animals do not habituate to repeated encounters with similar types of sensory disturbances.
- No compensatory mechanisms to offset energetic costs from sensory disturbances; predicted weight loss was permanent.

Another key assumption of the energetic model was related to the relationship described for weight loss and parturition rate (Figure 1). The Developer's Assessment Report (DAR) model assumes that parturition rate decreases by 0.0625 units per 1 kilogram (kg) loss of body weight. This assumption and model was deemed very conservative compared to a new model, the "Daniel" model, being considered by ENR (Daniel et al. 2009). The Daniel model assumes a decrease of about 0.02 units per 1 kg loss of body weight (see Figure 1 below).

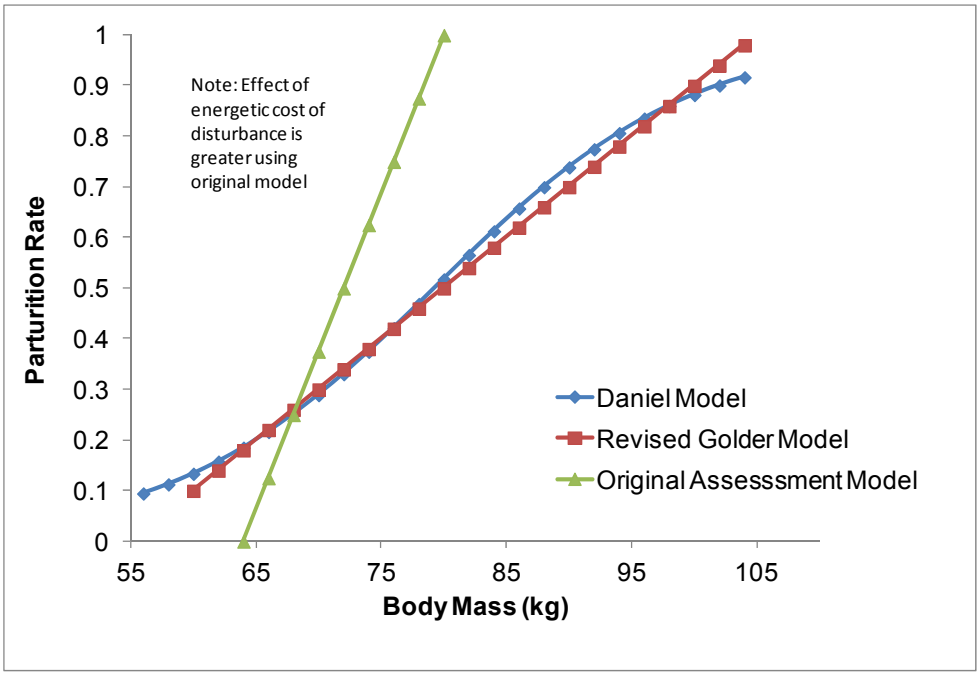

Figure 1: Modelled Relationships Describing Parturition Rates as a Function of Body Weight, as Part of the Energetics Assessment

If assuming that mass loss from one disturbance event is 0.0471 kg (see Section 8.5.4.2 in DAR), female caribou would be required to come into contact with almost 1000 such disturbances to reduce parturition rates from 1.0 to 0.5 (by 50%) under the Daniel relationship; whereas female caribou would have to come into contact with 340 disturbance events to result in no reproduction the following spring using the parturition rate-body mass relationship in the DAR. For a landscape in which an individual in a population encounters an average of 40 sensory disturbance events in its winter range (see Golder 2011), the Daniel model predicts that parturition rates of the female would be reduced by approximately 0.038 units (vs. 0.118 units from the DAR model). The main point is that the parturition rate-body mass formula in the DAR is more than 3-times stronger (more conservative) than that described using the Daniel model. This is another example where the DAR has clearly overestimated effects to caribou.

The DAR applied multiple conservatisms within the caribou assessment, such as the above-mentioned element of the energy model. This underlying philosophy of the assessment adds confidence to the predictability of the effects statements in the DAR. Aligning the energy model in the DAR with that being used by ENR will reduce the anticipated effect size on calf production rates. For the purposes of the DAR and meeting the requirements in the Terms of Reference, the energetic model is adequate enough to substantiate the cumulative effects on productivity of and persistence of caribou populations.

References

Blaxter, K. L. 1962. The energy metabolism of ruminants. C. C. Thomas, Springfield, Ill.

Boertje R.D. 1985. An energy model for adult female caribou of the Denali Herd, Alaska. Journal of Range Management 38:468-473.

Bradshaw, C.J.A., S. Boutin, and D.M. Hebert. 1998. Energetic Implications of Disturbance Caused by Exploration to Woodland Caribou. Canadian Journal of Zoology 76: 1319-1324.

Daniel, C., D. Russell, and M. Carlson. 2009. Modelling the effects of development on the Bathurst Caribou Herd. Demonstration Project.

Fancy, S.G., and R.G. White. 1987. Energy expenditures for locomotion by Barren-ground Caribou. Canadian Journal of Zoology 65:122-128.

Golder (Golder Associates Ltd.). 2011. Effects of Development on Barrenground Caribou: Insight from IQ and an Ecological Model. Prepared for the Kugluktuk Hunters and Trappers Organization, Kugluktuk, NU. Prepared by Golder Associates Ltd., Yellowknife, Northwest Territories. Report Number 10-13128-0042. 84 pages + appendices.

McEwan, E.H. 1970. Energy metabolism of Barren-ground Caribou. Canadian Journal of Zoology 57:201-2021.

INFORMATION REQUEST – YKDFN_2.10

Source: Yellowknives Dene First Nation (YKDFN)

Request

Cumulative Effects Monitoring and Adaptive Management Linkages

YKDFN request that the company completes a cumulative effects monitoring plan with appropriate linkages to adaptive management mitigations.

Response

The Terms of Reference required that the Developer's Assessment Report (DAR) include 'Plans for the monitoring and evaluation of cumulative effects and the adaptive management for the NICO Project's contribution to cumulative effects.' The Terms of Reference also asked for 'A description of how project-specific monitoring can contribute to and be compatible with regional monitoring programs such as the NWT Cumulative Impact Monitoring Program.' (Appendix L of the Terms of Reference). Some examples of proposed monitoring that could contribute to cumulative effects monitoring are presented in Section 18 of the DAR. Examples include contributing to the Northwest Territories Raptor Database, and the North American Peregrine Falcon Survey.

In practice, there is little overlap between cumulative effects monitoring and project-specific monitoring that has value to adaptive management. The most useful monitoring to guide adaptive management will occur within and immediately around the NICO Project footprint. Cumulative effects monitoring typically implies large scales (i.e., over landscapes, watersheds, or population ranges) and monitoring over years or decades. No single monitoring program can achieve both objectives.

Fortune Minerals Limited (Fortune) invites further dialogue with government agencies to determine where Fortune may make a meaningful contribution to cumulative effects monitoring.

INFORMATION REQUEST – YKDFN_3.1

Source: Yellowknives Dene First Nation (YKDFN)

Request

Furans/Dioxins

YKDFN request that the company make a commitment to meet emissions standards, including for dioxins and furans. This should be included as parts of a plan, along with appropriate baseline research in the RSA to allow for impact comparisons in the future, should the proponent have difficulty meeting the targets.

Response

Dioxin and furan emissions will comply with standards through the use of an incinerator designed to meet the standards outlined in Section 10.3.2.1 of the Developer's Assessment Report (DAR). The primary source of dioxins and furans, the waste incinerator, will be engineered and operated to meet the Canadian Council of Ministers of the Environment (CCME) emission standards for dioxins and furans (i.e., 80 pico-grams of International Toxic Quotients per cubic metre [pg I-TEQ/m^3]) (CCME 2001). The response to Environment Canada Information Request 11 (EC_11) details the intended waste incinerator and the commitment to stack test the incinerator while burning sewage sludge prior to the commissioning of the incinerator.

Based on communication with Environment Canada (D. Fox, Environment Canada, 2010, pers. comm.) in May 2010, it was agreed that management plans for the NICO Project will be developed when the NICO Project progresses to the permitting stage. Fortune will develop and implement appropriate adaptive management plans that will include a systematic process to mitigate exceedances of emission standards, should they occur. Section 10.9 of the DAR outlines the adaptive strategies in the way of headings.

References

CCME (Canadian Council of Ministers of the Environment). 2001. Canada-wide standards for dioxins and furans. Winnipeg, MB.

Fox, D. 2010. Air Pollution Management Analyst (North). Environment Canada, Yellowknife, NWT. Telephone conversation and email. 18 May and 25 May 2010.

INFORMATION REQUEST – YKDFN_3.2

Source: Yellowknives Dene First Nation (YKDFN)

Request

Dust Control

YKDFN request (as previously mentioned in IR 1.1 as an example) that a best management practices plan to control fugitive dust and metals emissions be developed and the impacts it will have to overall air quality be submitted.

Response

A best management practices plan to control fugitive dust and metals will be developed and implemented. Dust mitigation will include the following:

- spraying water on haul roads to maintain sufficient surface moisture during summer months;
- establishing and enforcing speed limits on unpaved surfaces to minimize dust from vehicle operations;
- equipping construction equipment with upswept exhausts to enhance dispersion of exhaust;
- equipping the fleet and other equipment with industry-standard emission control systems;
- constructing the NICO Project Access Road as narrow as possible, while maintaining safe construction practices;
- enclosing conveyance systems and processing facilities;
- limiting the height from which material is dropped to minimize dust;
- using high efficiency bag houses for point sources of releases;
- watering ore stockpiles and the primary crusher;
- revegetating the parts of the mine site that will not be disturbed in the future; and
- controlling dumping or transfer rates of materials.

Section 10.9 of the Developer's Assessment Report outlines the sections that will be included in the best management practices plan to control fugitive dust and metals emissions. A best management practices plan will be developed if the NICO Project progresses to the permitting stage as agreed upon with Environment Canada (D. Fox, Environment Canada, 2010, pers.comm.).

Further to the preamble, modelling results of total suspended particulate are conservative. Natural mitigation of dust, such as precipitation and snow accumulation during the winter months, was not included in the modelling due to the lack of publicly available data on the effect of precipitation and snow accumulation on dust control. The impact of the NICO Project on the air quality is best determined through a comprehensive ambient air

quality monitoring program. The development and implementation of an ambient air quality monitoring program is outlined in the response for Environment Canada Information Request 8.3 (EC_8.3). The measurement of the following compounds will be included in the proposed ambient air quality monitoring program:

- total suspended particulate;
- particulate matter with a mean aerodynamic diameter of 10 micrometres (PM_{10});
- particulate matter with a mean aerodynamic diameter of 2.5 micrometres ($PM_{2.5}$); and
- dustfall.

References

Fox, D. 2010. Air Pollution Management Analyst (North). Environment Canada, Yellowknife, NWT. Telephone conversation and email. 18 May and 25 May 2010.

INFORMATION REQUEST – YKDFN_4.1

Source: Yellowknives Dene First Nation (YKDFN)

Request

Progressive Reclamation

YKDFN request that the company provide clear discussion on just what progressive reclamation they intend to undertake, how they mean to complete the action and how it will have been judged to be successful. This should be covered by the development of a thoroughly laid out plan which fits within any new and improved overall closure plan based on best practices.

Response

Fortune Minerals Limited (Fortune) intends to progressively reclaim the Co-Disposal Facility (CDF) throughout the operating life of the mine. The perimeter dyke of the CDF will be raised continually in 5 metre (m) lifts using the upstream construction method. On every second 5 m lift, a 10 m wide bench will be provided on the exterior slopes of the perimeter dyke. After a bench is created, the previous 10 m height will be reclaimed by placing the soil cover and allowing the surface to re-vegetate. By the time the mine operation is completed, all but the final 10 m height of the perimeter dyke will have been reclaimed. This represents about 84 hectares (ha) out of a total slope area of about 132 hectares. Portions of the top surface of the CDF will be regraded, covered, and reclaimed after they reach their final grade. It is expected that about 50% of the total top surface area of about 40 ha will be reclaimed prior to the end of operations. Overall, about 85% area of the CDF will be reclaimed by the end of the operations of the proposed mine. The success of the reclamation will be evaluated by undertaking a monitoring program. While the initial goals of revegetation are to control erosion, the area is expected to gradually create viable self sustaining ecosystems over time. Fortune will work with the local residents and regulators to better define how reclamation will be judged. Fortune has already made the commitment in Information Response TG_27 to consult with the Tłı̨chǫ Government on the determination of the vegetation cover for the CDF.

This conceptual closure will be updated during operations of the proposed mine to verify its alignment with the local cultural and traditional values and other relevant closure guidelines (such as Wek'eezhii Land and Water Board Draft closure guidelines). Fortune has already commissioned a Traditional Knowledge Study to ensure the involvement of the Tłı̨chǫ Government and Tłı̨chǫ people in the development of a closure and reclamation plan that protects indigenous values and incorporates traditional knowledge. Lesson learned from other mines in the Northwest Territories will also be incorporated in the updated conceptual closure plan.

INFORMATION REQUEST – YKDFN_4.2

Source: Yellowknives Dene First Nation (YKDFN)

Request

Road Closure & Remediation

YKDFN request that the company provide clear indication on how they intend to reclaim the roads and created access, how they will pursue community input, and what the long-term monitoring logistics actually will be. Furthermore, this should be included within the updated conceptual reclamation plan.

Response

The fate of the road is up to the Tłı̨chǫ Government and Tłı̨chǫ people and has not yet been discussed with Fortune Minerals Limited (Fortune). A final decision on the road does not need to be taken for at least 25 years. Fortune expects that the fate of the road will be based on the political and environmental conditions at that time. As stated in other Information Request Response's in this document, the closure and reclamation plan will be a living document that will be re-visited periodically with the Tłı̨chǫ Government. Closure endpoints and objectives will likely vary over time.

INFORMATION REQUEST – YKDFN_4.3

Source: Yellowknives Dene First Nation (YKDFN)

Request

Closure Terminology and Structure

YKDFN request that the company resubmit their closure 'chapter' in a form more useful for review, that takes the lessons learned in the other processes here in the NWT and applies them, both in terms of structure and the concise use of terminology to ensure that all Parties and reviewers are consistent.

Response

Fortune Minerals Limited does not propose to resubmit the closure "chapter". The chapter, Developer's Assessment Report (DAR) Section 9.0, was written as an integral part of the DAR, with terminology that is consistent with the Project Description and the rest of the DAR document.

It should be noted that, as required by regulation, a separate Preliminary Closure and Reclamation Plan (PCRP) document is currently being prepared according to the requirements of the Mackenzie Valley Land and Water Board (MVLWB) and the Wek'èezhìi Land and Water Board (WLWB). Consultation with the Tłı̨chǫ Government will be an integral part of the preparation of the PCRP.

INFORMATION REQUEST – YKDFN_4.4

Source: Yellowknives Dene First Nation (YKDFN)

Request

Closure Objectives (Goals)

Even the mining in the Tar sands where thousands of squares kilometres of boreal forest are being destroyed will be re-vegetated. YKDFN do not accept that the NWT, especially the habitat of Bathurst Caribou which is so relied on, should not have the same expectations. To create 'suitable conditions' for nature is an empty commitment – if the 'suitable conditions' established by southern scientists fail, this company will still have achieved successful closure – though the site may be a scar on the landscape for generations.

YKDFN request that the company:

a) Explain what criteria were used in terms of the decision process which selected a 170 year closure timeframe as the preferred option.

b) Describe why they will not commit to undertake any re-vegetation work which will allow the area to be reclaimed to wildlife habitat type similar to the surrounding area.

c) Why the residents who rely on the land should accept this.

d) How have the company established the communities traditional and indigenous values and how do they intend to assess if the closure plan has been successful at protecting them?

Response

Response a

The timeframe of 170 years is incorrect. With reference to the closure schedule in Table 9.4-2 of the Developer's Assessment Report (DAR), reclamation and revegetation activities will start during the active mining period and will be completed within 10 years after mining ceases. In particular, about 85% of the area of the Co-Disposal Facility area will be covered and revegetated progressively before the end of mining, and this process will be completed within 2 years after the end of mining. Reclamation activities related to redundant site roads, the Effluent Treatment Facility, camp facilities, etc will be completed within 10 years after mining.

Response b

As a clarification of Section 9.4.4.5.2.2 in the DAR, the surfaces of the Co-Disposal Facility will be actively revegetated by planting grasses, but not shrubs or tree species. This is necessary to prevent erosion of the soil covers. In other areas, the reclamation process will generally allow areas disturbed by the mining process to be colonized back by the natural vegetation that will allow wildlife habitat similar to the surrounding area. This will be complemented by planting or seeding as required.

Response c

Fortune Minerals Limited (Fortune) believes that the stated approach provides the best means of re-establishing the natural habitat conditions.

Response d

As stated in the response of the Information Request YKDFN_4.1, Fortune has commissioned a Traditional Knowledge Study which will provide valuable information that will help to refine the conceptual closure and reclamation plan to reflect the Tłı̨chǫ people's traditional and indigenous values. The proposed progressive closure and reclamation plan will provide sufficient time to evaluate the effectiveness of the preferred reclamation schemes and to refine them as required to ensure their long-term reliability.

INFORMATION REQUEST – YKDFN_4.5

Source: Yellowknives Dene First Nation (YKDFN)

Request

Closure Vegetation

YKDFN request that the company explain:

a) What, in the company's opinion, would constitute suitable plants and how does the company intend to identify them?

b) Over the next 20 years of operation, 120 years of closure and 30 years of monitoring, what is the company is going to do to ensure that there is appropriate seeds and sufficient intra and inter species diversity to fulfill their closure obligations?

c) What conditions would require planting or seeding and what would be the trigger to enact this? Within the current closure objectives, this would never be needed and is an empty statement.

d) The development of a revegetation plan should be emphasized, with a clear vision, consistent with reasonable expectations of mine site reclamation. The integration of this plan with the closure and reclamation plan should be established, with clear links to closure objective, research reclamation and potential criteria for evaluation.

e) The proponent also suggests that similar vegetation studies to those undertaken at Ekati and Diavik will be undertaken, without providing any indication as to what studies in particular or a commitment when they will be commenced. This should be clarified and incorporated into the closure research plan.

f) Given the long backloading of liability, what financial management actions will the company take during operations to ensure that the closure program, appropriate monitoring, and research activities are sufficiently resourced, as in the sustainable development policy?

Response

Response a

Fortune Minerals Limited (Fortune) will undertake a literature review of vegetation species in the region and will evaluate their suitability for revegetation. Reclamation research from other mine operators will also be reviewed. Local residents will be consulted for their views on the most suitable vegetation species. The suitable species will be evaluated in field plot trials.

Response b

As outlined in response a), the revegetation field plots will help to select species that are suitable for use in revegetation. Seeds and/or stock of the promising species will be scaled up to larger scale testing to further evaluate their performance. Given the length of time for closure, Fortune is confident that there is sufficient time to collect seeds/stock for species that will be used for revegetation. In addition, natural plant succession from adjacent undisturbed areas (i.e., seed dispersal from animal and bird movement) is also expected over time.

Response c

Areas will be allocated for seeding and revegetation once they become available. As outlined in the response to Information Requests YKDFN_4.1 and YKDFN_4.4, Fortune will be undertaking progressive reclamation on the Co-Disposal Facility, and this will specifically involve seeding the entire cover area with grasses.

Response d

Fortune agrees that a revegetation plan will be developed and it will be integrated with the closure objectives and potential criteria for evaluation. This plan will be developed in cooperation with the Tłı̨chǫ Government.

Response e

As outlined in the responses to a) and b), the revegetation field plot trials will be implemented once consultation and an initial literature review is completed and mining areas are identified for reclamation. The plot study designs will be forwarded to the regulators and local residents to allow their review on what should be studied. As outlined in response b), some of the field trials will relate to evaluating revegetation species. Other trials that may be developed could include soil improvement techniques to enhance revegetation success.

Response f

A Preliminary Closure and Reclamation Plan is being developed according to the requirements of the Mackenzie Valley Land and Water Board and the Wek'èezhìi Land and Water Board. This will include an estimate of closure costs and a financial assurance will be posted based on this estimate. The amount and form of this financial assurance will be subject to negotiations between Fortune and the regulators. The financial assurance will be vested in government and will not be dependent on the longevity of Fortune.

INFORMATION REQUEST – YKDFN_4.6

Source: Yellowknives Dene First Nation (YKDFN)

Request

Closure Process

For the closure plan, YKDFN request

a) The company immediately work with communities to develop an engagement plan for closure – focusing on end use, closure goals/vision and the objectives.

b) Provide an engagement plan explaining how the company intends to include communities in the closure planning process throughout the life and post operations/pre-closure of the mine, including a discussion on how this will be funding after operations cease.

c) Describe what site specific studies are planned to be undertaken, linking them as a 'reclamation research plan' to mine components and closure objectives within an updated mine closure plan.

Response

Response a

Fortune Minerals Limited (Fortune) is currently negotiating with the Kwe Beh working group to develop a plan and schedule for Tłı̨chǫ community consultation sessions. One of the key items that will be discussed in these sessions will be closure objectives. Fortune's ultimate goal is to develop an engagement plan for closure as described in the Developer's Assessment Report Engagement Section 4.2 and 4.4, along with Closure and Reclamation Section 9.

Response b

Fortune intends to engage the communities in the closure planning process through the following:

- initiating meetings with leaders of the communities and government organizations;
- engaging each community through community-based activities such as open houses, presentations, and meetings;
- inviting community leaders and representatives to visit the NICO Project site; and
- granting specific requests for site visits from elders.

A Preliminary Closure and Reclamation Plan is being developed according to the requirements of the Mackenzie Valley Land and Water Board and the Wek'èezhìi Land and Water Board. The closure and reclamation plan will be a living document that will be periodically re-visited for updates as more is known about the site and people's reclamation goals. An estimate of closure costs and a financial assurance will be posted based on this estimate, which will include a component for consultation. The amount and form of this financial assurance will be subject to negotiations between Fortune and the regulators.

Response c

Fortune cannot comment on the details of any site specific studies until the activities listed in Information Request YKDFN_4.1 have been completed.

INFORMATION REQUEST – YKDFN_4.7

Source: Yellowknives Dene First Nation (YKDFN)

Request

CDF Closure objectives and Actions

a) What are the specific parameters of the cover system within the conceptual closure plan?

b) What is the objective of the cover and what criteria will success or failure be evaluated by? For example, using the above example, what reduction in net infiltration will be required for successful closure implementation.

c) What criteria is the company proposing to evaluate if the establishment of vegetation on the covers will be successful? For all other closure components, they have stated that they will create conditions for natural re-vegetation, a low bar that will be much easier to accomplish and evaluate.

Response

Response a

The cover system will comprise 0.5 metres (m) of glacial till underlain by 0.25 m of sand on the top of the Co-Disposal Facility (CDF), and 1 m of glacial till on the sloped perimeter dyke. The glacial till is a well-graded material which is resistant to erosion, which has a relatively low permeability. The sand layer on top of the CDF will act as capillary break to minimize the potential for upward flux of tailings pore water, reducing the potential for arsenic uptake by vegetation. The top surface of the closed CDF will be sloped at about 2% to enhance the water shedding capacity of the facility.

Response b

The objectives of the CDF cover system are to minimize wind and water erosion, and to reduce infiltration. The cover system is intended to be effective at shedding water, primarily of benefit during the spring freshet, and also to provide adequate store and release capacity to reduce infiltration during the drier summer months. The cover system is anticipated to reduce the net infiltration rates to between 10 to 15% of the total precipitation (i.e., less than 52 millimetres per square metre in an average year). The cover system will be monitored and instrumented to evaluate its performance. Details of the proposed field monitoring system will be provided in the future. The success of the cover system will be determined by observation of its resistance to erosion, by measurement of the net infiltration rate, and by observation of a sustainable vegetation cover.

Response c

As outlined in Section 3.8.1 of the Closure and Reclamation Plan in the Developer's Assessment Report, one of Fortune Minerals Limited (Fortune) goals is site stabilization and erosion control. The success of the reclamation will be evaluated by undertaking a monitoring program. While the initial goals of revegetation are to control erosion, the area is expected to gradually create viable self sustaining ecosystems over time. Fortune will work with the local residents and regulators to better define how reclamation will be judged. Fortune has already made the commitment in Information Response TG_27 to consult with the Tłı̨chǫ Government on the determination of the vegetation cover for the CDF.

This conceptual closure will be updated during operations of the proposed mine to verify its alignment with the local cultural and traditional values and other relevant closure guidelines (such as Wek'eezhii Land and Water Board Draft closure guidelines). Fortune has already commissioned a Traditional Knowledge Study to ensure the involvement of the Tłįchǫ Government and Tłįchǫ people in the development of a closure and reclamation plan that protects indigenous values and incorporates traditional knowledge. Lesson learned from other mines in the Northwest Territories will also be incorporated in the updated conceptual closure plan.

INFORMATION REQUEST – YKDFN_5.1

Source: Yellowknives Dene First Nation (YKDFN)

Request

Water Management - Nitrates

YKDFN request that the company provide discussions explaining why these contaminants of concern are not expected to occur at significant levels within the waste stream.

Response

Nitrate and ammonia concentrations were predicted based on the expected explosives waste rate, which is relatively low. The hydrogeologic model predicted low groundwater inflow rates, limiting the explosives waste rate during mining. Additionally, the underground mining component, when the explosives waste rate is most likely to vary, is small in comparison to the Open Pit component.

INFORMATION REQUEST – YKDFN_5.2

Source: Yellowknives Dene First Nation (YKDFN)

Request

Site Specific Water Quality Guidelines

YKDFN request:

1) The company provides justification for the development and application of a wide range of SSWQO instead of utilizing the CCME guidelines for the protection of aquatic life.

2) The company explains how they valued the unaltered water quality within the receiving environment and/or; the company explains how they 'costed' the deposition of waste in an effectively pristine receiving environment.

Response

Response 1

The YKDFN has requested justification for the development and application of Site-specific Water Quality Objectives (SSWQOs) instead of utilizing the Canadian Council of Ministers of the Environment (CCME) guidelines for the protection of aquatic life. Justification is provided in the SSWQOs in Appendix 7.VII of the Developer's Assessment Report. In brief, the Terms of Reference (TOR) for the NICO Project notes that SSWQOs are to be proposed for all contaminants of potential concern identified for the NICO Project to protect downstream water quality (MVRB 2009). As well, the CCME guidelines for the protection of aquatic life are considered generic because they are intended for application in all regions of Canada and do not, in most cases, make allowance for regional differences in water quality parameters which modify the toxicity of metals or, if they do, adjustments are made for water hardness only. For some metals, other quality parameters (e.g., dissolved organic carbon) have a greater influence on metal toxicity than hardness. As well, the generic guidelines do not make allowance for regional differences in the types of species present. In recognition of this, the CCME has included in their protocol for the derivation of water quality guidelines, procedures to modify the national water quality guidelines to account for the conditions at the site in question (CCME 2007). To account for the conditions at the NICO Project site, SSWQOs were developed and applied for the NICO Project.

Response 2

The requested information regarding valuation of existing water quality and costing of waste management related to changes to the receiving environment are not requirements defined in the TOR (MVRB 2009).

References

CCME (Canadian Council of Ministers of the Environment). 2007. A Protocol for the Derivation of Water Quality Guidlines for the Protection of Aquatic Life 2007. In: Canadian Environmental Quality Guidelines, 1999, Canadian Council of Ministers of the Environment, 1999, Winnipeg, MB.

MVRB (Mackenzie Valley Review Board). 2009. Terms of Reference for the Environmental Assessment of the Fortune Minerals Ltd. NICO Cobalt-Gold-Bismuth-Copper Project. EA 0809-04.

INFORMATION REQUEST – YKDFN_5.3

Source: Yellowknives Dene First Nation (YKDFN)

Request

Post Operations Water Management

YKDFN request that the company provide information on the extreme water design standards that were used for this project as well as what climatic modeling they used to establish the benchmarks for the values used in the return periods of extreme events.

YKDFN also request that the company provide discussion and clear commitments on what effluent quality criteria they suggest should apply after operations cease. Including information on just what the company intends to do, both in terms of the objectives of the establishment of the wetlands, but also on the design and optimization in terms of meeting these EQC's would be valuable in terms of the consideration of effective criteria.

Response

The extreme water design standards used for the NICO Project included an Environmental Design Flood, a Probable Maximum Precipitation (PMP), and an Inflow Design Flood. The Environmental Design Flood was equal to or greater than a 100-year return period 24-hour precipitation event, or a 100-year return period 30-day duration rainfall, plus snowmelt event. The 30-day, 100-year rainfall plus snowmelt event is 215 millimetres (mm) and the 1:100 year, 24-hour storm is expected to yield 83.6 mm of rain. The 1-day statistical PMP used was 241.7 mm. The Inflow Design Flood was 157.5 mm over a period of 24 hours and was defined to be 1/3 between the 1000-year return period daily precipitation and the PMP as recommended for a high standard of care in the 2007 Canadian Dam Association Dam Safety Guidelines (CDA 2007).

The surface runoff collection system, including the Seepage Collection Ponds, are designed to contain the Environmental Design Flood. The Co-Disposal Facility is designed to store the Inflow Design Flood.

Climatic modelling was not completed when developing the values and return periods associated with extreme events. However, the approach used to account for extreme events is conservative. The extreme events are statistical extremes based on the historical record (1953 to 2008) for the Yellowknife Airport. Being statistical extremes with return periods of 100 years, they are conservative estimates even when considering long-term climatic trends. The probable maximum precipitation makes no allowance for long-term climatic trends. Rather, it is the maximum precipitation meteorologically possible for a given storm area at a particular location.

The effluent quality criteria to be applied to discharges from the treatment wetlands systems after operations cease are the site-specific water quality objectives, to the extent possible, as these are aquatic health based benchmarks developed from toxicological information. Conceptual information on the design, optimization, and establishment of the wetlands was presented in Section 3.III.8.4 of the Developer's Assessment Report (DAR):

> *Wetland treatment has been selected as the base case for post-closure treatment of water that accumulates in SCP No. 1, 2, 3, and 5, and the Surge Pond. Passive treatment may also be implemented to treat Flooded Open Pit overflow if it is necessary and appropriate. Passive treatment options could include*

anaerobic treatment in biochemical reactors (BCRs), and/or aerobic wetlands. Passive treatment options have been developed for the purpose of initial evaluation. Conceptual design of the post-closure passive treatment options will take place prior to the detailed design stage of the NICO Project and will be submitted during water licensing. Field trials, based on actual site conditions and detailed from conceptual designs, will take place during mine operations. The detailed engineering design will be completed following scale-up of the field trial cells, using design criteria and operating parameters optimized from those trials. If passive treatment proves to be an unsustainable option for post-closure treatment of site discharge, then alternative treatment methods will be investigated as discussed in Section 3.III.10.4."

Section 3.III.8.4.1 further describes experience with passive treatment in cold climates. Development work on passive treatment is currently underway and will continue throughout mining as described above with the contingency described in Section 3.III.10.4.

Process water generated during pilot plant operations was concentrated into a brine using a reverse osmosis system, and this concentrated brine is currently being treated in a bench-scale passive treatment system. Approximately 400 litres (L) of brine is being treated in the bench-scale system to provide the initial "proof-of-principle" test to demonstrate that the background water quality matrix and expected contaminants are amenable to treatment by the proposed passive treatment mechanisms. There are several types of treatment systems that are classified as "passive", and they typically all rely on similar mechanisms for metals removal, which includes a combination of both anaerobic and aerobic biotreatment. Evaluation of a wetlands type system on a bench-scale with limited quantities of water is not feasible, so an alternate method for the "proof-of-principle" test is being used for bench-scale testing. This includes using a passive biochemical reactor as the anaerobic step and a passive aerobic polishing system as the aerobic step due to space constraints, time constraints, and limitations on the water available for testing. The anaerobic and aerobic biological treatment mechanisms are the same mechanisms that provide metals removal in wetlands systems. This "proof-of-principle" testing is the first step in the development of passive treatment as described in Section 3.III.8.4 of the DAR.

Preliminary results are shown in Table 1 of information request TG_28 and includes both total and dissolved metals results for the anaerobic (BCR) and aerobic (APC) bench cells. Through the third sampling event on 4 November 2011, the system had been operational 5 weeks after a 2 week incubation period. After treatment of approximately 300 L of water, reductions of an order of magnitude for the metals present have been achieved. Observations regarding these data are as follows:

- The arsenic removal is likely limited based on the amount of iron in the water but increased aeration may increase the arsenic removal in the APC. As discussed previously the engineering parameters will be determined during pilot testing and increased aeration requirements can be engineered into passive systems. For this bench testing the aeration will be increased to evaluate the impact on arsenic removal.
- Good removal of aluminum is occurring in the BCR; however, it appears that there is some residual aluminum in the APC from the materials used to construct and start-up the system. It is not unusual for passive systems to have a "flushing" period and it is expected that the aluminum levels in the APC effluent will also decrease.

References

CDA (Canadian Dam Association). 2007. Dam safety guidelines. Canadian Dam Association, Toronto, ON. 82 p.

INFORMATION REQUESTS

MACKENZIE VALLEY REVIEW BOARD

INFORMATION REQUEST – MVRB_1

Source: Mackenzie Valley Review Board (MVRB)

Request

Co-Disposal Facility - Mine Rock Void Space and Tailings Infill

a) The arbitrary figure of 50% was chosen as the amount of void space that would be in filled in the mine rock by tailings. Please provide rationale for the use of 50%.

b) Please describe the likelihood of alternative percentage infill scenarios that could occur (i.e. 40%, 60%) in waste rock void space and describe how these alternatives may impact Co-disposal Facility design, including dyke construction and scheduling.

Response

Response a

The 50% filling of the void spaces of the mine rock with tailings is an estimate at this stage based on the planned co-disposal procedures. This estimate was made for the purpose of predicting the overall volume of the Co-Disposal Facility (CDF). Variation in the actual percentage of void space filled would not affect the performance of the CDF. The proposed configuration of the CDF (i.e., with thin layers of tailings interspersed between rock layers, and with a surrounding perimeter dyke constructed of rock) will both facilitate the consolidation of the tailings and provide an inherently stable structure.

Response b

The effect of a change in the percentage of mine rock filled on the storage capacity requirement is plotted in Figure 1. The only effect of a change in the percentage of the in filled tailings would be a change in the height of the CDF. The worst case scenario would be if the tailings did not fill any of the voids of the mine rock. In such a case, the CDF storage requirement would increase by about 9%, which would mean a 15 metre increase in height of the CDF. This would result in a maximum elevation on the east end of the CDF of about 325 metres. The footprint of the CDF would not be changed.

INFORMATION REQUEST – MVRB_2

Source: Mackenzie Valley Review Board (MVRB)

Request

Co-Disposal Facility - Equipment Usage, Tailings Dispersal

a) Will the equipment used to prepare mine rock surfaces for tailings placement in the Co-disposal Facility be contained within the Co-disposal Facility perimeter throughout mine operations?

b) If mobile equipment will not remain within the Co-disposal Facility perimeter, provide mitigation to ensure that carry-back of tailings and contaminants by mobile equipment does not occur outside of the Co-disposal Facility.

Response

Response a

No, the equipment will not be contained with the Co-Disposal Facility (CDF) perimeter throughout the mine operations.

Response b

All equipment leaving the CDF will be pressure washed prior to leaving the area.

INFORMATION REQUEST – MVRB_3

Source: Mackenzie Valley Review Board (MVRB)

Request

Co-Disposal Facility - Adaptive Management

Please describe impacts to the Co-disposal Facility over the long-term, including impacts to ground water from seepage if thickened tailings has less solids content than the predicted 73-77% range during a prolonged time period in the operations phase.

Response

A change in the solids content would alter the water balance of the Co-Disposal Facility (CDF). The solids content of the tailings slurry determines the volume of water that will be sent to the CDF with the tailings. Much of the water in the slurry ends up stored in the pores of the accreting tailings mass; the remainder is “bleed water”, which will be released as free water and will need to be collected in the Surge Pond and then returned to the Processing Plant for re-use. With reference to Figure 3.9-5 of the Developer’s Assessment Report, a solids content of 75% will deliver about 545 000 cubic metres per year (m^3/year) to the CDF, of which about 446 000 m^3/year will be locked up in the tailings voids, leaving about 99 000 m^3/year of bleed water. A decrease in the solids content would increase the volume of water delivered to the CDF, which in turn would increase the amount of bleed water to be collected and returned to the Processing Plant. As an example, a solids content of 70% would result in about 245 000 m^3/year of bleed water. Providing the efficacy of the collection of bleed water remains the same, a decrease in the solids content would have little or no effect on the volume of water that reports as seepage to the Seepage Collection Ponds. A change in the solids content would not be expected to change the volume of seepage to groundwater as this factor would be a function of the total head on the porewater in the tailings, which should not change, and the hydrogeological properties of the Grid Ponds basin which will host the CDF. A decrease in the solids content should not increase either the volume of water taken from Lou Lake or the volume of water released as effluent. It would simply increase the volume of water in circulation between the CDF, the Surge Pond, and the Processing Plant.

The consolidation rate of the tailings will be fast since the tailings lenses will be surrounded on all sides by layers of mine rock. The tailings deposition points will be continuously moved during the winter months to minimize ice entrainment. Therefore, a decrease in solids content would not be expected to have any long-term effect.

INFORMATION REQUEST – MVRB_4

Source: Mackenzie Valley Review Board (MVRB)

Request

Diffuser in Peanut Lake, thermal regime, ice cover

Please describe the impacts to people and wildlife from weakened ice cover on Peanut Lake due to heated effluent discharge into the lake and discuss as part of the pathways analysis.

Response

Fortune Minerals Limited will post a sign on the portage into Peanut Lake from Nico Lake, indicating to snowmobiliers that the lake may have weakened ice. Snowmobilers will have the option of using the lake margins to cross Peanut Lake. However, it should be noted that the annual aerial wildlife surveys from 2004 to 2011 did not observe snowmobile activity on Peanut Lake. This pathway is therefore considered to have no linkage.

With regards to wildlife, moose and caribou are the only 2 mammals of sufficient size and which are active in winter to be exposed to weakened ice on Peanut Lake. Individuals from these species may encounter this risk at some times of year. However, it can be assumed that caribou and moose are able to make an assessment of ice hazards themselves. Thin ice can be felt to move and crack; caribou and moose will be sensitive to this. Considering that moose and caribou are very mobile and are exposed to thin ice conditions each spring and fall during the natural change of the seasons, they are likely excellent judges of ice conditions. The risk of harm to these species from weakened ice on Peanut Lake is considered to be very low, and the pathway is considered to have negligible effects to the persistence of moose and caribou populations.

INFORMATION REQUEST – MVRB_5

Source: Mackenzie Valley Review Board (MVRB)

Request

Closure & Reclamation - Adaptive Management Responses

a) Estimates of the pit infilling with water after operations in the base case are in the order of 120 years. Does Fortune have estimates for pit infill if the effluent treatment facility post-closure option is selected?

b) Does construction and operation of a new effluent treatment facility to treat flooded open pit water during post-closure represent treatment in perpetuity?

Response

Response a

If it became evident that a new active Effluent Treatment Facility (ETF) would be required to treat the surficial Open Pit water, then such treatment would be initiated just before overflow would otherwise occur. The water level in the Open Pit would thereafter be maintained just below the overflow level so that all effluent from the Open Pit would pass through the new ETF.

Response b

If it became necessary to construct and operate a new ETF to treat surficial Open Pit water, then such treatment would be continued as long as it was required. Effluent Treatment Facility treatment would be discontinued under one of the following circumstances:

- if the surficial water quality in the Open Pit improved to the point that water quality objectives could be met without further treatment; or
- if the ETF was replaced by an alternative treatment method, such as in-pit treatment or use of a passive Wetland Treatment System.

It is expected that the water quality in the Open Pit will improve slowly over time due to decreases in long-term loadings from the exposed pit walls and due to stratification or other biological processes in the flooded Open Pit. This is not something that can be reliably predicted at this time. In this context, perpetual treatment using a new ETF is an unlikely worst case scenario; however, it cannot be completely discounted.

INFORMATION REQUESTS

ABORIGINAL AFFAIRS AND NORTHERN DEVELOPMENT CANADA

INFORMATION REQUEST – AANDC_1

Source: Aboriginal Affairs and Northern Development Canada (AANDC)

Request

Site-specific Water Quality Objectives - Baseline Water Quality Data

1) Please provide a rationalization as to why a number of the proposed SSWQOs are higher than those which appear to be readily achievable through the implementation of either an ion exchange or reverse osmosis treatment system

2) What are the predicted impacts to Nico Lake as a result of exceeding the proposed aluminum guideline?

3) Please rationalize the use of modelled baseline values compared to measured baseline values for assessing changes to the existing baseline condition

Response

Response 1

The Site-specific Water Quality Objectives (SSWQOs) were developed to provide benchmarks for assessment of potential impacts to receiving water quality. A number of the proposed SSWQOs are higher than those which appear to be readily achievable through the implementation of either an ion exchange or reverse osmosis treatment system because the objective concentrations are aquatic health based benchmarks developed from toxicological information and have no basis on available treatment technologies. The evaluation of treatment technology options for water treatment during operations was guided, in part, by ability to treat to or lower than SSWQO values at the end of pipe for as many chemicals as possible. This was done instead of developing a separate set of treated effluent quality objectives.

Response 2

Predicted aluminum concentrations Nico Lake during operations are primarily due to deposition of dust predicted by air quality dispersion modelling. As noted in Section 7.13.1 of the Developer's Assessment Report, the predictions of dust deposition and associated metals are conservative, as are the assumptions used to incorporate them as an input to the surface water quality model. The total aluminum concentrations are likely overestimated during operations as a result and it is therefore highly unlikely that the dissolved aluminum concentration associated with these predictions would exceed the proposed SSWQO for alumimum in Nico Lake during operations. Potential impacts to Nico Lake as a result of exceeding the proposed aluminum objective therefore are negligible.

Response 3

Modelled baseline values were used to assess changes to the existing baseline condition instead of measured baseline values so that the comparisons were based on values generated using the same set of assumptions and simplifications incorporated in the modelling, and therefore are the most appropriate representations of predicted changes in the system due to the project. Measured baseline values for the Marian River and waterbodies and watercourses upstream of and adjacent to Nico, Peanut, and Burke lakes were used to develop baseline model inputs, and measured baseline values for Nico, Peanut, and Burke lakes were used to calibrate the baseline model.

INFORMATION REQUEST – AANDC_2

Source: Aboriginal Affairs and Northern Development Canada (AANDC)

Request

Site-specific Water Quality Objectives - Derivation

1) Please confirm the most appropriate parameters (e.g., pH and temperature) for use in developing SSWQOs and recalculate any parameters if necessary.

2) Please confirm the derivation of the SSWQO for aluminum.

Response

Response 1

The AANDC has asked for confirmation that the most appropriate parameters (e.g., pH and temperature) have been used in developing the Site-specific Water Quality Objectives (SSWQOs) and that, if necessary, the parameters are recalculated. The development of the SSWQOs for ammonia, chloride, copper, and sulphate relied upon such parameters, as well as others.

For ammonia, the SSWQOs for Nico and Peanut lakes of 4.16 milligrams (mg) total ammonia-N/L were derived from the guideline for total ammonia developed by the U.S. EPA based on pH and temperature (U.S. EPA 2009). The objectives were derived based on the average temperature and pH of the historical measurements in Nico and Peanut lakes (predicted pH and temperature values as a result of the NICO Project are not available). It is recognized that the objectives may be under protective at pH values above the mean and overprotective at pH values below the mean. The SSWQOs for ammonia do not change over the temperature ranges historically observed in Nico and Peanut lakes. Based on the range in pH values historically observed in Nico and Peanut lakes, the SSWQO for ammonia for Nico Lake ranges from 3.04 to 5.41 mg total ammonia-N/L. In Peanut Lake the SSWQO ranges from 3.04 to 5.64 mg total ammonia-N/L. Regardless, predicted concentrations of ammonia during construction, operations, active closure, and post-closure of the NICO Project are well below the ranges in SSWQOs provided above.

For chloride, the SSWQOs for Nico and Peanut lakes of 353 milligrams per litre (mg/L) were derived using the equation provided by the Iowa Department of Natural Resources based on water hardness and sulphate concentration (http://www.iowadnr.gov/water/standards/files/ws_fact.pdf). The objectives were derived based on a water hardness of 50 mg/L as $CaCO_3$ and a sulphate concentration of 5 mg/L. In Nico Lake, water hardness ranges from 26 to 57.1 mg/L as $CaCO_3$ and sulphate concentrations range from 1.7 to 6.6 mg/L. In Peanut Lake, water hardness ranges from 27 to 39 mg/L as $CaCO_3$ and sulphate concentrations range from 0.25 to 2.8 mg/L. Based on these historical ranges in measurements, SSWQOs for chloride range from 334 to 355 mg/L for Nico Lake and from 350 to 389 in Peanut Lake. Predicted concentrations in both Nico and Peanut lakes are well below the ranges in SSWQOs provided above.

For sulphate, the SSWQOs for Nico and Peanut Lakes of 500 mg/L were derived based on guidance provided by the Iowa Department of Natural Resources based on water hardness and chloride concentration (http://www.iowadnr.gov/water/standards/files/ws_fact.pdf). The objectives were derived based on a water

hardness of less than 100 mg/L and a chloride concentration of less than 5 mg/L. In Nico Lake, maximum measured water hardness was 57.1 mg/L as $CaCO_3$ and the maximum measured chloride concentration was 2 mg/L. In Peanut Lake, the maximum measured water hardness was 39 mg/L as $CaCO_3$ and the maximum measured chloride concentration was 2 mg/L as $CaCO_3$.

For copper, the development of the SSWQOs used the Biotic Ligand Model (BLM) approach (U.S. EPA 2007). In using the approach, all water samples collected from Nico and Peanut lakes which had been fully characterized with respect to calcium, magnesium, sodium, potassium, sulphate, chloride, alkalinity, dissolved organic carbon (DOC), temperature, and pH were used in the model. The BLM calculates an objective for each set of input parameters. For example, if there are 10 water samples for a waterbody, the BLM calculates 10 instantaneous copper objectives. The lowest of the calculated instantaneous objectives were proposed as the SSWQOs for copper. The calculated instantaneous objectives account for the variability in water parameters over time and space given that the samples used in the derivation were collected from multiple sampling locations within each waterbody and at different times of the year. As such, the objectives are considered to be protective with respect to current conditions in Nico and Peanut lakes. The objectives are also considered to be protective of predicted conditions in Nico and Peanut lakes. This is because for most water quality parameters used in the calculation (calcium, magnesium, sodium, potassium, sulphate, and chloride), levels are predicted to increase relative to current conditions as a result of the NICO Project, and these parameters have a protective effect on copper toxicity. Predicted values for temperature, pH, alkalinity, and DOC are not available; however, it is not expected that these values would decrease as a result of the NICO Project relative to the range in current conditions.

Response 2

The AANDC has asked for confirmation of the derivation of the SSWQO for aluminum. Site-specific water quality guidelines of 420 µg/L and 410 µg/L were derived for Nico and Peanut lakes, respectively. The objectives for aluminum were derived using the equation that is currently provided by the British Columbia Ministry of Environment, Lands and Parks to derive water quality guidelines for dissolved ammonia at a pH of less than 6.5 (BCMELP 1994). In Nico Lake, the pH ranges from 7.1 to 7.8. In Peanut Lake, the pH ranges from 7.0 to 7.8. The pH ranges in Nico and Peanut lakes are outside the pH range for which the equation provided by the BCMELP is applicable. Still, the SSWQOs are considered protective of aquatic life in Nico and Peanut lakes.

The toxicity of aluminum is highly dependent on pH. The toxicity data provided in the CCME guideline derivation for aluminum was reviewed. There were few studies included in the guideline derivation in the pH ranges measured in Nico and Peanut lakes. Adverse effects on survival (37% mortality) were observed using the chironomid *Tanytarius dissimilis* following 55 days of exposure to 800 micrograms per litre (µg/L) aluminum at pH 6.8 (Lamb and Bailey 1981; as cited in CCREM 1987). Reproduction in *Daphnia magna* was impaired by 50% at a concentration of 680 µg/L aluminum at pH 6.5 to 7.5 following 3 weeks of exposure (Schofield and Trojnar 1980, as cited in CCREM 1987). The results of the study by Biesnger and Christensen (1972) were not included in the CCME guideline derivation; however, they demonstrated a 50% and 16% impairment in reproduction in *Daphnia magna* following 21 days of exposure to 680 µg/L and 320 µg/L aluminum, respectively at pH 7.4 to 8.2. This result is consistent with that of the Schofield and Trojnar study (1980, as cited in CCREM 1987). *Daphnia magna* appear to be more sensitive to the effects of aluminum than other cladocerans. For example, *Holopedium gibberum*, the most abundant cladocerna in Nico Lake (Annex C of the DAR) was found in an acidified Ontario lake with an aluminum concentration of 490 µg/L (Bleiwas 1983; as cited in Havas and Likens 1985). This species has also been shown to be tolerant to aluminum in laboratory tests. Exposure to 1000 µg/L at pH 6.5 resulted in no adverse effects on survival (Havas and Likens 1985).

There were no studies cited in the CCME guideline derivation for aluminum for fish in the pH range measured in Nico and Peanut lakes, and in general these studies are lacking for fish. The available data suggests that fish are more sensitive to the effects of aluminum than invertebrates. Hunn et al. (1987) exposed eyed embryos of book trout (*Salvelinus fontinalis*) to a pH value of 7.81 without and with aluminum (283 µg/L) in soft water (hardness <9 mg/L as $CaCO_3$, which is consistent with hardness measured in Nico and Peanut lakes) for 60 days. Exposure to aluminum significantly decreased the growth of brook trout after 45 and 60 days. There were no significant effects of aluminum on embryo mortality and hatchability. Kane and Rabeni (1987) exposed small mouth bass (*Micropterus dolomieui*) larvae to 252 µg/L aluminum at pH 7.3 in a 30 day chronic test. There were no significant effects of aluminum on survival or growth. Sublethal effects on fish were demonstrated, including deformities, reduced activity and abnormal swimming behaviour. Roy et al. (2000) studied the toxicity of aluminum in the Saquenay River, Quebec, in relation to discharges from an aluminum smelter. In waters downstream of the effluent outfalls, concentrations ranging from 470 to 540 µg/L in soft neutral-pH (pH 7.0 to 7.3) waters had no significant effect on *Ceriodaphnia dubia* survival and growth and fathead minnow (*Pimephales promelas*) survival and growth.

Complexation is an important factor in reducing aluminum bioavailability and toxicity. For example, the complexation of aluminum by DOC matter reduces the bioavailability and toxicity of aluminum to fish in neutral to slightly basic water (Gundersen et al. 1994; Winter et al. 2004). As well, the formation of dissolved aluminosilicates has been shown to reduce the bioavailability and toxicity of aluminum to fish (Burchall et al. 1989).

Dissolved organic carbon concentrations in both Nico Lake and Peanut Lake are relatively high (ranging from approximately 10 to 20 mg carbon/L). Aluminum in both the solid phase of the tailings and waste rock for the NICO Project is primarily bound with silicate minerals (Annex A of the DAR). Based on these mineralogical results, the aluminum-bearing particulate in water is most likely in the form of silicates (Section 5.14 of Annex A of the DAR). As well, dissolved aluminum is likely to be present bound to DOC or as dissolved aluminosilicates which forms at pH values greater than or equal to 4. This is in contrast to most of the toxicity tests described above which used soluble aluminum salts that speciate to Al^{3+} or $Al(OH)_4^-$, which are considered the most toxic forms of aluminum.

Given the mitigating effects of DOC and silicates on aluminum toxicity and that toxic effects on invertebrates and fish were not noted in waters of similar hardness, and pH to Nico and Peanut lakes receiving effluent discharges from an aluminum smelter, the SSWQOs of 420 and 410 µg/L are considered protective of aquatic life.

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INFORMATION REQUEST – AANDC_3

Source: Aboriginal Affairs and Northern Development Canada (AANDC)

Request

Water Management – Effluent Treatment Facility (ETF) Design Assumptions

1) Please confirm that the "worst case" numbers were used in the design.

Response

Worst case numbers were used in the design. From Section 3, Appendix 3.III.8.2 of the Developer's Assessment Report, second paragraph, bullets 1, 2, and 4 describe the flow and water quality basis, as follows:

- The hydraulic basis of design for equipment was a predicted flow volume of 1597 m^3/day, which is the maximum design flow rate based on a 25 year wet return at the end of operations.
- The average ETF influent (0.192 M-m^3 or 525 m^3/day) used for the estimation of operations and maintenance costs was the average of the start-up (284 m^3/day) and end of operations (766 m^3/day) flows.
- The composition of the influent reporting to the ETF was based on a range of "worst case" and "early operation" conditions (Table 3.III.7-2). The influent design basis was based on the results of geochemical predictions of mine water quality during operations.

INFORMATION REQUEST – AANDC_4

Source: Aboriginal Affairs and Northern Development Canada (AANDC)

Request

Effluent Treatment Facility - Design Assumptions

1) Please confirm the estimate of regenerant volume, and that any increased regenerat disposal cost will not affect the Proponent's decision to use ion exchange for effluent treatment.

Response

From Section 3, Appendix 3.III.8.2 of the Developer's Assessment Report (DAR), second paragraph, bullet 5 correctly presents the regenerant volume. In summary, Ion exchange regenerant rates will be 563 m^3/year (hydrochloric acid), and 222 m^3/year 50% sodium hydroxide.

From Section 3, Appendix 3.III.8.2 of the DAR, second paragraph, bullets 1 and 2 describe the flow and water quality basis for the calculation of regenerant volume:

- The hydraulic basis of design for equipment was a predicted flow volume of 1597 m^3/day, which is the maximum design flow rate based on a 25 year wet return at the end of operations.
- The average ETF influent (0.192 M-m^3 or 525 m^3/day) used for the estimation of operations and maintenance costs was the average of the start-up (284 m^3/day) and end of operations (766 m^3/day) flows.

The composition of the influent reporting to the Effluent Treatment Facility (ETF) was based on a range of "worst case" and "early operation" conditions (Appendix 3.III; Table 3.III.7-2). The influent design basis was based on the results of geochemical predictions of mine water quality during operations.

In the "Update for the Developer's Assessment Report" (MVRB 2011, internet site) the decision to utilize reverse osmosis technology rather than the ion exchange technology is described as follows:

> "In Section 2.3.6 of the DAR, Fortune Minerals Limited (Fortune) stated that it was considering the use of a reverse osmosis system for effluent water treatment instead of the currently proposed Ion Exchange (IX) system. Fortune can now confirm it will be using a RO/chemical treatment/biological treatment system combined with chemical treatment and biological treatment for effluent water treatment at the NICO Project. The RO system provides the best available technology for removing contaminants from water and concentrates the contaminants into a brine stream. The proposed system depends on chemical precipitation to remove the majority of the metals and then on active biological treatment in a 2 step process that achieves selenium removal anaerobically and ammonia removal aerobically. The aerobic step is also included to provide polishing of the anaerobic effluent for parameters that may be added as nutrients (carbon source and phosphorus and nitrogen, if required) and also to remove any sulfide generated in the anaerobic treatment step."

References

MVRB (Mackenzie Valley Review Board). DAR Update Letter. Available at http://www.reviewboard.ca/registry/project_detail.php?project_id=72&doc_stage=5. Accessed November 2011.

INFORMATION REQUEST – AANDC_5

Source: Aboriginal Affairs and Northern Development Canada (AANDC)

Request

Groundwater

1) Please confirm the location of Monitoring Well 10-290.

2) Please provide the monitoring data for 10-290.

Response

Response 1

The location of condemnation drillhole 10-290 is within the Co-Disposal Facility (CDF) area as shown in Appendix Figure 7.II.1.1 of the Developer's Assessment Report (DAR). Specifically, the coordinates are as follows:

- X – 513360 (Easting)
- Y – 7047280 (Northing)
- Z – 228 m (Elevation)

Note: Table 7.III.2-1 in the DAR incorrectly stated the location of 10-290 as being in the footprint of the Open Pit. The table should read as follows:

Type of Monitoring Location	Objective of Monitoring Location	Groundwater Monitoring Location	Depth of Screened Interval		Screened Rock Unit
			From (mbgs)	To (mbgs)	
Artesian flow	Groundwater flowing from an exploration drill hole located within the footprint of the Co-Disposal Facility.	10-290	Unscreened open hole with casing through overburden to top of rock.		Artesian hole, casing burned in and capped with ball valve.

Response 2

The monitoring data in DAR Attachment 7.III.II-15, Appendix 7.III.2.12 labelled as 10-287 are the water quality data for 10-290.

INFORMATION REQUEST – AANDC_6

Source: Aboriginal Affairs and Northern Development Canada (AANDC)

Request

Groundwater

1) Please identify whether the potential impacts to the groundwater sample results include analyses other than pH, and whether the potential impacts could alter any conclusions drawn from the use of this data.

Response

Yes, changes in pH can influence other results, primarily metals rather than major ions; however, it is considered that there are sufficient samples that are not elevated in pH for appropriate comparisons and evaluations can be made, and that the influence of these values will not alter the conclusions drawn from the use of the data.

INFORMATION REQUEST – AANDC_7

Source: Aboriginal Affairs and Northern Development Canada (AANDC)

Request

Groundwater

1) Please identify the predicted major constituents of the 330 mg/L TDS that is expected to be observed towards the end of mine.

Response

Based on the groundwater quality measured (Attachment 7.III.2.3 of Appendix 7.III in the Developer's Assessment Report) the major constituents will be sulphate, sodium, and bicarbonate, with lesser amounts of calcium and chloride. Values for these parameters vary by borehole and are provided in the above noted attachment.

INFORMATION REQUEST – AANDC_8

Source: Aboriginal Affairs and Northern Development Canada (AANDC)

Request

Site Water Quality Predictions – Operations

1) Will this wastage rate, 1.5%, also apply during the early years when underground mining is occurring?

Response

During underground mining it is likely that the waste rate will be higher than 1.5%, however, the amount of explosives used would be much lower, thus, the overall mass release rate is still likely lower than for the Open Pit.

INFORMATION REQUEST – AANDC_9

Source: Aboriginal Affairs and Northern Development Canada (AANDC)

Request

Water Management

1) Will there be groundwater discharging, e.g., Grid Ponds, within the area of the CDF that will contribute to seepage through the CDF dykes? What is the volume, and does it need to be included in water balance and seepage water quality assumptions?

Response

The Grid Ponds currently receive discharge from groundwater. This discharge results from infiltration in the Bowl Zone, located upgradient to the west of the Grid Ponds. The high ground to the south, west, and north of the Grid Ponds forms a groundwatershed divide (Figure 11.1-14, of the Developer's Assessment Report [DAR]), which limits the extent of the recharge area. The groundwater discharge into the Grid Ponds reports as baseflow in the runoff that crosses the alignment of the future Co-Disposal Facility (CDF) Seepage Collection Pond (SCP) dams. Construction of the CDF will not stop the baseflow contribution of groundwater to the runoff which will report to the SCPs.

The site water balances consider the contribution of groundwater implicitly rather than explicitly. Groundwater does not show as a separate input into the CDF; rather the contribution of groundwater is included in the runoff term (i.e., the arrow labelled "R" on Figures 3.9-5 and 3.9-6 of the DAR during operations and on Figures 3.9-7 and 3.9-8 of the DAR after closure). The overall runoff number includes runoff from the Bowl Zone which is calculated by multiplying the precipitation by a runoff coefficient of 0.48.

The adequacy of the Bowl Zone runoff factor of 0.48 can be judged by comparing it to runoff factors that have been calculated from watersheds in the area where flows are monitored. Section 11.2.2.2.2 of the DAR provided the mean discharge rates per unit area from several drainage areas around the NICO Project area. The runoff coefficients of these drainage areas were calculated using the long-term average mean annual precipitation of 343.5 millimetres (equivalent to 0.0109 cubic metres per second per square kilometre [$m^3/s/km^2$]) as shown in Table 1. The measured runoff coefficients vary between 0.30 to 0.48.

Table 1: Runoff Coefficents for Local Watersheds

Watershed Area	Mean Discharge Per Unit Area ($m^3/s/km^2$)	Mean Precipitation Per Unit Area ($m^3/s/km^2$)	Run-off Coefficient
Lou Lake Drainage	0.0045	0.0109	0.41
Burke Lake Drainage	0.0040	0.0109	0.37
Indin River	0.0052	0.0109	0.48
Emile River	0.0033	0.0109	0.30

$m^3/s/km^2$ = cubic metre per second per square kilometre

The groundwater model (as shown in Table 11.I.2-2 of the DAR) predicts only an average baseflow of 252 cubic metres per day for the Nico Lake Creek (which includes watershed areas BL1 and BL2). These watershead areas occupy a total footprint of 18.5 square kilometres. The baseflow translates to 0.00016 $m^3/s/km^2$, which is only about 1.4% of the annual precipitation.

In summary, the contribution of groundwater discharge into the Grid Ponds is taken into account in the calculation of inflows to the CDF in the site wide water balances. The water quality model also considers the mass input of chemical parameters, including arsenic, in the current runoff from the Grid Ponds area.

INFORMATION REQUEST – AANDC_10

Source: Aboriginal Affairs and Northern Development Canada (AANDC)

Request

Water Management - Post Closure

1) Has the Proponent considered constructing the CDF perimeter dykes and closure caps as impermeable structures to minimize the volume of water requiring treatment post-closure, and to minimize the risk of requiring active water treatment post-closure.

2) Can the Proponent provide an estimate of how much time would be required to rinse sufficient metals from the system such that passive treatment could be implemented with a high degree of certainty?

Response

Response 1

Once the Co-Disposal Facility (CDF) is fully covered and vegetated, the flow of seepage water that reports from the CDF to the Seepage Collection Ponds will eventually become equal to the volume of water that infiltrates through the cover. This infiltration flow will be a function of the cover performance and is expected to be about 15 to 20% of the precipitation. With reference to Figures 3.9-7 and 3.9-8 in the Developer's Assessment Report, the volume of the seepage water is expected to be about 51 000 cubic metres per year. This seepage water will be passively treated in constructed wetlands and then released directly into Nico Lake.

Construction of the CDF perimeter dykes as low permeability structures would not ultimately reduce this seepage amount. If it were even possible to construct literally impermeable structures, then the ongoing infiltration through the cover would raise the water table inside the CDF to the point where water would eventually flow out over the tops of the perimeter dykes. This so-called "bath-tub" effect would again result in the outflow from the CDF to the Seepage Collection Ponds being equal to the inflow through the cover. In the end, it is the infiltration performance of the cover and not the permeability of the perimeter dykes that will determine the post-closure volume of seepage reporting to the Seepage Collection Ponds.

The CDF perimeter dykes have been purposefully designed to be free draining. This will result in a low phreatic surface in the dykes. The low phreatic surface makes the perimeter dykes inherently more stable than if there was a high water phreatic surface within the CDF. The free draining condition will also have advantages during the operating phase of the CDF, because it will enhance the drainage and consolidation of the tailings.

The CDF cover is specifically designed to reduce infiltration into the CDF after closure. The top layer will comprise glacial till which is the best natural material locally available in sufficient quantities. It will have a relatively low permeability, which combined with the 2% cross-slope will shed water of the surface, especially during the spring melt. The cover is expected to act as a "store and release" cover during the summer season.

Response 2

The quality of water which seeps out of the toe of the CDF will improve immediately upon closure because of the cessation of the input of tailings slurry water into the CDF. The construction of the cover will reduce the volume

of toe seepage, as discussed above. The concentrations of parameters in the toe leachate are expected to decrease slowly over time as the result of flushing out of porewater from the tailings and mine rock. The closure plan requires that the active water treatment be kept in operational condition for 10 years in case it is needed. If at that time the efficiency of the passive treatment system has been demonstrated, the active treatment system will be decommissioned. Development and testing of the constructed wetland system will be initiated during the operational years of the proposed mine.

INFORMATION REQUEST – AANDC_11

Source: Aboriginal Affairs and Northern Development Canada (AANDC)

Request

Water Management - Wetland Treatment Efficiency

1) Wetland treatment in cold climates may not perform as well as expected treatment in warmer climates. Please provide further details on the proposed alternative treatment system such as the type of facility, the treatment expected and threshold values that will be used to assess whether wetlands treatment is sufficient or where alternative treatment is required for some or all parameters (e.g., mercury).

Response

As described in Section 3.III.8.4 of the Developer's Assessment Report (DAR), "Wetland treatment has been selected as the base case for post-closure treatment of water that accumulates in SCP (Seepage Collection Ponds) No. 1, 2, 3, and 5, and the Surge Pond. Passive treatment may also be implemented to treat Flooded Open Pit overflow if it is necessary and appropriate. Passive treatment options could include anaerobic treatment in biochemical reactors (BCRs), and/or aerobic wetlands. Passive treatment options have been developed for the purpose of initial evaluation. Conceptual design of the post-closure passive treatment options will take place prior to the detailed design stage of the NICO Project and will be submitted during water licensing. Field trials, based on actual site conditions and detailed from conceptual designs, will take place during mine operations. The detailed engineering design will be completed following scale-up of the field trial cells, using design criteria and operating parameters optimized from those trials. If passive treatment proves to be an unsustainable option for post-closure treatment of site discharge, then alternative treatment methods will be investigated as discussed in Section 3.III.10.4."

Section 3.III.8.4.1 of the DAR, further describes experience with passive treatment in cold climates. Development work on passive treatment is currently underway and will continue throughout mining as described above with the contingency described in Section 3.III.10.4 of the DAR.

Process water generated during pilot plant operations was concentrated into a brine using a reverse osmosis system, and this concentrated brine is currently being treated in a bench-scale passive treatment system. Approximately 400 litres (L) of brine is being treated in the bench-scale system to provide the initial "proof of principal" test to demonstrate that the background water quality matrix and expected contaminants are amenable to treatment by the proposed passive treatment mechanisms. There are several types of treatment systems that are classified as "passive" and they typically all rely on similar mechanisms for metals removal which includes a combination of both anaerobic and aerobic biotreatment. Evaluation of a wetlands type system on a bench-scale with limited quantities of water is not feasible, so an alternate method for the "proof of principal test" is being used for bench-scale testing. This includes using a passive biochemical reactor as the anaerobic step and a passive aerobic polishing system as the aerobic step due to space constraints, time constraints, and limitations on the water available for testing. The anaerobic and aerobic biological treatment mechanisms are the same mechanisms that provide metals removal in wetlands systems. This "proof-of-principle" testing is the first step in the development of passive treatment as described in Section 3.III.8.4 of the DAR.

Preliminary results are shown in Table 1 of information request TG_28 and includes both total and dissolved metals results for the anaerobic (BCR) and aerobic (APC) bench cells. Through the third sampling event on 4 November 2011 the system had been operational 5 weeks after a 2 week incubation period. After treatment of approximately 300 L of water, reductions of an order of magnitude for the metals present have been achieved. Observations regarding these data are as follows:

- The arsenic removal is likely limited based on the amount of iron in the water but increased aeration may increase the arsenic removal in the APC. As discussed previously the engineering parameters will be determined during pilot testing and increased aeration requirements can be engineered into passive systems. For this bench testing the aeration will be increased to evaluate the impact on arsenic removal.
- Good removal of aluminum is occurring in the BCR; however, it appears that there is some residual aluminum in the APC from the materials used to construct and start-up the system. It is not unusual for passive systems to have a “flushing” period, and it is expected that the aluminum levels in the APC effluent will also decrease.

INFORMATION REQUEST – AANDC_12

Source: Aboriginal Affairs and Northern Development Canada (AANDC)

Request

Water Management - Long-term Water Quality Impacts

1) Predictions are provided up to Mine Year 33. Please provide additional information on expected trends for these parameters beyond this time; particularly regarding whether the concentrations will begin to decrease and whether the increased loadings will begin to move down through the watershed with time.

Response

The water quality modelling completed for Nico, Peanut, and Burke lakes and the Marian River assumed that parameter concentrations in treatment wetland discharges to Nico Lake would not attenuate over time during the post-closure period (i.e., the same loading would be received by Nico Lake year after year in perpetuity). This assumption is conservative, as the quantities of metals in the Co-Disposal Facility are finite and would be expected to be depleted over time (e.g., as leachable source material in the Co-Disposal Facility becomes more geochemicaly stable and porewater is flushed out). It is therefore expected that concentrations for the noted parameters will begin to decrease over time beyond closure.

The flow and mass balance approach used in the water quality modelling explicitly includes downstream transport through the watershed with time. Nico Lake has an average residence time of about one year, whereas Peanut and Burke lakes have residence times of less than one year. The short residence times in these lakes results in rapid changes in water quality throughout the system in response to changes in loadings and is reflected in the figures included for select parameters in Section 7.6.3.3 and in Appendix 7.V of the Developer's Assessment Report, for all parameters.

INFORMATION REQUEST – AANDC_13

Source: Aboriginal Affairs and Northern Development Canada (AANDC)

Request

Site Water Quality Predictions - Closure and Post Closure

1) Can passive treatment systems successfully reduce mercury and selenium concentrations.

2) What is the prediction for mercury concentrations in Nico, Peanut, and Burke Lakes and the Marian River after Mine Year 33.

3) Are Peanut or Burke Lake actively fished, and is there a potential for mercury related impacts to fish in these lakes.

4) Please provide an assessment as to whether conditions in Nico Lake would be expected to support methylation of mercury. Please provide an evaluation of the significance of these results as well as an assessment of potential impacts to the downstream aquatic ecosystem.

Response

Response 1

Passive treatment systems can successfully treat a range of metals. Section 3.III.8.4 of the Developer's Assessment Report (DAR) in the "Aerobic Wetland" subsection and Section 3.III.8.4.1 specifically discuss success in selenium treatment. Process water generated during pilot plant operations was concentrated into a brine using a reverse osmosis system, and this concentrated brine is currently being treated in a bench-scale passive treatment system. Approximately 400 litres (L) of brine will be treated in the bench-scale system to provide the initial "proof of principle" test to demonstrate that the background water quality matrix and expected contaminants are amenable to treatment by the proposed passive treatment mechanisms. There are several types of treatment systems that are classified as "passive" and they typically rely on similar mechanisms for metals removal, which includes a combination of both anaerobic and aerobic biotreatment. Evaluation of a wetlands type system on a bench-scale with limited quantities of water is not feasible. So an alternate method for the "proof of principle test" is being used for bench-scale testing and includes using a passive biochemical reactor as the anaerobic step and a passive aerobic polishing system as the aerobic step due to space constraints, time constraints, and limitations on the water available for testing. The anaerobic and aerobic biological treatment mechanisms are the same mechanisms that provide metals removal in wetlands systems. This "proof-of-principle" testing is the first step in the development of passive treatment as described in Section 3.III.8.4 of the DAR. Selenium is present in water used for this initial bench-scale testing. The preliminary data from the NICO bench-scale tests currently underway show an order of magnitude selenium reduction with the residual selenium below 0.005 milligrams per litre (mg/L). Analytical results for mercury were below detection limits in the concentrated brine derived from pilot plant process water.

Preliminary results are shown on Table 1 in information request AANDC_11 and include both total and dissolved metals results for the anaerobic (BCR) and aerobic (APC) bench cells. Through the third sampling event on 4 November 2011 the system had been operational for 5 weeks, after a 2 week incubation period. After

treatment of approximately 300 L of water, reductions of an order of magnitude for the metals present has been achieved. Observations regarding these data are as follows:

- Arsenic removal is likely limited based on the amount of iron in the water, but increased aeration may increase arsenic removal in the APC. As discussed previously, the engineering parameters will be determined during pilot testing and increased aeration requirements can be engineered into passive systems. For this bench testing, aeration will be increased to evaluate the impact on arsenic removal.
- Good aluminum removal is occurring in the BCR. However, it appears that there is some residual aluminum in the APC from the materials used to construct and start-up the system. It is not unusual for passive systems to have a "flushing" period and it is expected that the aluminum levels in the APC effluent will also decrease over time.

Response 2

As noted in the response to AANDC_12, the water quality modelling completed for Nico, Peanut, and Burke lakes and the Marian River assumed that parameter concentrations in treatment wetland discharges to Nico Lake would not attenuate over time during the post-closure period and that this assumption is conservative. The modelling predictions presented in the DAR are approaching a quasi-steady state concentration near the end of the presented time period, so mercury predictions beyond year 33 would be expected to be similar to those presented in the DAR for the post-closure period. However, it is expected that mercury concentrations would begin to decrease over time beyond closure for reasons noted in the response to AANDC_12.

Furthermore, the site water quality predictions for mercury at closure that were used as input to the receiving water quality model appear to be highly conservative. The site water quality predictions are based on the geochemical characterization of waste rock, ore, and tailings presented in Annex A of the DAR, which included non-detectable results (at a detection limit of 0.0001 mg/L) for mercury in all samples. Where analytical results were non-detectable in the geochemical analysis, the site water quality predictions were conservatively estimated using detection limit values as input concentrations. The analytical results for the concentrated brine created from pilot plant process water (Table 1 in AANDC_11) show that mercury concentrations were non-detectable at a lower detection limit of 0.000027 mg/L, which is just above the CCME guideline of 0.000026 mg/L. This suggests that mercury concentrations in seepages from the CDF to the treatment wetlands will likely be much lower than predicted in the DAR, exceedance of the CCME guideline for total mercury in Nico Lake will be unlikely, and concentrations in Peanut Lake, Burke Lake, and the Marian River downstream will be lower than predicted.

Response 3

Traditional and non-traditional use of fisheries resources was provided in Section 12.2.6.3 of the DAR. This section notes that there are reports of historical traditional fishing in Peanut Lake and Nico Lake, and that fishing was good in these lakes, but these lakes may not be currently used for fishing. The available information presented in the DAR does not indicate that Peanut or Burke lakes are actively fished.

As noted in Response 2 above, mercury concentration predictions for treatment wetlands discharging to Nico Lake appear to be highly conservative and exceedance of the CCME guideline for total mercury as a result of NICO Project discharges post-closure is unlikely. Downstream mercury concentration predictions based on these conservative input concentrations were presented in Tables 7.6-11 and 7.6-12 of the DAR for Peanut and Burke lakes, respectively. The predicted total mercury concentrations are below than the CCME guideline and

represent an increase of less than 25 and 16 percent in Peanut Lake and Burke Lake, respectively. Potential for mercury related impacts in fish are related to methylation of mercury, which is discussed below in Response 4.

Response 4

Mercury methylation rates increase with (Weiner et al. 2002):

- higher organic matter present;
- lower pH;
- lower dissolved oxygen concentration;
- higher sulphate concentration; and
- higher temperature.

The NICO Project is not expected to result in changes in pH, dissolved oxygen, temperatures, and the amount of organic matter present in Nico Lake waters and sediments relative to natural baseline variation. Sulphate concentrations are predicted to increase in the water column in Nico Lake from 4 to 6 mg/L under baseline conditions to 17 to 27 mg/L following closure, and low Dissolved Oxygen (DO) concentrations have been observed at depth in Nico Lake under baseline conditions in winter and summer (Annex C of the DAR). Accordingly, some increase in mercury methylation rates during periods of low DO concentration could occur at depth in Nico Lake following closure.

However, concentrations of selenium are also expected to increase relative to baseline concentrations, and selenium has been shown to reduce the uptake and bioaccumulation of mercury throughout the food web, in both terrestrial (e.g., Gailer et al. 2000) and aquatic (e.g., Bjerregaard and Christensen 1993) species. In particular, Belzile et al. (2006) demonstrated that concentrations of total and methyl mercury in tissues of zooplankton, mayflies (*Stenonema femoratum*), amphipods (*Hyalella azteca*), and young-of-the-year perch (*Perca flavescens*) were inversely correlated with selenium concentrations in lake water. The projected post-closure total selenium to total mercury concentration ratios in Nico Lake (i.e., 70:1 by mass) are within the range of those in lakes observed in the Belzile et al. (2006) study (i.e., 56:1 to 96:1 by mass) to have lower methyl mercury concentrations in zooplankton, mayfly, amphipod, and perch tissues. Therefore, post-closure conditions in Nico Lake and in downstream waters are unlikely to result in increases in uptake of methyl mercury in lower trophic levels and bioaccumulation in fish and result in impacts to aquatic life in Nico Lake and in the downstream aquatic ecosystem.

References

Belzile, N., Y-W Chen, J.M. Gunn, J. Tong, Y. Alarie, T. Delonchamp, and C-Y Lang. 2006. The effect of selenium on mercury assimilation by freshwater organisms. Can. J. Fish. Aquat Sci. 63: 1-10.

Bjerregaard, P., and L. Christensen. 1993. Accumulation of organic and inorganic mercury from food in the tissues of *Carcinus maenas*: effect of waterborne selenium. Mar. Ecol. Prog. Ser. 99: 271–281.

Gailer, J., G.N. George, I.J. Pickering, S. Madden, R.C.,Yu, E.Y. Prince, M.B. Denton, H.S. Younis, and H.V. Aposhian. 2000. Structural Basis of the Antagonism Between Inorganic Mercury and Selenium in Mammals. Chem. Res. Toxicol. 13: 1135–1142.

Wiener, J.G., D.P. Krabbenhoft, G.H. Heinz, and A.M Scheuhammer. 2002. Ecotoxicology of mercury. in handbook of ecotoxicology. Edited by D.J. Hoffman, B.A. Ratter, G.A. Burton Jr., and J.J. Cairns Jr. CRC Press, Boca Raton, FL. pp. 409-462.

INFORMATION REQUEST – AANDC_14

Source: Aboriginal Affairs and Northern Development Canada (AANDC)

Request

Pit Lake - Closure

1) Discuss any advantages and disadvantages for both filling scenarios.

2) Describe any differences, with respect to environmental impacts, of both scenarios. For example, are differences in post-closure water chemistry expected under the different scenarios.

3) Please provide a detailed cost comparison of the active versus natural flooding scenarios.

Response

Response 1 and 2

Accelerated Pit Flooding: The scenario of active pit flooding discussed in Section 9.4.3.4 in the Developer's Assessment Report indicates that it is technically possible to pump water from the Marian River to achieve Open Pit overflow within 10 years after closure. This scenario involves significant capital costs to construct the pump and pipeline system, and also operating costs to carry out the pumping over a 7 to 10 year period. Preliminary modelling of Flooded Open Pit water quality suggests that the active filling would not eliminate the potential requirement to treat the overflow water before discharging it to the environment. This is because, notwithstanding the input of clean water from the Marian River, the Open Pit would still receive runoff water from the exposed rock on the walls of the Open Pit. This is a conservative model that Fortune will continue to refine over time. Furthermore, the Flooded Open Pit water would be expected to be fully mixed rather than stratified, so the overflow water would have quality similar to the average quality in the Open Pit as a whole. Under this scenario, the onset of post-overflow treatment (if needed) would be in 10 years after closure (rather than after about 120 years for passive flooding); therefore, the net present cost of post-overflow water treatment would be much higher.

Passive Pit Flooding: Under this scenario, it is predicted that Open Pit overflow would not occur for about 120 years after closure. It is not currently possible to accurately predict the quality of the water that will overflow from the Open Pit at that time. Nonetheless, compared to accelerated pit flooding, the slow filling of the Open Pit over the long time period has a greater likelihood of producing stratification in the flooded Open Pit, with the surfical water being of better quality than that at depth. The rate of acid generation and metal leaching off the exposed pit walls will reduce considerably over the 120 year time period, and the runoff entering the Open Pit from the Co-Disposal Facility will be non-contact water.

Recognizing the uncertainty about the quality of the final Open Pit overflow water, the closure plan allows for treatment of the overflow in Wetland Treatment System No. 4 (please refer to information request response TG_28 for preliminary bench-scale passive treatment system results). Active treatment in a new Effluent Treatment Facility is a contingency, which could be implemented if Wetland Treatment System No. 4 could not provide adequate water quality. Passive flooding also provides greater opportunity to develop, verify, and implement methods of in-pit treatment. In-pit treatment could for example, comprise adding fertilizer to generate

algae growth to remove metals. The main disadvantage of the passive pit flooding scenario is that it requires monitoring of the pit water quality over a longer time period.

Under the passive pit flooding scenario, there will be no discharge of Flooded Open Pit water for about 120 years, while with the accelerated pit flooding scenario, such discharge could occur within 10 years of closure. As a result, passive pit flooding would defer the onset of any environmental impacts to surface water. As discussed above, passive pit flooding will increase the likelihood of stratification and it will afford more opportunity to develop methods of in-pit treatment, if required. For this reason, it is likely that the quality of the surficial Flooded Open Pit water will be better with the passive flooding scenario.

Response 3

A detailed cost breakdown of the 2 options is provided in Attachment A.

ATTACHMENT A

Detailed Cost Comparison of the Active Versus Natural Flooding Scenarios

(please refer to supporting documents)

INFORMATION REQUEST – AANDC_15

Source: Aboriginal Affairs and Northern Development Canada (AANDC)

Request

Mine Rock Management

1) What is the selenium leaching potential of Type 2 mine rock.

2) Will using the material in the CDF dyke contribute to elevated selenium concentrations in water the must be managed post-closure.

Response

Response 1

The selenium leaching concentration of the various rock types is discussed throughout Annex A, and within Appendix 7.II of the Developer's Assessment Report (DAR). Water quality results based on these leaching concentrations are provided for downstream receivers in Appendix 7.V of the DAR.

Response 2

As indicated in Section 7.II.3.5 of the DAR:

"Type 2 water quality: Assigned to runoff from the perimeter embankments of the CDF. Type 2 water quality was calculated using the results of humidity cell tests 100925, 100802, 100913, 100914, 100881, and field cell test FC-2."

The reader is referred to Appendix VII-1c of Annex A for a full listing of results (including selenium) from the humidity cells that were used to assign concentrations for leachate potential. The leaching potential from rock expected to be used or stored on-site has accounted for a variety of parameters within the water quality predictions both during operations and in post-closure (see Section 7.II.3.6.2 of the DAR for a discussion of Closure and Post-Closure).

Water quality results based on these leaching concentrations and the current mine plan are provided for downstream receivers during operations and post-closure in Appendix 7.V of the DAR.

INFORMATION REQUEST – AANDC_16

Source: Aboriginal Affairs and Northern Development Canada (AANDC)

Request

Co-disposal Facility Management

1) How much time is required after tailings placement before mine rock can be deposited.

2) Frozen layers may thaw and settle. Will the presence of frozen layers impact the operation of the CDF including: placement strategy, long-term stability, and pore water quality and movement.

Response

Response 1

The Co-Disposal Facility (CDF) placement strategy aims to increase the extent of inter-mixing between tailings and mine rock. Penetration of mine rock into an underlying layer of tailings is of benefit. To this end, it is desirable to place mine rock on top of the tailings soon after the placement of the layer of tailings has been completed. Mine rock placement will generally be by the “dump and doze” method, whereby mine trucks will dump the rock adjacent to the fresh tailings area and a dozer will push the rock over the tailings layer. It is expected that the detailed placement methodology will evolve over the early years of operations.

Response 2

The co-disposal plan is such that there will be relatively little water available to form clear ice lenses within the tailings. The tailings will be dewatered at the Process Plant site to a thickened tailings consistency of 73 to 77% solids content prior to pumping to the CDF for disposal. The amount of bleed water released from the thickened tailings will be small. The CDF and individual tailings deposits are both designed to slope to the west, at a slope of about 2%. This will facilitate the removal of water from runoff or snow melt, which will drain to the west and then will be collected into a Seepage Collection Pond. Any ice lenses that form within the tailings deposits will either thaw and drain during the following summer or they will remain frozen and become perennial. In the long-term, the CDF is expected to freeze back, so perennial ice lenses will become part of an overall frozen mass. They are not expected to thaw after closure. The CDF perimeter dyke was conservatively designed to be stable even if it contained 100% saturated tailings. The stability does not rely on the presence of internal rock layers or frozen zones. Zones of perennially frozen tailings or ice would have the benefit of reducing the movement of both air and porewater through the CDF. This will reduce the rate of oxidation of acid generating rock and it would also slow the transport of leachate through the CDF.

INFORMATION REQUESTS

ENVIRONMENT CANADA

INFORMATION REQUEST – EC_1

Source: Environment Canada (EC)

Request

Communications Tower

The proponent is asked to:

1) Describe whether the communications tower will be free standing or supported by guy wires. If guy wires are to be used, please describe the mitigation measures that will be used to minimize the risk of bird collisions.

2) Describe whether any lighting will be used on the tower and what type of lights may be used.

3) Provide an inventory of all other tall structures and overhead wires that may pose a collision risk to birds.

Response

The final design of the 46 metre communication tower has not yet been determined. For the purposes of this assessment, it is assumed that the structure will have guy wires, and will be illuminated according to the relevant legislation. Other structures at the mine will have a low profile relative to the communication tower; there will be a transmission line connecting the generators to the water pump on Lou Lake, a mill, generator exhaust stacks, and fuel tanks. The transmission line is likely to be a wood-pole design similar to municipal electrical distribution lines. This transmission line would be within a forested valley, and the risk to waterfowl from collisions is anticipated to be low.

Mid-air collisions with transmission lines and towers by birds may cause injury or mortality. The existing literature usually discusses bird collisions resulting from transmission lines (such as APLIC 1994, 2006). Other hazards such as municipal electrical distribution lines and guy wires are not often discussed. The frequency of these strikes is difficult to monitor because it happens quickly and carcasses are often rapidly removed by scavengers (Prince et al. 1986; Bevanger 1995). Although it does occur, transmission line strikes have not been identified as a major cause of mortality for most species of raptors or passerines (APLIC 1994). Janss (2000) classified avian mortality by morphology, and found that weight, wing length, total length, and tail length could be used to accurately predict species with a high risk of collision. Birds with a high wing loading (i.e., poor manoeuvrability), heavy weights, and short wings and tails were more frequently victims of collision. Behavioural differences between species likely plays a role, with species that flock, fly frequently, and fly at low altitudes being more susceptible to transmission line collision (Janss 2000; APLIC 1994).

These studies indicate that waterfowl are the most susceptible to transmission line collisions, and few concerns are raised regarding the effects to passerines and raptors. Considering the low density of waterfowl in the area, the relatively high topography around the transmission line (which would tend to dissuade waterfowl from flying just above tree height), the frequency of collision is anticipated to be very low. This pathway is expected to have negligible effects to the persistence of waterfowl populations in the study area, and is considered to be a minor pathway.

References

APLIC (Avian Power Line Interaction Committee). 1994. Mitigating bird collisions with power lines: the state of the art in 1994. Edison Electric Institute. Washington, DC.

APLIC. 2006. Suggested practices for avian protection on power lines. state of the art in 2006. Edison Electric Institute. Washington, DC.

Bevanger, K. 1995. Estimates and population consequences of Tetranoid mortality caused by collisions with high tension power lines in Norway. Journal of Applied Ecology. 32:745-753.

Janss, G.F.E. 2000. Avian mortality from power lines: a morphologic approach of a species-specific mortality. Biological Conservation; 95(3): 353-359

Prince, H.H., G.A. Dawson, P.J. Rusz, and R.D. Rusz. 1986. Bird collisions with transmission lines near a power plant cooling pond. Wildlife Society Bulletin, Vol 14(4):441-44.

INFORMATION REQUEST – EC_2

Source: Environment Canada (EC)

Request

Vegetation Clearing

The proponent is asked to:

1) Clarify the dates used to define the "nesting season" versus the "breeding season", and the information source used to identify these dates.

2) Identify all vegetation clearing or topsoil removal that is likely to take place during the breeding season, and a rationale as to why such activities must be conducted during this period

3) Identify the specific measures and follow-up monitoring that will be used to ensure that nests encountered during project activities or found on project infrastructure will be protected from disturbance or destruction.

Response

Response 1

The nesting season and the breeding season terminology used in Section 15.3.2.1 of the Developer's Assessment Report (DAR) both refer to the migratory bird nesting season, which was defined by Environment Canada as occurring approximately from 15 May to 31 July. These dates were provided in a letter to the Mackenzie Land and Valley Review Board on 20 July 2007 (in regards to the Taltson Hydroelectric Expansion Project, Environment Canada file 4339 001 017).

Response 2

As much as possible, vegetation clearing will take place outside of the migratory bird nesting season to avoid disturbing migratory bird nests.

Response 3

Mitigation and monitoring will be similar to that practiced at other operating mines in the Northwest Territories. As much as possible, clearing of vegetation will be avoided during the migratory bird nesting season and environmental staff will be vigilant for evidence of birds nesting on NICO Project infrastructure (as per the Conceptual Wildlife Effects Monitoring Program, Appendix 18.II.4.2 of the DAR). Any nests identified will be reported to Environment Canada, and efforts will be made to limit activity in the vicinity of the nest.

INFORMATION REQUEST – EC_3

Source: Environment Canada (EC)

Request

Risk to Waterbirds from Contaminated Water, Sediment, or Invertebrates

The proponent is asked to:

1) Describe anticipated concentrations of contaminants in the CDF, Seepage Collection Ponds, Surge Pond, drainage ditches, and flooded open pit.

2) Provide a copy of the wildlife health risk assessment.

3) Identify thresholds for contaminant concentrations that will be used to trigger adaptive management.

4) Outline mitigation measures that will be used to ensure that waterfowl and other aquatic birds are not exposed to harmful substances that may be found in CDF, Seepage Collection Ponds, Surge Pond, drainage ditches and flooded open pit.

5) Discuss monitoring that will be used to ensure that contaminant levels remain below specified thresholds and to ensure that further mitigation measures necessary to protect waterbirds are effective.

6) Specify the criteria that will be used to determine that waterbirds are making "regular use" of the water management ponds, or that birds are "unhealthy".

7) Clarify whether waterbird use of the CDF will also be included in regular monitoring.

Response

Response 1

Environment Canada has requested a description of anticipated concentrations of contaminants in NICO Project surface waters. These are provided in the Site Water Quality Predictions, Appendix 7.II of the Developer's Assessment Report (DAR).

Response 2

The Wildlife Health Risk Assessment is provided as Attachment A to this information request. Overall, these water management ponds are anticipated to cause a negligable to low risk to waterbirds.

Response 3

Thresholds will be developed according to the principles and approach outlined in the Water and Effluent Quality Management Policy (MVLWB 2011), and will be identified in permitting phase.

Response 4

Scaup and hooded merganser have been observed throughout the summer in Little Grid Pond, where arsenic concentrations exceed 300 milligrams per litre. Potential exposure to arsenic will not be exacerbated by the NICO Project. Monitoring will be undertaken to determine if waterbirds are using surface water ponds, as described in the Conceptual Wildlife Effects Monitoring Plan, Appendix 18.II (Section 18.II.4.8 Waterbirds) of the

DAR. Experience from existing mines (such as at the Snap Lake, Diavik, Giant and Con mines) indicates that waterbirds do not often use seepage collection ponds and ditches, likely because these waterbodies are small, in areas of high activity, and have little forage. An exception to this is the preferred use of such waterbodies if they are the first to thaw in spring. If the exposure of waterbirds to high concentrations of harmful substances results in a risk to waterbirds in excess of the existing risk, then adaptive management will be undertaken as per the Environmental Management System, described in Subject of Note: Biophysical Environment Monitoring and Management Plans (Section 18).

Response 5

Monitoring of surface water quality will be completed according to the Water Licence. Continued monitoring of surface water ponds for waterbird activity will be undertaken, as per the Conceptual Wildlife Effects Monitoring Plan (Appendix 18.II of the DAR). The results of this monitoring will inform the Environmental Management System.

Response 6

Criteria have not yet been developed for determining when waterbirds are making regular use of the water management ponds, or when they appear unhealthy. Experience from existing mines indicates that waterbirds do not often use seepage collection ponds and ditches, and a similar frequency of use is expected for the NICO Project. Should monitoring of the surface water management ponds indicate that water quality and the frequency of use by waterfowl (i.e., exposure levels) may result in health risks to birds that exceed existing levels, adaptive management will be undertaken as per the Environmental Management System. However, the risk to individual waterfowl is anticipated to be negligible relative to current conditions.

Response 7

All water management ponds or other mine-related waterbodies (including the Co-Disposal Facility) that may attract waterbirds will be monitored.

References

MVLWB (Mackenize Valley Land and Water Board). 2011. Water and Effluent Quality Management Policy. 31 March 2011.

ATTACHMENT A

WILDLIFE RISK ASSESSMENT

(please refer to supporting documents)

INFORMATION REQUEST – EC_4

Source: Environment Canada (EC)

Request

Mapping of Waterbird Observations

The proponent is asked to:

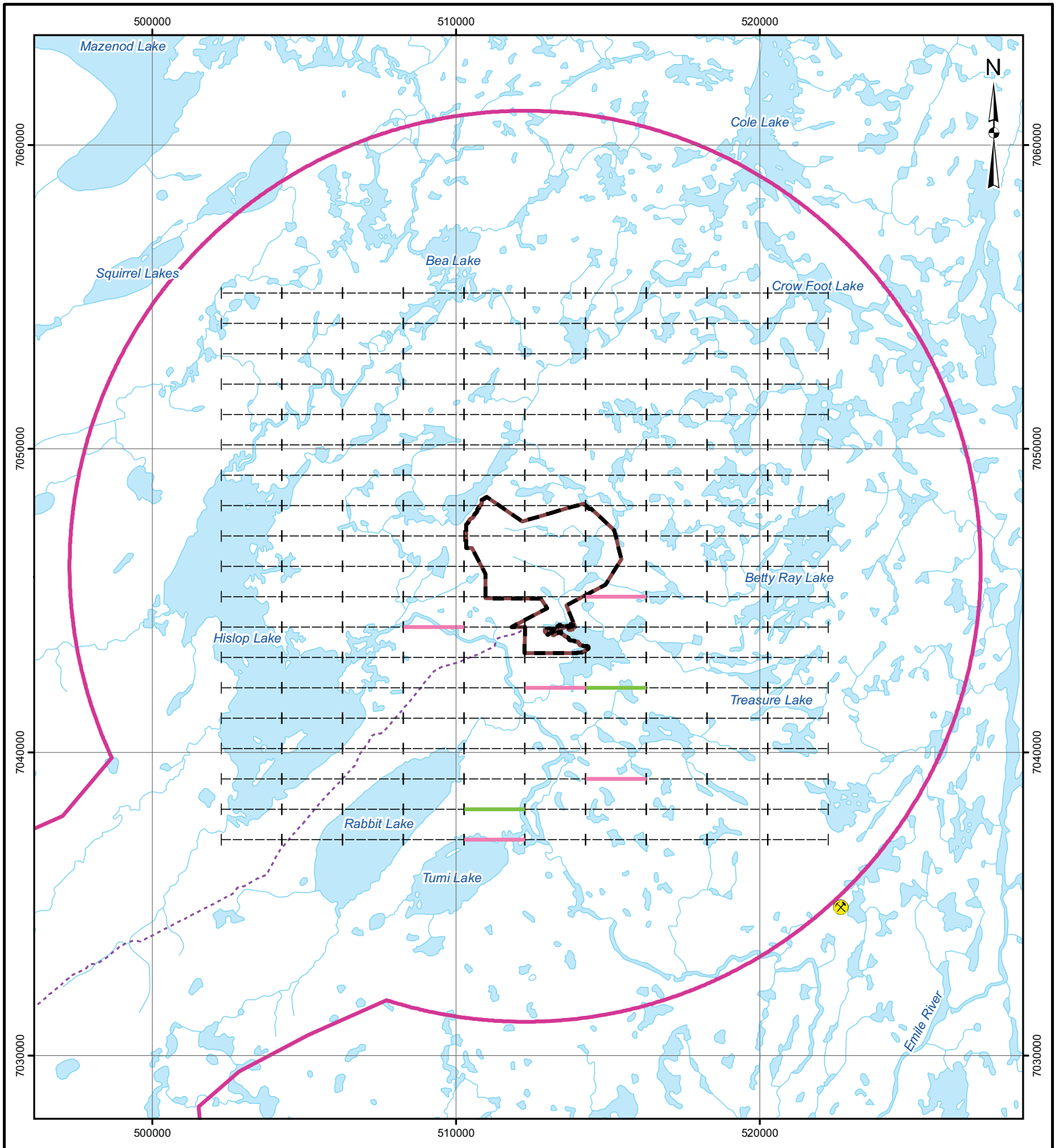
1) Provide revised waterbird maps that show areas of different waterbird densities by species or major bird groups (e.g., loons, grebes, ducks, geese, swans, terns) and by season using density contour maps or a similar technique.

Response

Surveys of waterbirds completed on 4 June and 27 July 2006 followed methods similar to those outlined in Hines and Robertson (2006), in that waterbirds were counted by flying transects and recording observations made in each 2 kilometre segment of each transect. Detailed methods are provided in the Baseline Wildlife and Wildlife Habitat Report (Annex D of the Developer's Assessment Report). Detailed maps of waterbird observations from these surveys are provided here, Figures 1 to 7. Maps are presented only for species where more than 10 individual birds were observed, not including chicks. The response to Information Request EC_5 presents the number of birds observed.

References

Hines, J.E., and M.O. Wiebe Robertson. 2006. Surveys of geese and swans in the Inuvialuit Settlement Region, Western Canadian Arctic, 1989-2001. Occasional Paper 112, Environment Canada, Yellowknife.



LEGEND

- RAYROCK MINE
- PROJECT LEASE BOUNDARY
- PROPOSED NICO PROJECT ACCESS ROAD
- WATERCOURSE
- WATERBODY

OBSERVATIONS

- 0
- 1-2
- 3-4
- 5-6
- 7-8
- 9-10
- 11-12
- 13-14
- 15-16

- REGIONAL STUDY AREA

5 0 5

SCALE 1:175,000 KILOMETRES

REFERENCE

Base data obtained from Atlas of Canada, DMTI, and GeoGratis.
Projection: UTM Zone 11 Datum: NAD 83

FORTUNE MINERALS LIMITED
NICO DEVELOPER'S ASSESSMENT REPORT

TITLE

TRANSECT SEGMENTS CONTAINING AMERICAN WIGEON, 2006

Golder Associates
Edmonton, Alberta

IR-Wild-001-GIS			
PROJECT No. 09-1373-1004		SCALE AS SHOWN	REV. 0
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GIS	ANK	28 Nov. 2011	
CHECK	DP	02 Dec. 2011	
REVIEW	JV	02 Dec. 2011	

FIGURE: 1

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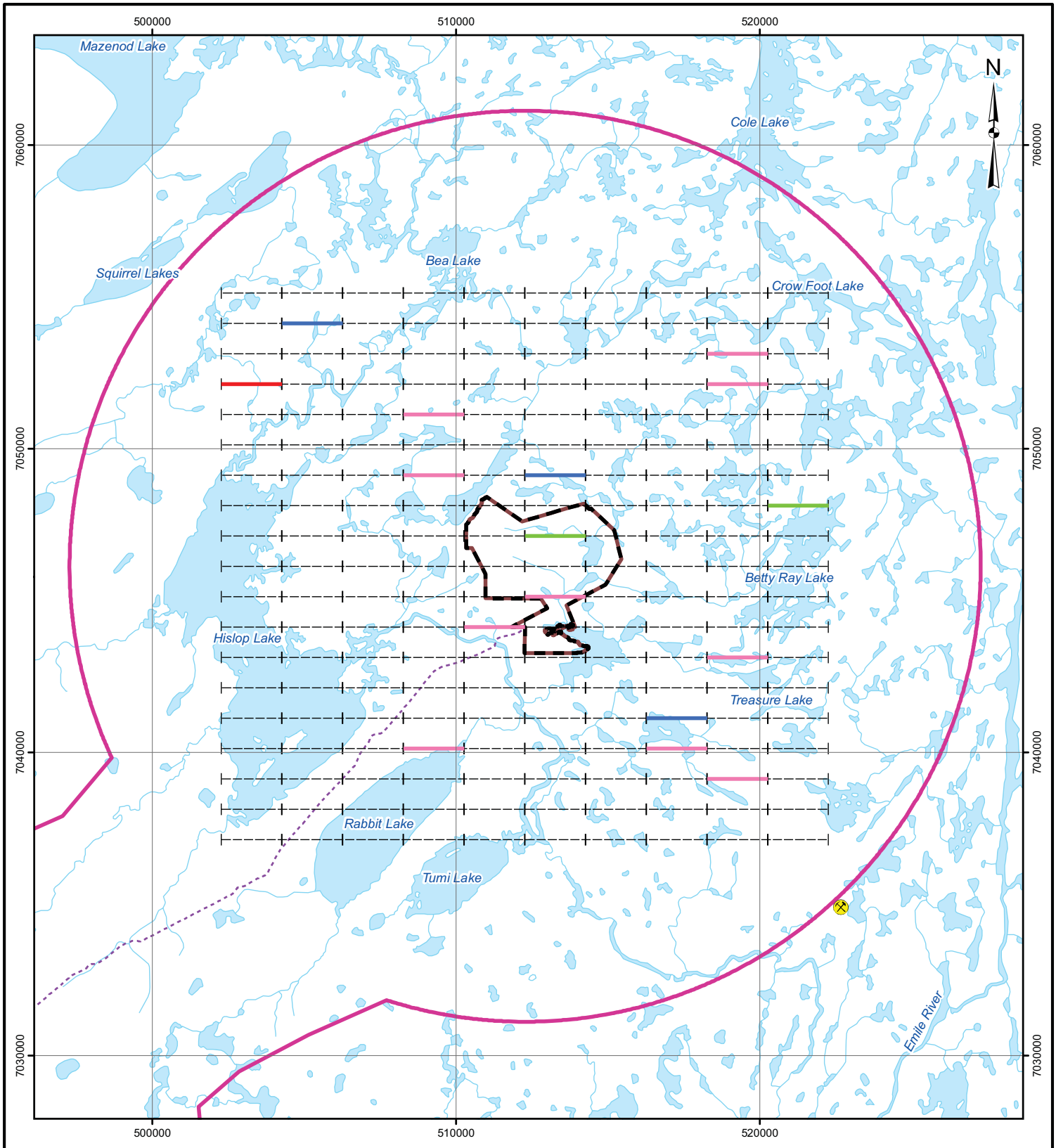

LEGEND

- RAYROCK MINE
- PROJECT LEASE BOUNDARY
- PROPOSED NICO PROJECT ACCESS ROAD
- WATERCOURSE
- WATERBODY

OBSERVATIONS

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- 15-16

- REGIONAL STUDY AREA

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SCALE 1:175,000 KILOMETRES

REFERENCE

Base data obtained from Atlas of Canada, DMTI, and GeoGratis.
Projection: UTM Zone 11 Datum: NAD 83

FORTUNE MINERALS LIMITED
NICO DEVELOPER'S ASSESSMENT REPORT

TITLE

TRANSECT SEGMENTS CONTAINING BUFFLEHEAD, 2006

Golder Associates
Edmonton, Alberta

IR-Wild-002-GIS			
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GIS	ANK	28 Nov. 2011	
CHECK	DP	02 Dec. 2011	
REVIEW	JV	02 Dec. 2011	

FIGURE: 2

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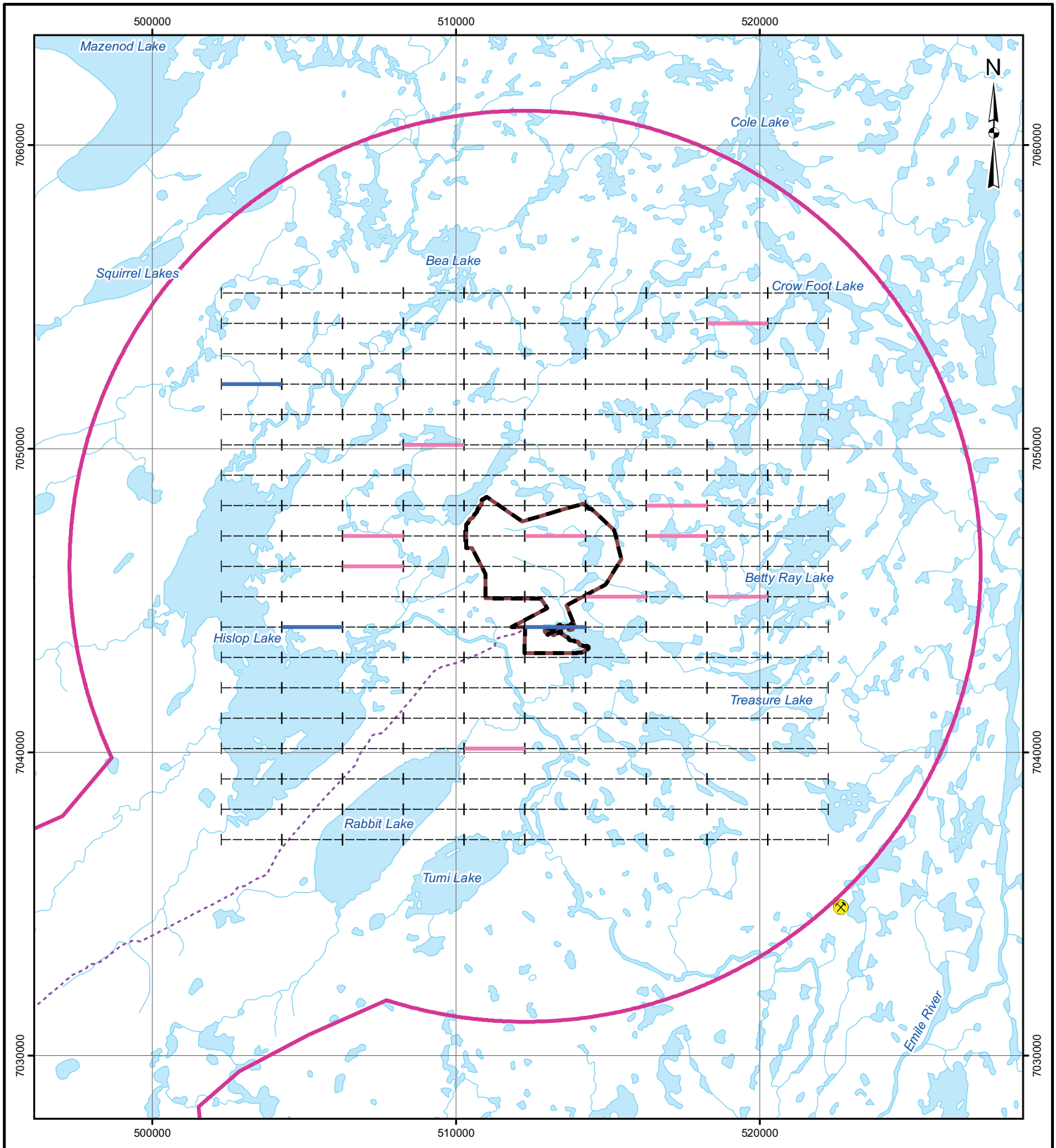

LEGEND

- RAYROCK MINE
- PROJECT LEASE BOUNDARY
- PROPOSED NICO PROJECT ACCESS ROAD
- WATERCOURSE
- WATERBODY

OBSERVATIONS

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REGIONAL STUDY AREA

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SCALE 1:175,000 KILOMETRES

REFERENCE

Base data obtained from Atlas of Canada, DMTI, and GeoGratis.
Projection: UTM Zone 11 Datum: NAD 83

FORTUNE MINERALS LIMITED
NICO DEVELOPER'S ASSESSMENT REPORT

TITLE

TRANSECT SEGMENTS CONTAINING MALLARD, 2006

Golder Associates
Edmonton, Alberta

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REVIEW	JV	02 Dec. 2011	

FIGURE: 3

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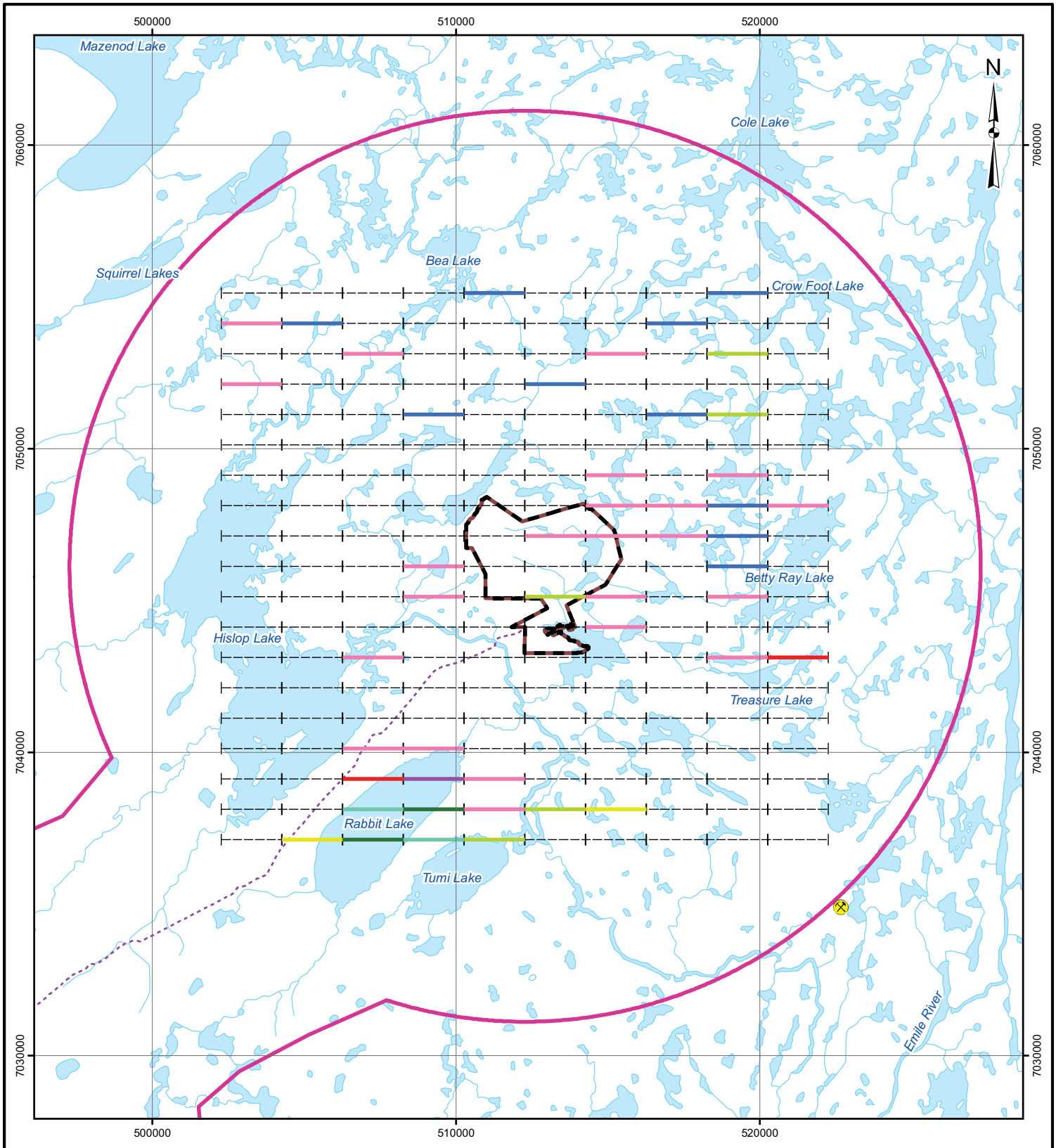

LEGEND

- RAYROCK MINE
- PROJECT LEASE BOUNDARY
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- WATERCOURSE
- WATERBODY

OBSERVATIONS

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- REGIONAL STUDY AREA

SCALE 1:175,000

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KILOMETRES

REFERENCE

Base data obtained from Atlas of Canada, DMTI, and GeoGratis.
Projection: UTM Zone 11 Datum: NAD 83

FORTUNE MINERALS LIMITED
NICO DEVELOPER'S ASSESSMENT REPORT

TITLE

TRANSECT SEGMENTS CONTAINING SCAUP, 2006

Golder Associates
Edmonton, Alberta

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REVIEW	JV	02 Dec. 2011	

FIGURE: 4

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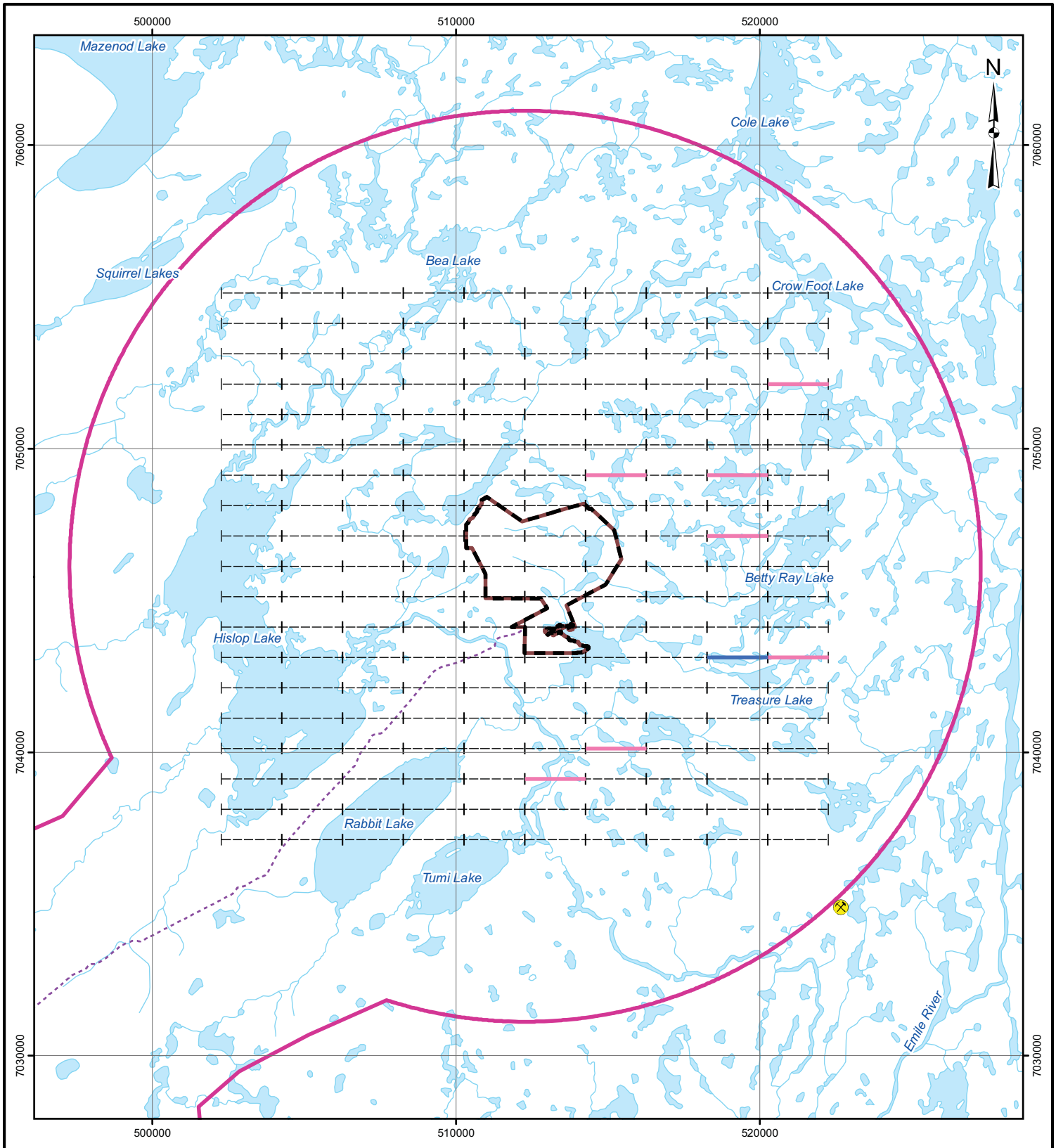

LEGEND

- RAYROCK MINE
- PROJECT LEASE BOUNDARY
- PROPOSED NICO PROJECT ACCESS ROAD
- WATERCOURSE
- WATERBODY

OBSERVATIONS

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- REGIONAL STUDY AREA

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SCALE 1:175,000 KILOMETRES

REFERENCE

Base data obtained from Atlas of Canada, DMTI, and GeoGratis.
Projection: UTM Zone 11 Datum: NAD 83

FORTUNE MINERALS LIMITED
NICO DEVELOPER'S ASSESSMENT REPORT

TITLE

TRANSECT SEGMENTS CONTAINING SURF SCOTER, 2006

Golder Associates
Edmonton, Alberta

IR-Wild-005-GIS			
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FIGURE: 5

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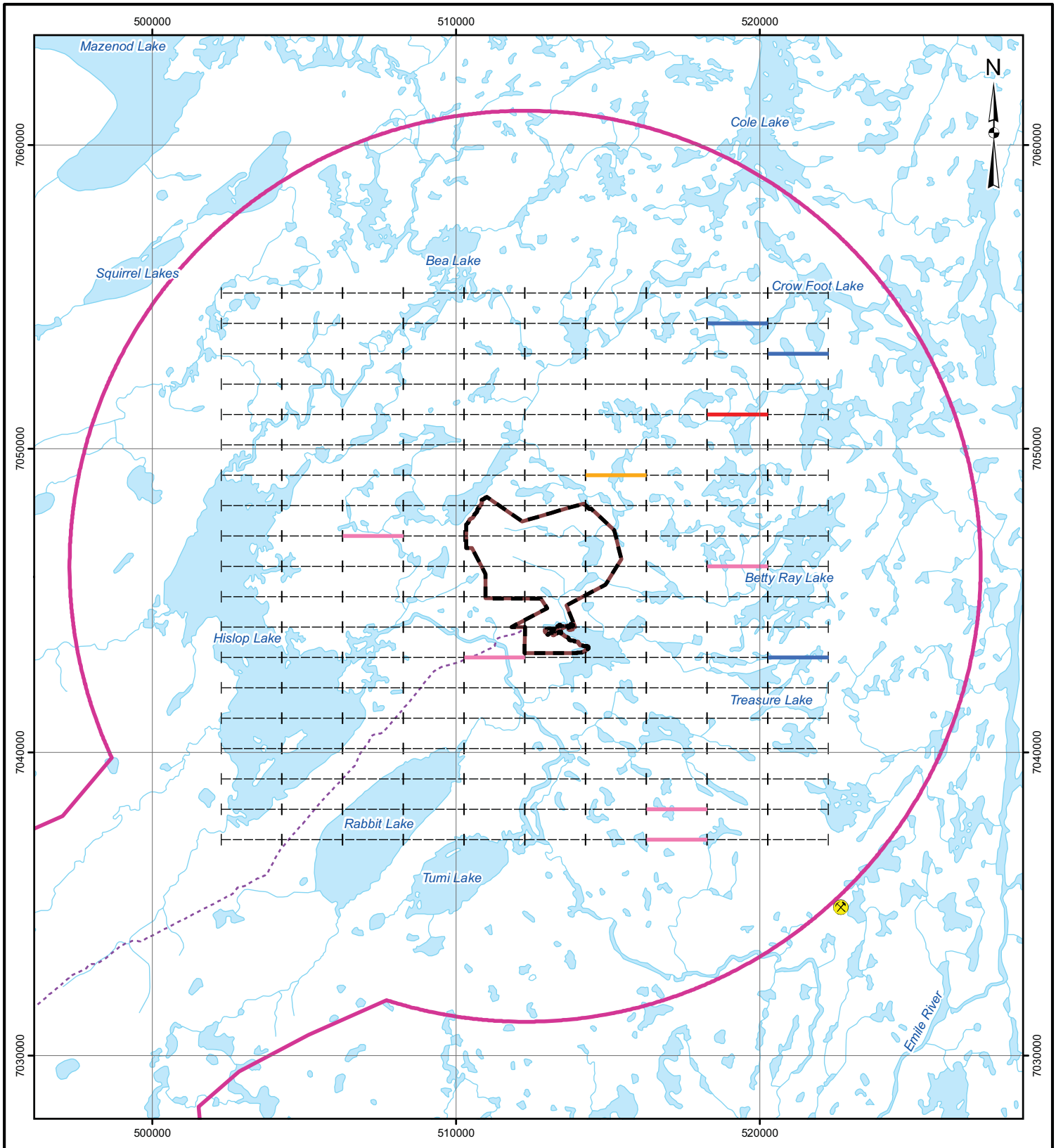

LEGEND

- RAYROCK MINE
- PROJECT LEASE BOUNDARY
- PROPOSED NICO PROJECT ACCESS ROAD
- WATERCOURSE
- WATERBODY

OBSERVATIONS

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- REGIONAL STUDY AREA

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SCALE 1:175,000 KILOMETRES

REFERENCE

Base data obtained from Atlas of Canada, DMTI, and GeoGratis.
Projection: UTM Zone 11 Datum: NAD 83

FORTUNE MINERALS LIMITED
NICO DEVELOPER'S ASSESSMENT REPORT

TITLE

TRANSECT SEGMENTS CONTAINING WHITE-WINGED SCOTER, 2006

Golder Associates
Edmonton, Alberta

IR-Wild-006-GIS			
PROJECT No. 09-1373-1004		SCALE AS SHOWN	REV. 0
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FIGURE: 6

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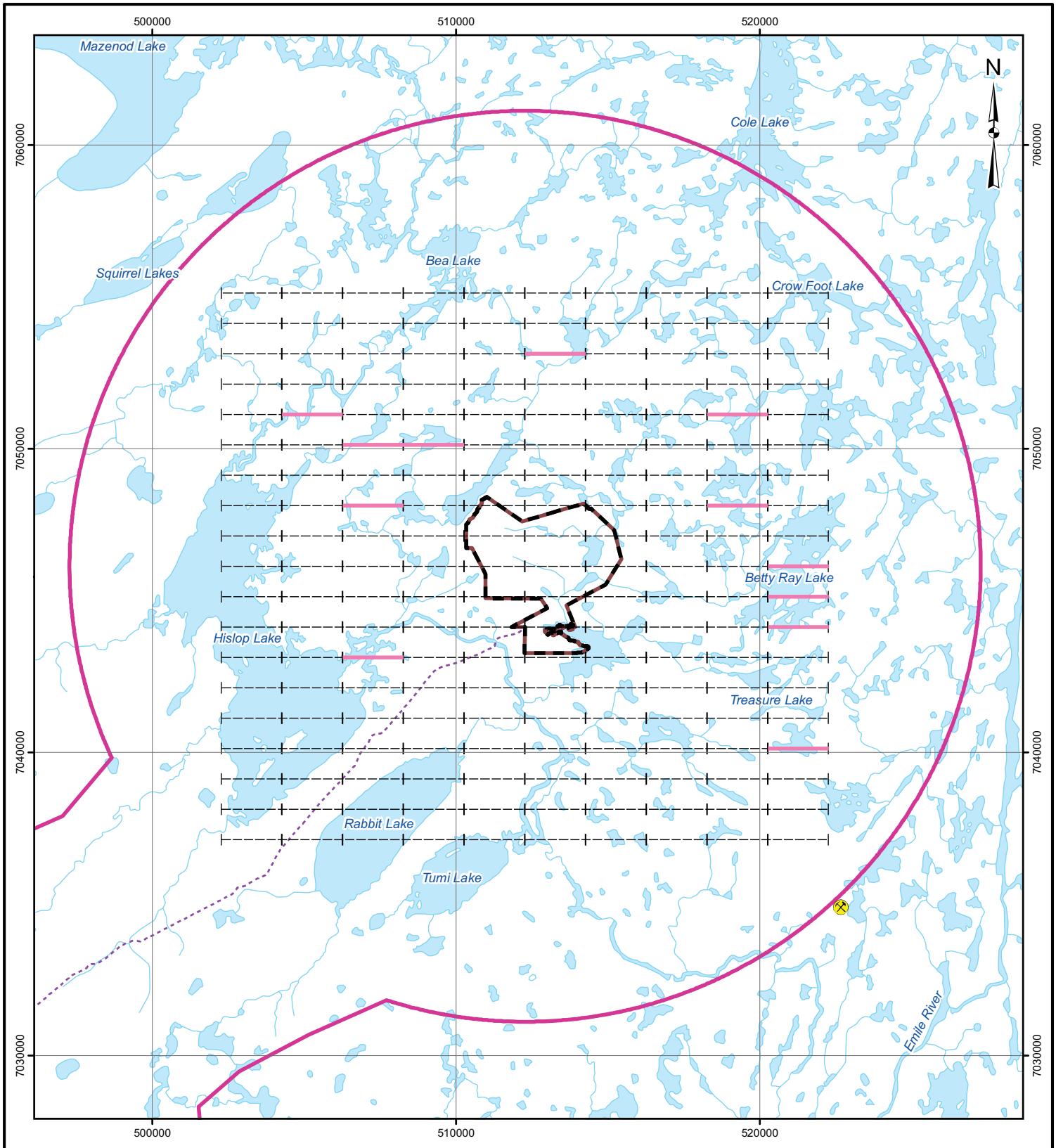


LEGEND

- RAYROCK MINE
- PROJECT LEASE BOUNDARY
- PROPOSED NICO PROJECT ACCESS ROAD
- WATERCOURSE
- WATERBODY

OBSERVATIONS

- 0
- 1-2
- 3-4
- 5-6
- 7-8
- 9-10
- 11-12
- 13-14
- 15-16

- REGIONAL STUDY AREA

5 0 5

SCALE 1:175,000 KILOMETRES

REFERENCE

Base data obtained from Atlas of Canada, DMTI, and GeoGratis.
Projection: UTM Zone 11 Datum: NAD 83

FORTUNE MINERALS LIMITED
NICO DEVELOPER'S ASSESSMENT REPORT

TITLE

TRANSECT SEGMENTS CONTAINING COMMON LOON, 2006

Golder Associates
Edmonton, Alberta

IR-Wild-007-GIS			
PROJECT No. 09-1373-1004		SCALE AS SHOWN	REV. 0
DESIGN	DP	29 Nov. 2011	
GIS	ANK	29 Nov. 2011	
CHECK	DP	02 Dec. 2011	
REVIEW	JV	02 Dec. 2011	

FIGURE: 7

G:\2008\1373\08-1373-0017 Fortune Minerals Nico EIS\GIS\Mapping\MXD\Wildlife\IR-Wild-007-GIS.mxd

INFORMATION REQUEST – EC_5

Source: Environment Canada (EC)

Request

Waterbird Densities

The proponent is asked to:

1) Clarify the size of the Local Study Area (in km^2) and the Regional Study Area (in km^2).

2) Provide waterbird densities of adults and young by km^2 of land (i.e., both terrestrial land and water) rather just by km^2 of water.

Response

Unfortunately, the data collected in 2004 and 2005 cannot be presented in the format requested by Environment Canada. Aerial surveys were completed for waterbirds on 119 lakes within the proposed mine and the NICO Project Access Road local study areas, and along an 8 kilometre (km) segment of the Marian River. Only the selected 119 lakes were surveyed; other lakes and intervening land were not surveyed. As such, Table 15.2-15 of the Developer's Assessment Report (DAR) presents densities by square kilometre of water only, and cannot be represented by area of both terrestrial and water landscape.

In 2006, survey methods were changed to improve compatibility with protocols described by Hines and Robertson (2006). Nineteen transects, each 20 km in length, were flown within the proposed mine regional study area. Each transect had a survey width of 200 metres on either side of the aircraft, for a total area of 152 square kilometres, as the Baseline Wildlife and Wildlife Habitat Report (Annex D). Table 1 presents the density of each species per square kilometre of landscape (including both land and water).

References

Hines, J.E., and M.O. Wiebe Robertson. 2006. Surveys of geese and swans in the Inuvialuit Settlement Region, Western Canadian Arctic, 1989-2001. Occasional Paper 112, Environment Canada, Yellowknife.

Table 1: Density of Each Species per Square Kilometre of Landscape (including both land and water)

Species	Pairs	Unknown	Lone Drakes	Lone Hens	Grouped Drakes	Total Birds	Total/km^2 of Landscape
American Wigeon	3	1	5	5	0	17	0.11
Bufflehead	12	12	7	5	2	50	0.33
Canada goose	0	6	0	0	0	6	0.04
Canvasback	0	1	1	0	0	2	0.01
Common goldeneye	1	0	1	0	0	3	0.02
Common Loon	4	8	0	0	0	16	0.11
Common Merganser	0	0	1	0	0	1	0.01
Mallard	1	10	6	3	2	23	0.15
Pacific Loon	2	6	0	0	0	10	0.07
Red-brested merganser	2	0	1	0	0	5	0.03
Ring-necked duck	3	0	0	0	0	6	0.04
Red-necked grebe	0	4	0	1	0	5	0.03
Sandhill Crane	0	1	0	0	0	1	0.01
Scaup[a]	32	282	11	5	38	400	2.63
Surf scoter	7	1	1	0	0	16	0.11
Tundra swan	2	0	0	0	0	4	0.03
Unknown diver	0	68	0	1	0	69	0.45
Unknown duck	6	134	0	5	0	151	0.99
Unknown look	1	2	0	0	0	4	0.03
Unknown merganser	0	1	0	0	0	1	0.01
Unknown scoter	0	8	0	0	0	8	0.05
White-winged scoter	5	22	2	1	4	39	0.26

a = includes greater scaup and lesser scaup
km^2 = square kilometre

INFORMATION REQUEST – EC_6

Source: Environment Canada (EC)

Request

Habitat Suitability Model for Waterbirds

The proponent is asked to use their existing waterbird data to verify the accuracy of their Habitat Suitability Model to determine whether the model presents an accurate assessment of habitat quality.

Response

The aerial survey methods used in 2004 and 2005 included a very limited geographic area; all survey effort was focused on a localized area along the proposed road alignment and anticipated mine footprint.

The aerial survey methods used in 2006 followed those described in Hines and Robertson (2006), where transects were divided into 2 kilometre segments for the purposes of recording observations. Thus, the exact location along the transect of each observation was not recorded. The available waterbird data is therefore not suitable to complete a validation of the Habitat Suitability Index (HSI) model.

However, the objective of the HSI modelling is to investigate various development scenarios, and their possible effects to waterfowl. The key variable in the modelling is the change in amount of development on the landscape. Four scenarios are presented, ranging from an undeveloped landscape (reference scenario) to a future scenario that includes the NICO Project and associated access road, the Tłı̨chǫ Road, contaminated sites, (e.g., Rayrock Mine), and exploration camps. The modelling indicates that this future scenario could cause up to a 1.8% loss of good waterfowl habitat from the regional study area, which is a low magnitude effect (i.e., 1 to 10% change). Validation of the HSI is unlikely to change the impact classification of low magnitude and the overall prediction of no significant effects from the NICO Project and other developments on waterfowl populations.

References

Hines, J.E., and M.O. Wiebe Robertson (editors). 2006. Surveys of geese and swans in the Inuvialuit settlement region, western Canadian Arctic, 1989 to 2001. Occational Paper Number 112. Canadian Wildlife Service.

INFORMATION REQUEST – EC_7

Source: Environment Canada (EC)

Request

Air quality Modelling Input and Output Data

EC requests that the proponent:

1) Provide all input and output model data files used to generate the air quality predictions presented in the DAR. All input and output files for CALMET, CALPUFF, and CALPOST should be provided in a model-ready format.

Response

CALMET, CALPUFF, and CALPOST input and output files are provided in a model-ready format on an external hard drive. Files are organized in the following folders:

1_CALMET

- MM5 files, CALMET input and output files

2_Baseline Case

- Combustion: CALPUFF input and output files for carbon monoxide (CO), particulate matter with a mean aerodynamic diameter of 2.5 microns ($PM_{2.5}$), particulate matter with a mean aerodynamic diameter of 10 micron (PM_{10}), and Total Suspended Particulate (TSP) concentrations and depositions.
- Metals: CALPUFF input and output files for metal concentrations and depositions.
- PAH_Concentration: CALPUFF input and output files for Polycyclic Aromatic Hydrocarbons (PAH) concentrations.
- PAH_Deposition: CALPUFF input and output files for PAH depositions.
- Reactives: CALPUFF input and output files for sulphur dioxide (SO_2) and nitrogen dioxide (NO_2) concentrations, as well as Potential Acid Input (PAI).
- VOC: CALPUFF input and output files for Volatile Organic Compounds (VOC) concentrations.

3_Application Case

- Short-Term Combustion: CALPUFF input and output files for 1-hour and 24-hour $PM_{2.5}$, PM_{10}, and TSP concentrations.
- Short-Term Metals: CALPUFF input and output files for 1-hour and 24-hour metal concentrations.
- Long-Term Combustion: CALPUFF input and output files for annual $PM_{2.5}$, PM_{10}, TSP concentrations and depositions.

- Long-Term Metals: CALPUFF input and output files for annual metal concentrations and depositions.
- PAH_Concentration: CALPUFF input and output files for PAH concentrations.
- PAH_Deposition: CALPUFF input and output files for PAH depositions.
- Reactives: CALPUFF input and output files for SO_2 and NO_2 concentrations, as well as PAI.
- VOC: CALPUFF input and output files for VOC concentrations.

INFORMATION REQUEST – EC_8

Source: Environment Canada (EC)

Request

Air Quality Modelling and Monitoring

EC requests that the proponent provide the following information:

1) Please provide estimates of the spatial extend of the predicted exceedances of ambient air quality standards within and outside of the mine lease boundary.

2) Please provide frequency of exceedance plots for NO_2, which are similar to the plots provided for TSP (figure 10.4-12) and $PM_{2.5}$ (figure 10.4-9).

3) Please provide details of an ambient air quality monitoring plan to address the predicted exceedances.

Response

Response 1

The spatial extents of the predicted exceedances of ambient air quality standards are as follows:

a) Annual Nitrogen Dioxide: As indicated in Section 10.4.2.3 of the Developer's Assessment Report (DAR), approximately 4 hectares (ha) outside of the NICO Project Lease Boundary exceed the standard. Including the area within the NICO Project Lease Boundary, a total area of approximately 42 ha exceed the standard.

b) 24-hour $PM_{2.5}$: As indicated in Section 10.4.2.3 of the DAR, approximately 189 ha outside of the NICO Project Lease Boundary exceed the standard. Including the area within the NICO Project Lease Boundary, a total area of approximately 653 ha exceed the standard.

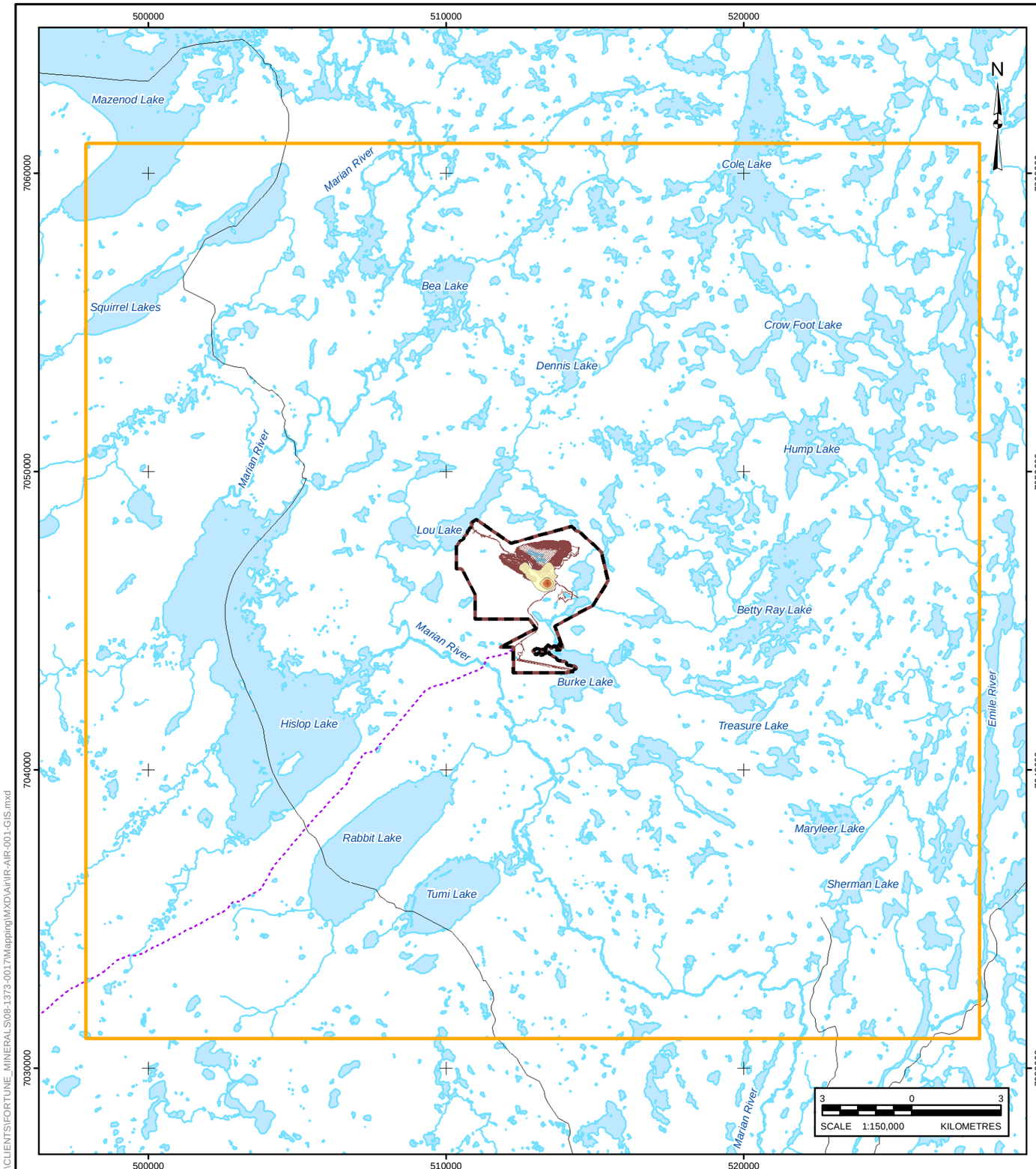
c) 24-hour Total Suspended Particulate (TSP): Approximately 381 ha outside of the NICO Project Lease Boundary exceed the standard. Including the area within the NICO Project Lease Boundary, a total area of approximately 881 ha exceed the standard.

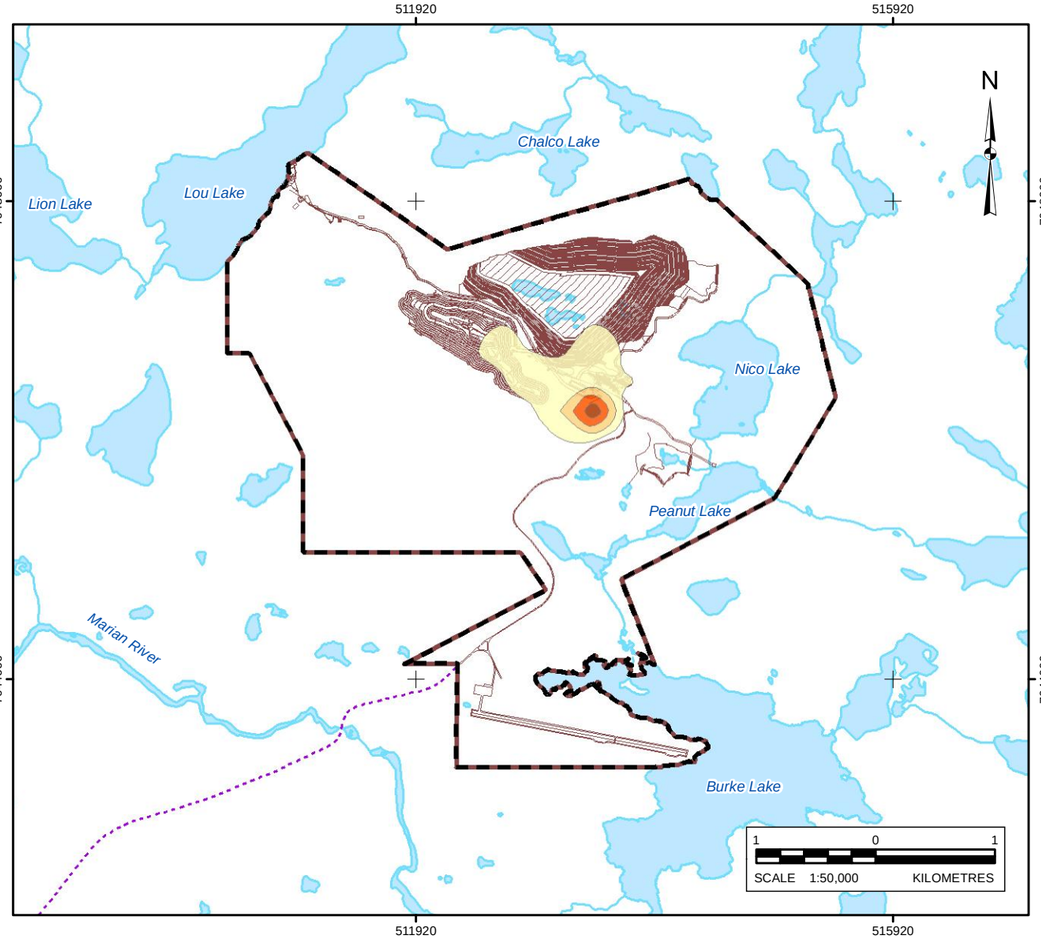
d) Annual TSP: Approximately 27 ha outside of the NICO Project Lease Boundary exceed the standard. Including the area within the NICO Project Lease Boundary, a total area of approximately 448 ha exceed the annual standard.

Modelling results of particulate matter are conservative and hence the areas exceeding the standards are likely smaller than those predicted. Natural mitigation of dust, such as precipitation and snow accumulation during the winter months, was not included in the modelling due to the lack of publicly available data on the effect of precipitation and snow accumulation on dust control. The impact of the NICO Project on the air quality is best determined through a comprehensive ambient air quality monitoring program. The development and implementation of an ambient air quality monitoring program is outlined in the response for Environment Canada Information Request 8.3 (EC_8.3).

Response 2

Frequency of exceedance plots are shown in Figures 1 and 2 for predicted 1-hour and 24-hour NO_2 concentrations, respectively.





LEGEND

- PROJECT LEASE BOUNDARY
- PROPOSED NICO MINE SITE
- EXISTING WINTER ROAD
- PROPOSED NICO PROJECT ACCESS ROAD
- WATERCOURSE
- WATERBODY
- LOCAL STUDY AREA

NUMBER OF DAYS EXCEEDING AIR QUALITY STANDARD

- > = 150
- 100 to 149
- 50 to 99
- 1 to 49

REFERENCE

Base data obtained from GeoGratis.
Projection: UTM Zone 11 Datum: NAD 83

FORTUNE MINERALS LIMITED
NICO DEVELOPER'S ASSESSMENT REPORT

TITLE

NUMBER OF DAYS EXCEEDING 1-HOUR NITROGEN DIOXIDE AIR QUALITY STANDARDS

Golder Associates
Edmonton, Alberta

FILE No. IR-AIR-001-GIS				
PROJECT No. 09-1373-1004			SCALE AS SHOWN	REV. 0
DESIGN	NP	24 Oct. 2011	FIGURE: 1	
GIS	DC	30 Nov. 2011		
CHECK	DC	02 Nov. 2011		
REVIEW	NP	02 Nov. 2011		

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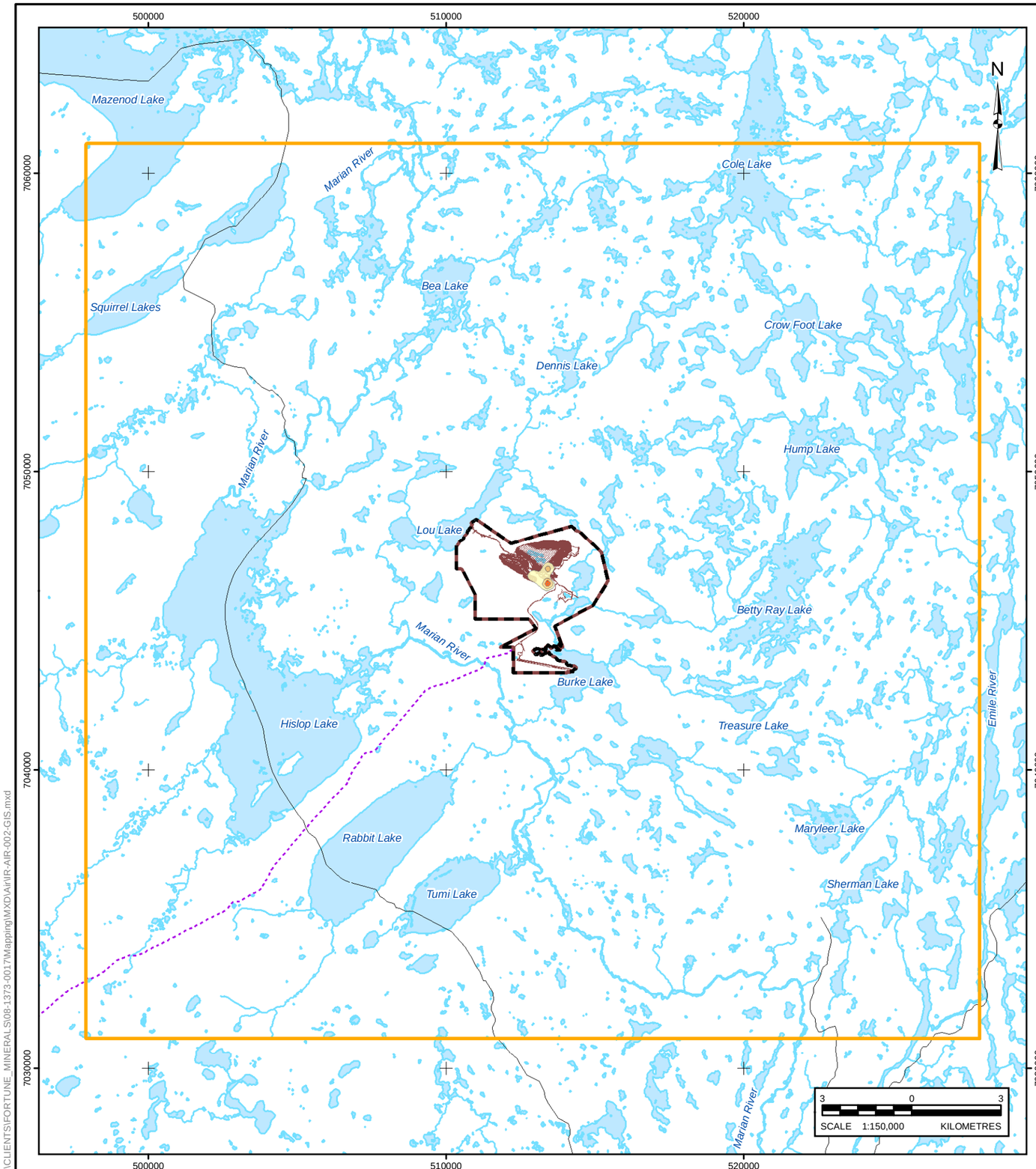

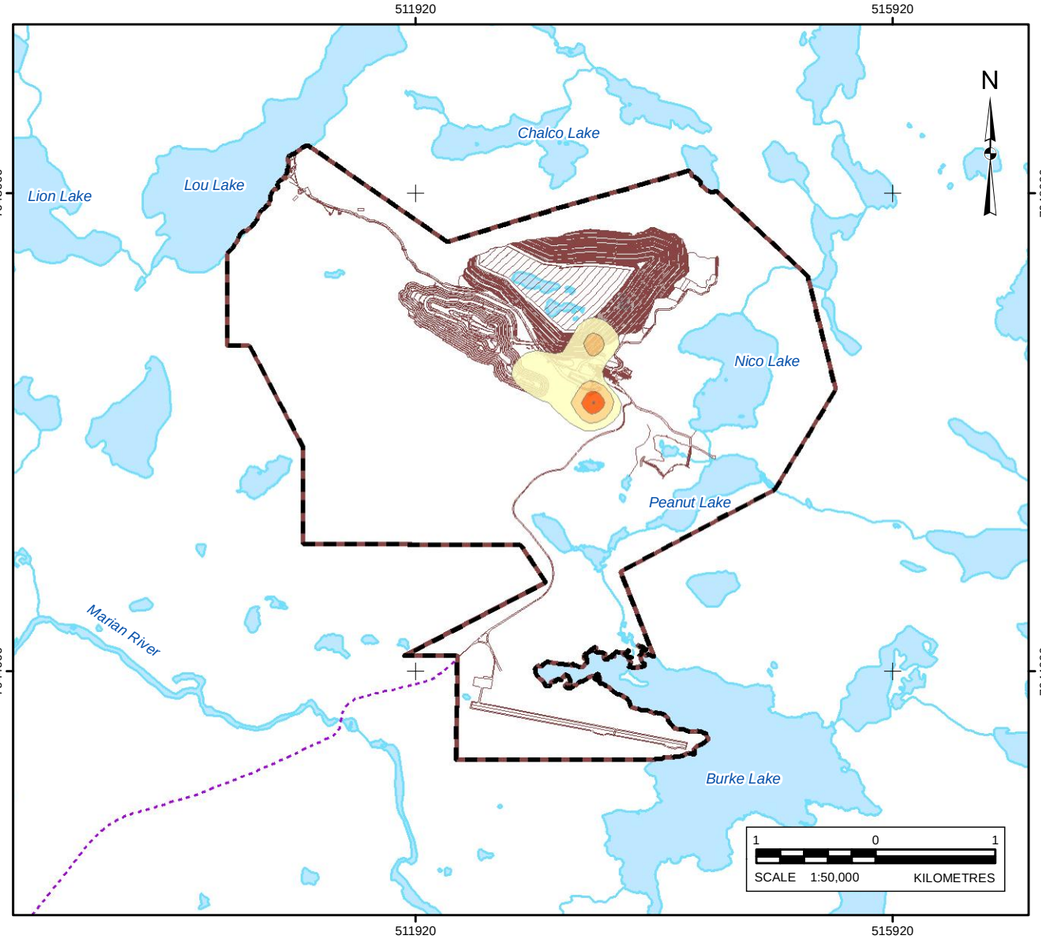

LEGEND

- PROJECT LEASE BOUNDARY
- PROPOSED NICO MINE SITE
- EXISTING WINTER ROAD
- PROPOSED NICO PROJECT ACCESS ROAD
- WATERCOURSE
- WATERBODY
- LOCAL STUDY AREA

NUMBER OF DAYS EXCEEDING AIR QUALITY STANDARD

- > = 15
- 10 to 14
- 5 to 9
- 1 to 4

REFERENCE

Base data obtained from GeoGratis.
Projection: UTM Zone 11 Datum: NAD 83

FORTUNE MINERALS LIMITED
NICO DEVELOPER'S ASSESSMENT REPORT

TITLE

NUMBER OF DAYS EXCEEDING 24-HOUR NITROGEN DIOXIDE AIR QUALITY STANDARDS

Golder Associates
Edmonton, Alberta

FILE No. IR-AIR-002-GIS				
PROJECT No. 09-1373-1004			SCALE AS SHOWN	REV. 0
DESIGN	NP	24 Oct. 2011	FIGURE: 2	
GIS	DC	30 Nov. 2011		
CHECK	DC	02 Nov. 2011		
REVIEW	NP	02 Nov. 2011		

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Response 3

Table 1 presents an outline of the proposed monitoring program for assessing impacts of emissions from the NICO Project on local air quality. When the NICO Project progresses past the permitting stage, the type of air quality monitoring proposed for the NICO Project would likely include sampling for TSP, PM_{10}, and $PM_{2.5}$ at least one location on the NICO Project Lease Boundary. Passive monitoring stations for sulphur dioxide and nitrogen dioxide would also be proposed, likely to be co-located with the particulate monitoring station(s). In addition to the particulate and passive monitoring proposed, a dustfall monitoring program on the NICO Project Lease Boundary, proposed NICO Project Access Road, and adjacent (off-site) to significant material handling locations would be proposed. It is anticipated that the number of dustfall stations that will be proposed would likely be between 5 and 8 and that each station will be designed to generate data on dustfall deposition. It is important to note that dustfall data may exceed the predicted deposition values because dustfall monitors indiscriminately capture particles in a range of sizes, including particles considerably larger than TSP (i.e., larger than approximately 100 micrometres). This potential result does not intrinsically invalidate or cast doubt on the predicted deposition rate.

All of the monitoring stations would be sited in accordance with a slightly modified version of the Alberta Monitoring Directive. The Alberta Monitoring Directive will be modified to include consideration of site accessibility and electrical service accessibility. The program will also be designed to be responsive to changing conditions and monitoring results. The detailed siting assessment will be conducted in consultation with Environment Canada and the Northwest Territories Department of Environment and Natural Resources.

Table 1: Proposed Monitoring Program

Parameter	Frequency	Location	Phase
Meteorological Conditions			
Wind speed	Hourly	On-site meteorological station	Construction and Operation
Wind direction	Hourly		Construction and Operation
Temperature	Hourly		Construction and Operation
Rain	Hourly		Construction and Operation
Relative Humidity	Hourly		Construction and Operation
Net Radiation	Hourly		Construction and Operation
Ambient Air Quality			
TSP	Every 6 days	On-site: location to be defined based on maximum predicted concentrations within the NICO Project Lease Boundary; Along the NPAR: location to be defined; and Offsite: location to be defined.	Construction and Operation
PM_{10}	Every 6 days		Construction and Operation
$PM_{2.5}$	Every 6 days		Construction and Operation
Dustfall	Monthly		Construction and Operation
SO_2	Monthly		Operation
NO_2	Monthly		Operation

NPAR = NICO Project Access Road; TSP = total suspended particulate; PM_{10} = particulate matter of particle diameter less than 10 µm; $PM_{2.5}$ = particulate matter of particle diameter less than 2.5 µm; SO_2 = sulphur dioxide gas; NO_2 = nitrogen dioxide gas

INFORMATION REQUEST – EC_9

Source: Environment Canada (EC)

Request

Metal Deposition

Please provide the following information:

1) Details on how metal deposition was predicted.

2) Spatial isopleth plots of predicted TSP and dust deposition rates.

3) Metal speciation profiles for TSP and fugitive dust.

4) The references noted above in the preamble: "Appendix IV - results.xlsx" and "Nico Project: Tailings and Mine Rock Co-Disposal Facility FEED study (Golder 2010)".

Response

Response 1

Metal deposition was estimated assuming that the metal compounds were a part of the particulate matter emissions. The primary sources of metal emissions from the NICO Project are fugitive dust associated with the disturbance of ore, including handling and transport activities (e.g., road dust), and combustion sources from fleet (e.g., vehicles and equipment), power generators, and the incinerator. Particulate matter emissions were modelled using California Puff Plume Dispersion Model (CALPUFF), which includes algorithms for wet and dry deposition. Because larger particulates are typically associated with fugitive dust and fine particulates are typically associated with combustion, the fugitive dust emissions were modelled as Total Suspended Particulates (TSP) and the combustion emissions were modelled as particulate matter with an aerodynamic mean diameter of 2.5 micrometres ($PM_{2.5}$). Table 1 presents the deposition velocities and scavenging coefficients used in the CALPUFF model.

Table 1: Particulate Deposition Parameters used in CALPUFF

	Deposition Velocity[a] [m/s]	Wet Deposition Scavenging Coefficients[b] [s^{-1}]	
		Liquid Precipitation	Frozen Precipitation
TSP	2.93×10^{-2}	6.30×10^{-4}	2.10×10^{-4}
$PM_{2.5}$	1.94×10^{-3}	9.61×10^{-5}	3.20×10^{-5}

[a] Derived from Figure 19.4, Seinfeld and Pandis (1998).

[b] Derived from Figure 1-11, U.S. EPA 1995.

TSP = total suspended particulate; $PM_{2.5}$ = particulate matter of particle diameter less than 2.5 µm; m/s = metre per second; s^{-1} = per second

Sources of particulate matter with similar metal compositions were grouped and each group was modelled individually in CALPUFF. After the CALPUFF runs are completed, a utility program for CALPUFF called POSTUTIL was used to partition individual metal compounds for each group using the associated metal

speciation profile (Table 2). CALPOST was also used to provide predictions for the annual dry, wet, and total deposition rates for each metal compound.

Response 2

A spatial isopleths plot of the annual TSP deposition rates is presented in Section 10.4.2.3.2, Figure 10.4-13 of the Developer's Assessment Report. It was assumed that, because fugitive dust is associated with the larger particulate matter, dust deposition rates were similar to those for TSP.

Response 3

Metal speciation profiles for TSP and fugitive dust are presented in Table 2 for the NICO Project. The fraction of metals in the particulate matter emissions from the Snare Rapids incinerator are different than those for the NICO Project incinerator and hence are also presented in Table 2.

Table 2: Fraction of Metals in Particulate Matter Emissions from Various Emission Sources

Metals	Fugitive Emission Sources - Ore	Fugitive Emission Sources - Ore and Mine Rock	Fugitive Emission Sources - Mine Rock	Diesel Combustion Sources	NICO Project Incinerator	Snare Rapids Incinerator
aluminum	$4.14x10^{-2}$	$4.63x10^{-2}$	$4.79x10^{-2}$	$8.00x10^{-4}$	—	—
antimony	$2.59x10^{-5}$	$1.38x10^{-5}$	$9.67x10^{-6}$	—	$2.15x10^{-3}$	$7.90x10^{-4}$
arsenic	$8.07x10^{-3}$	$2.90x10^{-3}$	$1.12x10^{-3}$	—	$5.67x10^{-5}$	$5.36x10^{-4}$
barium	$2.50x10^{-4}$	$4.53x10^{-4}$	$5.23x10^{-4}$	—	$1.21x10^{-4}$	$3.86x10^{-5}$
beryllium	$2.56x10^{-6}$	$1.87x10^{-6}$	$1.63x10^{-6}$	—	$3.78x10^{-7}$	$7.06x10^{-8}$
bismuth	$1.11x10^{-3}$	$6.79x10^{-4}$	$5.30x10^{-4}$	—	—	—
boron	—	—	—	—	—	—
bromine	—	—	—	—	—	—
cadmium	$1.16x10^{-7}$	$1.28x10^{-7}$	$1.32x10^{-7}$	$6.00x10^{-4}$	$3.61x10^{-3}$	$1.36x10^{-3}$
calcium	$5.51x10^{-2}$	$2.55x10^{-2}$	$1.53x10^{-2}$	—	—	—
chromium	$4.36x10^{-5}$	$4.69x10^{-5}$	$4.81x10^{-5}$	$1.00x10^{-4}$	$1.51x10^{-3}$	$1.12x10^{-3}$
chromium 6	—	—	—	—	$3.38x10^{-6}$	$6.30x10^{-7}$
cobalt	$9.49x10^{-4}$	$3.48x10^{-4}$	$1.41x10^{-4}$	$1.00x10^{-4}$	$9.16x10^{-5}$	$1.89x10^{-5}$
copper	$1.81x10^{-4}$	$1.41x10^{-4}$	$1.27x10^{-4}$	$1.00x10^{-4}$	$6.24x10^{-3}$	$2.32x10^{-3}$
gallium	—	—	—	$1.00x10^{-4}$	—	—
indium	—	—	—	$6.00x10^{-4}$	—	—
iron	$1.79x10^{-1}$	$1.18x10^{-1}$	$9.71x10^{-2}$	$5.00x10^{-4}$	—	—
lanthanum	—	—	—	—	—	—
lead	$1.03x10^{-5}$	$6.86x10^{-6}$	$5.67x10^{-6}$	$1.00x10^{-4}$	$7.31x10^{-3}$	$2.66x10^{-2}$
lithium	$8.52x10^{-6}$	$1.31x10^{-5}$	$1.47x10^{-5}$	—	—	—
magnesium	$2.35x10^{-2}$	$2.29x10^{-2}$	$2.26x10^{-2}$	—	—	—
manganese	$1.76x10^{-3}$	$8.20x10^{-4}$	$4.97x10^{-4}$	$1.00x10^{-4}$	$4.54x10^{-4}$	$1.62x10^{-4}$
mercury	—	—	—	—	$8.33x10^{-4}$	$6.97x10^{-4}$
molybdenum	$1.24x10^{-5}$	$6.40x10^{-6}$	$4.33x10^{-6}$	—	$1.07x10^{-5}$	$2.00x10^{-6}$
nickel	$2.97x10^{-5}$	$1.70x10^{-5}$	$1.26x10^{-5}$	—	$1.31x10^{-3}$	$1.19x10^{-3}$
palladium	—	—	—	$1.00x10^{-4}$	—	—
phosphorus	—	$1.51x10^{-4}$	$2.03x10^{-4}$	$1.00x10^{-4}$	$1.29x10^{-4}$	$2.40x10^{-5}$
potassium	$2.92x10^{-2}$	$4.40x10^{-2}$	$4.90x10^{-2}$	—	—	—

Table 2: Fraction of Metals in Particulate Matter Emissions from Various Emission Sources (continued)

Metals	Fugitive Emission Sources - Ore	Fugitive Emission Sources - Ore and Mine Rock	Fugitive Emission Sources - Mine Rock	Diesel Combustion Sources	NICO Project Incinerator	Snare Rapids Incinerator
rubidium	—	—	—	—	—	—
selenium	$4.42x10^{-6}$	$4.32x10^{-6}$	$4.28x10^{-6}$	—	$8.99x10^{-5}$	$3.18x10^{-5}$
silicon	—	—	—	$6.30x10^{-3}$	—	—
silver	$2.78x10^{-7}$	$1.98x10^{-7}$	$1.71x10^{-7}$	$1.00x10^{-4}$	$1.06x10^{-4}$	$3.94x10^{-5}$
sodium	$7.11x10^{-3}$	$5.47x10^{-3}$	$4.91x10^{-3}$	—	—	—
strontium	$1.50x10^{-5}$	$1.88x10^{-5}$	$2.01x10^{-5}$	—	—	—
thallium	$4.85x10^{-7}$	$5.17x10^{-7}$	$5.28x10^{-7}$	—	—	—
tin	$9.66x10^{-6}$	$6.31x10^{-6}$	$5.15x10^{-6}$	—	—	—
titanium	$2.14x10^{-3}$	$1.71x10^{-3}$	$1.57x10^{-3}$	—	—	—
tungsten	—	—	—	—	—	—
uranium	$1.32x10^{-5}$	$7.58x10^{-6}$	$5.63x10^{-6}$	—	—	—
vanadium	$3.84x10^{-5}$	$3.56x10^{-5}$	$3.47x10^{-5}$	—	$4.33x10^{-4}$	$8.07x10^{-5}$
yttrium	$2.11x10^{-5}$	$1.49x10^{-5}$	$1.27x10^{-5}$	—	—	—
zinc	$2.19x10^{-5}$	$2.59x10^{-5}$	$2.73x10^{-5}$	$7.00x10^{-4}$	$4.52x10^{-3}$	$1.61x10^{-3}$
zirconium	—	—	—	—	—	—

Response 4

The document requested as “Appendix IV – results.xlsx” was provided in Annex A, Appendix IV of the Developer’s Assessment Report:

i) Golder Associates Ltd. 2011. NICO Project: Geochemical Characterization of Waste Rock, Ore, and Tailings (Appendix IV). Prepared for Fortune Minerals Limited. Mississauga, ON.

The relevant findings of the second requested document, identified as “Nico Project: Tailings and Mine Rock Co-Disposal Facility FEED study (Golder 2010)” have been incorporated into the above-listed Annex. This overall FEED study document is therefore not included in this response.

References

Seinfeld, J.H., and S.N. Pandis. 1998. Atmospheric chemistry and physics. John Wiley & Sons, Inc. New York. 1326 p.

U.S. EPA (United States Environmental Protection Agency). 1995. User’s Guide for the Industrial Source Complex (ISC3) Dispersion Models (Revised) Volume II - Description of Model Algorithms. Office of Air Quality Planning and Standards Emissions, Monitoring and Analysis Division, Research Triangle Park, North Carolina. EPA-454/B-95-003b.

INFORMATION REQUEST – EC_10

Source: Environment Canada (EC)

Request

Transport of Concentrate

EC requests that the proponent provide the following information:

1) The expected chemical composition of the concentrate to be shipped from the mine.

2) The type of truck trailers that will be used to transport the bags of concentrate (e.g. open flat deck or enclosed trailers).

3) Deatiled specifications for the bags that will be used to contain the concentrate as well as examples of other mines using these bags to transport concentrate.

4) The alternatives that were considered for transporting concentrate and the reasons why this transport system was selected.

5) The mitigation and monitoring strategies to minimize the lost of concentrate during the handling and transportation process.

Response

Response 1

See Tables 1 and 2 for data.

Table 1: Plant Design Bulk Concentrate Composition

		Bulk Concentrate
Co	%	3.67
Au	g/t	51.54
Bi	%	4.30
Zn	%	0.06
Cu	%	1.62
Ni	%	0.07
As	%	25.80
Fe	%	25.65
Mn	%	0.06
Mg	%	1.96
Cd	%	0.00
Pb	%	0.15
Al	%	1.01
S	%	18.23

Table 2: Plant Design Bulk Concentrate Mineralogy Composition

Mineral Species		Bulk Concentrate
		wt %
CoAsS	Cobaltite	10.3
Bi	Native Bismuth	1.5
Bi_2S_3	Bismuthinite	3.4
Fe_3O_4	Magnetite	5.9
Fe_2O_3	Hematite	-
FeAsS	Arsenopyrite	45.9
FeS_2	Pyrite	10.2
FeS	Pyrrhotite	-
$CuFeS_2$	Chalcopyrite	2.9
ZnS	Sphalerite	0.1
NiS	Millerite	0.1

Response 2

Open flat deck with fuel tanker below deck.

Response 3

Double wall 1.5 cubic metre capacity bulk bag. This double walled bag will have protective sleeves on 12” lifting loops at the 4 corners of a duffle top. Open bottom bag with 4 outside bottom triangle flaps and one full flap. The bottom is held closed with an outside holding cord. A slip seal liner will be made of linear-blend Polyethylene. Tie-offs will be provided to secure the bag to a pallet for protection of the bottom fabric. Several other mines using this type of bag but the manufacturer cannot divulge their names. Fortune Minerals Limited will attempt to find a few other mines using this type of bag before the Technical Sessions.

Response 4

Alternatives considered were steel bulk containers with open tops, PolyBoxes with open tops, and Flatbed trailer with sealed sides/back and canvas retractable top cover. Smallest unit size which is a major factor in the cold climate, most easily secured with a sealed inner liner and spill proof as bags are robust enough to remain intact in a truck rollover situation.

Response 5

Bags are filled and emptied mechanically with fill limiting controls and discharge into an enclosed hoppers. Sealed liners within the bulk bags ensure no concentrate loss during shipping.

INFORMATION REQUEST – EC_11

Source: Environment Canada (EC)

Request

Incineration of Sewage

If the proponent plans to incinerate sewage sludge, EC requests the following information:

1) Detailed specifications of the incinerator.

2) A letter from the manufacturer stating that the incinerator is designed to incinerate sewage sludge. The letter should include previous stack testing results demonstrating that the incinerator can achieve the Canada-wide Standards for Dioxines and Furans while incinerating sewage sludge.

3) A commitment from the proponent to stack test the incinerator emissions while burning sewage sludge prior to the commissioning of the incinerator.

Response

Response 1

Eco Waste Solutions Model ECO 1TN1P, consists of a Primary Chamber, Secondary Chamber, Air Pollution and Heat Recovery System, and a Main Control Panel. It is a Custom-sized, 2-stage, controlled air, batch style incineration system and factory assembled. Primary Chamber is a 6 to 8 hour burn cycle and 6 to 8 hour cooldown operating at 650 to 850 degrees Celsius (°C). The Secondary Chamber is completely separate from the Primary Chamber to expose gaseous products of combustion to high temperature, 1000 °C for 2 seconds. The outer shell is ¼" mild steel (44W HSLA) painted with rust inhibiting, heat resistant paint. Refractory linings are 6" ceramic fibre blocks with stainless steel (Type 310SS) anchors on the walls and 6" reinforced castable refractory on the floor. The Burner package is a forced draft, pressure-mechanical atomizing with a built in blower to supply combustion air. Oil pump is driven by the blower motor complete with integral relief valve and filter, pressure gauge and high voltage ignition transformer. There is an electronic combustion control relay with scanner to control combustion and supervise the flame with a 5 second fuel shut-off upon flame failure.

Response 2

Within the attached quote, Dioxins and Furans limits are as required by the Canada Wide Standards Limits, 80 pg/Rm^3 TEQ (Attachment A).

Response 3

Fortune Minerals Limited will consult with Environment Canada to develop a stack testing program.

ATTACHMENT A

NICO Project Camp Waste Incinerator

(please refer to supporting documents)

INFORMATION REQUEST – EC_12

Source: Environment Canada (EC)

Request

Water Quality and Treatment

The proponent is asked to:

1) Clarify what basis is used for the final water quality predictions for each waterbody.

2) Provide a description of what the final effluent water quality is expected to be entering and exiting the WWTP.

3) Provide a description of what the final effluent water quality is expected to be entering and exiting the future proposed wetlands area after closure.

4) Provide an assessment of how the increase in concentrations of the identified parameters will ultimately affect each identified lake and the associated aquatic life.

Response

Response 1

The basis used for the final water quality predictions for each waterbody was provided in Sections 7.6.3.1 and 7.6.3.2 of the Developer's Assessment Report (DAR) and detailed in Appendix7.I.

Water quality predictions during operations were based on the expected quality of effluent from the Effluent Treatment Facility and deposition of dust and associated metals in the watershed during operations.

Water quality predictions during closure were based on discharges from treatment wetlands to Nico Lake and reflect the application of conservative assumptions regarding attenuation of concentrations in closure water quality predictions for waters entering the treatment wetlands, as the expected quality of waters exiting the treatment wetlands is not yet known. As stated in Appendix 7.I, Section 7.I.2.4:

> *Monthly concentration predictions for waters influent to the treatment wetlands (Wetland Treatment Systems No. 1, 2, and 3; Appendix 7.II) were applied to flows to Nico Lake during closure. These influent concentrations were adjusted to cap predicted exceedances of site-specific water quality objectives concentrations at the respective objective concentrations. No further adjustments were applied due to uncertainty regarding the constituent specific effectiveness of the planned passive treatment system.*

Response 2

The expected quality of Surge Pond water entering the Effluent Treatment Facility (WWTP) during operations was provided in Appendix 7.II, Table 7.II.3-1. The expected quality of treated effluent exiting the WWTP for treatment option 3 (ion exchange) was provided in Appendix 7.I, Table 7.I.2.1.

In the "Update for the Developer's Assessment Report" (30 September 2011) a description of the final effluent water quality expected to be entering and exiting the WWTP, for both the treatment system option presented in

the DAR and for an updated reverse osmosis and chemical precipitation treatment system that is expected to be more robust (i.e., can effectively handle a wider range of influent concentrations relative to the ion exchange system, and produces a stable chemical precipitate that is easier to manage relative to the waste streams associated with the ion exchange system) is provided in Table 1 of information request TG_28.

Response 3

The expected quality of waters entering the future proposed treatment wetlands after closure was presented in detail in Attachment 7.II.IV-2 of the DAR. As noted in the response to EC-12 1) above, the expected quality of waters exiting the treatment wetlands is not yet known and conservative attenuation assumptions were applied to the predicted influent concentrations to represent treatment wetland discharges in the DAR.

Process water generated during pilot plant operations was concentrated into a brine using a reverse osmosis system, and this concentrated brine is currently being treated in a bench-scale passive treatment system. Approximately 400 litres (L) of brine is being treated in the bench-scale system to provide the initial “proof-of-principle” test to demonstrate that the background water quality matrix and expected contaminants are amenable to treatment by the proposed passive treatment mechanisms. There are several types of treatment systems that are classified as "passive", and they typically all rely on similar mechanisms for metals removal. which includes a combination of both anaerobic and aerobic biotreatment. Evaluation of a wetlands type system on a bench-scale with limited quantities of water is not feasible, so an alternate method for the “proof-of-principle” test is being used for bench-scale testing. This includes using a passive biochemical reactor as the anaerobic step and a passive aerobic polishing system as the aerobic step due to space constraints, time constraints, and limitations on the water available for testing. The anaerobic and aerobic biological treatment mechanisms are the same mechanisms that provide metals removal in wetlands systems. This “proof-of-principle” testing is the first step in the development of passive treatment as described in Section 3.III.8.4 of the DAR.

Preliminary results are shown in Table 1 of information request TG_28 and includes both total and dissolved metals results for the anaerobic (BCR) and aerobic (APC) bench cells. Through the third sampling event on 4 November 2011, the system had been operational 5 weeks after a 2 week incubation period. After treatment of approximately 300 L of water, reductions of an order of magnitude for the metals present have been achieved. Observations regarding these data are as follows:

- The arsenic removal is likely limited based on the amount of iron in the water but increased aeration may increase the arsenic removal in the APC. As discussed previously, the engineering parameters will be determined during pilot testing and increased aeration requirements can be engineered into passive systems. For this bench testing, the aeration will be increased to evaluate the impact on arsenic removal.
- Good removal of aluminum is occurring in the BCR; however, it appears that there is some residual aluminum in the APC from the materials used to construct and start-up the system. It is not unusual for passive systems to have a “flushing” period, and it is expected that the aluminum levels in the APC effluent will also decrease.

Response 4

An assessment of how the increase in concentrations of the identified metals will ultimately affect each identified lake and the associated aquatic life was presented in the DAR in Sections 7.7.2 (summarized from Section 12.4.2, 7.7.3, 7.10.2.1, 7.11.2.2, and 7.12.2). As summarized in Section 7.12.2:

Overall, the weight of evidence from the analysis of the primary pathways predicts that the incremental impacts from the NICO Project will result in changes to water and sediment quality in Nico, Peanut, and Burke lakes, but that these changes will not have a significant adverse impact on the suitability of water in these lakes to support a viable and self-sustaining aquatic ecosystem.

INFORMATION REQUEST – EC_13

Source: Environment Canada (EC)

Request

Waste Treatment and Disposal

The proponent is asked to:

1) Respond if they could lower the arsenic concentration for what is considered mine rock suitable for construction

On a related matter, the proponent is also proposing to dispose of non-hazardous wastes (construction materials, incinerator ash, etc) in the CDF, along with tailings and waste rock. This will increase the volume required in the CDF and potentially complicate the design of the impoundments and the disposal schedule.

2) Clarify if this is commonly done. Also clarify why this is the preferred method of disposal of non-hazardous wastes (as opposed to a separate landfill, for example).

Response

Response 1

Given that arsenic is present in the existing natural environment and rocks in the vicinity of the mine, and that arsenic naturally occurs in the waterbodies downstream of the NICO Project, it is considered unlikely that it will be possible to lower the arsenic concentration in the rock suitable for construction. Consideration has, however, been given to construct with a design suitable achieving current naturally observed levels of arsenic downstream of the site.

Response 2

Disposal of non-hazardous waste in tailings or waste rock management facilities is common practice at mines in the north and throughout the world, for various reasons, including logistics, and limiting potential off-site impacts. Furthermore, it will help reduce truck traffic and the carbon load that would accompany shipping this material off-site. The volume of non-hazardous waste is considered to be inconsequential relative to the amount of rock and tailings to be placed in the Co-Disposal Facility and is not expected to result in any substantial design changes.

INFORMATION REQUESTS

NATIONAL RESOURCES CANADA

INFORMATION REQUEST – NRCan_1-1

Source: Natural Resources Canada (NRCan)

Request

Mine Waste Management – Mineral and Metals Sector

1) Please review and verify/revise assessments for mineralized mine rock.

2)
   i) For the ore (FC5), what happens to arsenopryrite and pyrite during the processing?
   ii) Where do they report to (rougher tailings, cleaner tailings, or concentrate)?

3)
   i) why did the humidity cell tests exclude the cleaner tailings?
   ii) Does the proponent plan additional testing to determine the longer-term behaviour of the cleaner tailings as a component of the bulk tailings, and when?

4) Please review and verify the labelling for Figure 3.ii.3-1

5) Please review and verify AMD assessments for the mine rock considering the uncertainties.

6) Please clarify or revise the statement that 10% of mine rock has acid generation potential (Appendix 3.II CDF Management Plan, pg. 3.II.9), which is contradictory to other data such as those obtained from the kinetic testing results

7) Please review the NAG-pH values assigned for the feldspar porphyry and rhyolite.

8) Please review and revise the reported claudetite (As2O3) concentrations of the tailings and provide an explanation for the discrepancy

9) Please review and revise inconsistent statements regarding As, Bi, Sb concentrations of the Mine Rock, mineralized rock, ore, and tailings

10) Do these values represent the detection limits for Cd and Se?

11)
   i) Please provide the mine rock production data (amount mined over the lifetime of the project) with the rock classification such as Type 1-3 and sub-economic mine rock
   ii) Please provide a comprehensive sampling and monitoring plan involving the Type-2 rocks ahead of the operations to ensure that there is adequate material for the perimeter dyke
   iii) will the geochemical criteria developed to classify the rocks be reassessed and confirmed prior to their use during the operations?
   iv) Are the numbers of different types of samples analyzed and tested representative of the rock and tailings volumes to be excavated, processed, and disposed?

12)

i) what detrimental effects would this have on the co-disposal of the tailings with the waste rock

ii) would the void space of the waste rock be effectively filled?

iii) would continued settling occur within the CDF following the placement of the cover materials, and would that compromise the cover properties

Response

Response 1

The assessments made for mineralized mine rock have been reviewed and verified. Based on this review, the original position taken in the Developer's Assessment Report (DAR) is maintained. The acid rock drainage/metal leaching (ARD/ML) assessment is consistent with guidance documents and with recent assessment practices for other mine assessments completed in the north. Please see Section 3.4.2.1 of the DAR for more information.

The NP:AP ratio (also called the neutralization potential ratio or, NPR) criteria derived with "bulk" NP (i.e., developed through acidification of the sample and back titration through a modified Sobek method) is considered to be appropriate and consistent with the geochemistry guidance documents provided below. For example acid base accounting (ABA) evaluation in Price (1997) uses NPR as the screening criteria, rather than the carbonate neutralization potential ratio (CNPR). The reasons for use of NPR rather than CNPR are due to several factors, including availability of general data regarding for NPR and the development of the acid generation classification values based on review of a large database of NPR information. As further discussed in the MEND (2009) document, evaluation of actual potential for ARD must also include consideration of not only ABA data but mineralogy and kinetic testing, which have been completed and reported on in full in the submitted documents.

Geochemistry related guidance documents:

- Draft Guidelines and Recommended Methods for the Prediction of Metal Leaching and Acid Rock Drainage at Mine sites in British Columbia (Price 1997).
- Guidelines for Acid Rock Drainage Prediction in the North (Department of Indian and Northern Development - DIAND 1992).
- Prediction Manual for Drainage Chemistry from Sulphidic Geologic Materials. (Mine Environment Neutral Drainage - MEND Report 1.20.1 (MEND 2009).
- Global Acid Rock Drainage Guide (GARD Guide). Internet site http://www.gardguide.com/ (INAP 2009).

Response 2, i) and ii)

If processed, arsenopyrite and pyrite will be crushed, ground, and will report to the waste streams in various amounts including rougher tailings, cleaner tailings, and concentrate. The amount reporting will depend on the concentrations within the ore which are variable over time. These influencing factors are considered in the mine design and in the water quality estimates.

Response 3, i)

The ARD/ML assessment is consistent with guidance documents and with recent assessment practices for other mine assessments completed in the north.

The humidity cell tests excluded the cleaner tailings because at the time of initial testing, the composition of materials was uncertain due to refinements in the process, as such cleaner tailings were unavailable. Sampling was therefore done on the materials that were available.

Response 3, ii)

Yes, currently testing of 2 tailings composite samples, which include both rougher and cleaner tailings, is underway based on recent pilot plant metallurgical tests.

Response 4

The labelling for Figure 3.ii.3-1 contains an error. The curve currently labelled “Cleaner Tailings” should be labeled “Rougher Tailings”, while the curve currently labelled “Rougher Tailings” should be labelled “Cleaner Tailings”. To clarify, Cleaner Tailings have a finer grind that Rougher Tailings.

Response 5

The AMD assessments for Mine Rock have been reviewed and consider them reasonable and appropriate. It is not appropriate to simply use the number of humidity cell samples that generate acidity as an indication of the proportion of rock that might generate acidity. Since the purpose of humidity cell testing is to investigate or verify ABA testing, it is by design that more humidity cell samples representing materials that could generate acidity are selected, since these are the materials of interest. A more appropriate way to identify the amount of material that might generate acidity is to use the greater number of samples, selected at representative intervals, that have been tested for ABA, then to provide context to the ABA analyses through supplemental humidity cell testing. This was the approach followed.

The ARD/ML assessment is consistent with guidance documents and with recent assessment practices for other mine assessments completed in the north, and the values presented are therefore provided with confidence. Not all NP is required to come from carbonate minerals, furthermore NAG testing and humidity cell testing is used to confirm the observed ABA data.

Response 6

Clarification to response 6 is provided in the discussion of response 5 above. The statement made in Appendix 3.II Co-Disposal Facility Management Plan, pg. 3.II.9 of the DAR, that 10% of mine rock has acid generation potential, is not contradictory to other data, including those obtained from the kinetic testing results. The 2 tests are done on different sample sets for different reasons. Kinetic tests are chosen to investigate a variety of conditions, however, they are not chosen to determine the proportion of rock that might be acid generating.

Response 7

A review of Table 5-3, in Annex A of the DAR for the feldspar porphyry and rhyolite has identified a typing error. These values have been corrected.

Response 8

There are often differences between percentages determined through mineralogy and those determined based on elemental analyses. Generally, the mineralogy sample descriptions are for localized samples, and should be used primarily as an indicator of the mineral types governing reactions, rather than as a definitive indicator of overall amounts of a given mineral. Since elemental analyses are completely digested, and since there are generally more elemental analyses collected, they are usually a better indicator of actual bulk amounts of a given element; if this can be correlated to a specific mineral than the elemental data will usually provide a better

indication of the actual amounts of that mineral. Given the above discussion it is not necessary to revise the reported amounts, as they are both reasonable, and, although different, provide useful information.

Response 9

This has been determined to be a “wording issue” rather than an inconsistency. To clarify, '10 times greater than the crustal abundance' should read 'greater than 10 times crustal abundance' in the text.

Response 10

Yes, the values represent the detection limits for Cadmium and Selenium.

Response 11, i)

A monitoring plan will be developed during operation, once approvals are received to proceed with mine development. This monitoring plan is expected to include the following options:

- testing for ARD potential; and
- testing to characterize the Type of mine rock

Response 11, ii)

The geochemical criteria developed to classify the rocks was developed with the purpose of use during operations; this intent was stated in the DAR. Until operations begin and rock to be moved is exposed, there is no significant way to improve upon or reassess the geochemical criteria developed to classify the rocks.

Response 11, iii)

Yes, the geochemical criteria developed to classify the rocks will be confirmed prior to their use during operations.

Response 11, iv)

The numbers of different types of samples analyzed and tested selected to be representative of the rock and tailings volumes to be excavated, processed, and disposed is consistent with those as suggested by generally established guidelines. The generally established guidelines used in this assessment are as follows:

i) Draft Guidelines and Recommended Methods for the Prediction of Metal Leaching and Acid Rock Drainage at Minesites in British Columbia (Price 1997)

iii) Guidelines for Acid Rock Drainage Prediction in the North (Department of Indian and Northern Development - DIAND 1992)

iv) Prediction Manual for Drainage Chemistry from Sulphidic Geologic Materials. (Mine Environment Neutral Drainage - MEND Report 1.20.1 (MEND 2009)

v) Global Acid Rock Drainage Guide (GARD Guide).internet site http://www.gardguide.com/ (INAP 2009)

Response 12, i)

Un-thickened tailings tend to segregate during deposition. The coarsest particles will settle adjacent to the discharge point and the finest particle will settle further away. Areas of segregated fines (“slimes”) would be difficult to deal with operationally and they would tend to be slower to consolidate. Such segregation is also unfavorable if the tailings are metal leaching and have acid generation potential. Acid mine drainage often forms on the coarsest fraction of deposited tailings as they are more free draining and allow greater ingress of oxygen.

In the Co-Disposal Facility (CDF), the tailings will be thickened to a solids content between 73 to 77%. This would mean there will be no segregation of the fines and the coarse particles. The non-segregated thickened tailings will be less susceptible to the ingress of oxygen and infiltration of water. The filling of the void spaces of the mine rock with such non-segregating tailings will significantly reduce the acid generating and metal leaching potentials of the tailings and the mine rock.

Response 12, ii)

Based on the proposed filling procedure, it is estimated that about 50% of the void spaces of the mine rock will be filled with tailings.

Response 12, iii)

The CDF is designed to be free draining structure. Consolidation of the tailings is expected to be very fast since the co-disposal process will verify that the tailings will be surrounded by the highly permeable mine rock which will significantly reduce the distance the consolidated water has to travel. Additionally, the tailings deposition scheme will also make a significant effort to reduce ice entrainment. Therefore, the settlement expected on the cover is insignificant.

INFORMATION REQUEST – NRCan_1-2

Source: Natural Resources Canada (NRCan)

Request

Mine Waste Management – Mine Effluent

What are the operational parameters at existing effluent treatment facilities with similar design proposed for the NICO Project?

Response

Reverse osmosis (RO) treatment is not as commonly implemented at mine sites as chemical precipitation technologies, as the mining influenced water that requires treatment is commonly much higher in total dissolved solids, sulphate, and hardness than the projected Effluent Treatment Facility influent water quality at the NICO Project. One recent project that uses an RO system as the primary treatment process and then further treats the brine and recombines the treated brine with the RO permeate is installed at the Homestake Mine in South Dakota to treat waste rock leachate. Constituents of concern are sulphate and selenium and the system operates at similar flows to those projected for the NICO Project with a much higher spring freshet due to limited available storage to minimize flow surges due to precipitation. The treatment system was designed to treat elevated levels of selenium and has been fully operational since March of 2007 and consistently achieves the 0.005 milligrams per litre stream standard.

This strategy of primary treatment by RO with further treatment of the brine has also been evaluated on the pilot scale and is currently in the design stage at the Port Granby Project, as part of the Port Hope Area Initiative. For this project, treatment included biological treatment for nitrogen species, the RO system, and chemical precipitation of the brine stream for metal and radionuclide removal.

While RO treatment processes have not been commonly used at mine sites for treatment of mining influenced water in the past, they are becoming increasingly utilized as discharge standards become more stringent. The operational requirements for the proposed NICO system are on the more moderate end of the typical mining project.

INFORMATION REQUEST – NRCan_1-3

Source: Natural Resources Canada (NRCan)

Request

Contingency Plans - Metal Prices

Are there contingency plans for potential changes in the metal prices, and if so, how do these affect the Project and the environment?

Response

Fortune Minerals Limited (Fortune) has modelled different scenarios using both high and low metal prices. During periods of high metal prices, additional material may be processed as ore which may extend the mine life somewhat. However, the ore body is well understood and this increase would not affect the mine plan, just the amount of material processed through the mill. Material may be processed at an accelerated rate, but only to the maximum capacity of the mill design. This will only realize an increase in production approximately 10%. All components of the mill have been designed to handle this rate.

During periods of low metal prices, some of the ore at the cut-off grade may become economic. This material may be stockpiled within the boundary of the Co-Disposal Facility (CDF) for potential future processing or may be placed in the CDF as mine rock. The Open Pit modelling showed that the pit design is relatively insensitive to the metal price, just the waste to ore ratio changes with metal price. Because of this, the CDF design will hold all the material mined regardless of the metal price used. Most of the material mined is placed in the CDF because of the high concentration ratio of the NICO ore.

INFORMATION REQUEST – NRCan_1-4

Source: Natural Resources Canada (NRCan)

Request

Baseline terrain and geotechnical conditions

Please provide the following: any additional detailed information on characteristics of subsurface materials in the mine site area including results of geotechnical investigations, borehole logs, ground thermal data, and results of laboratory testing to characterize geotechnical conditions

Response

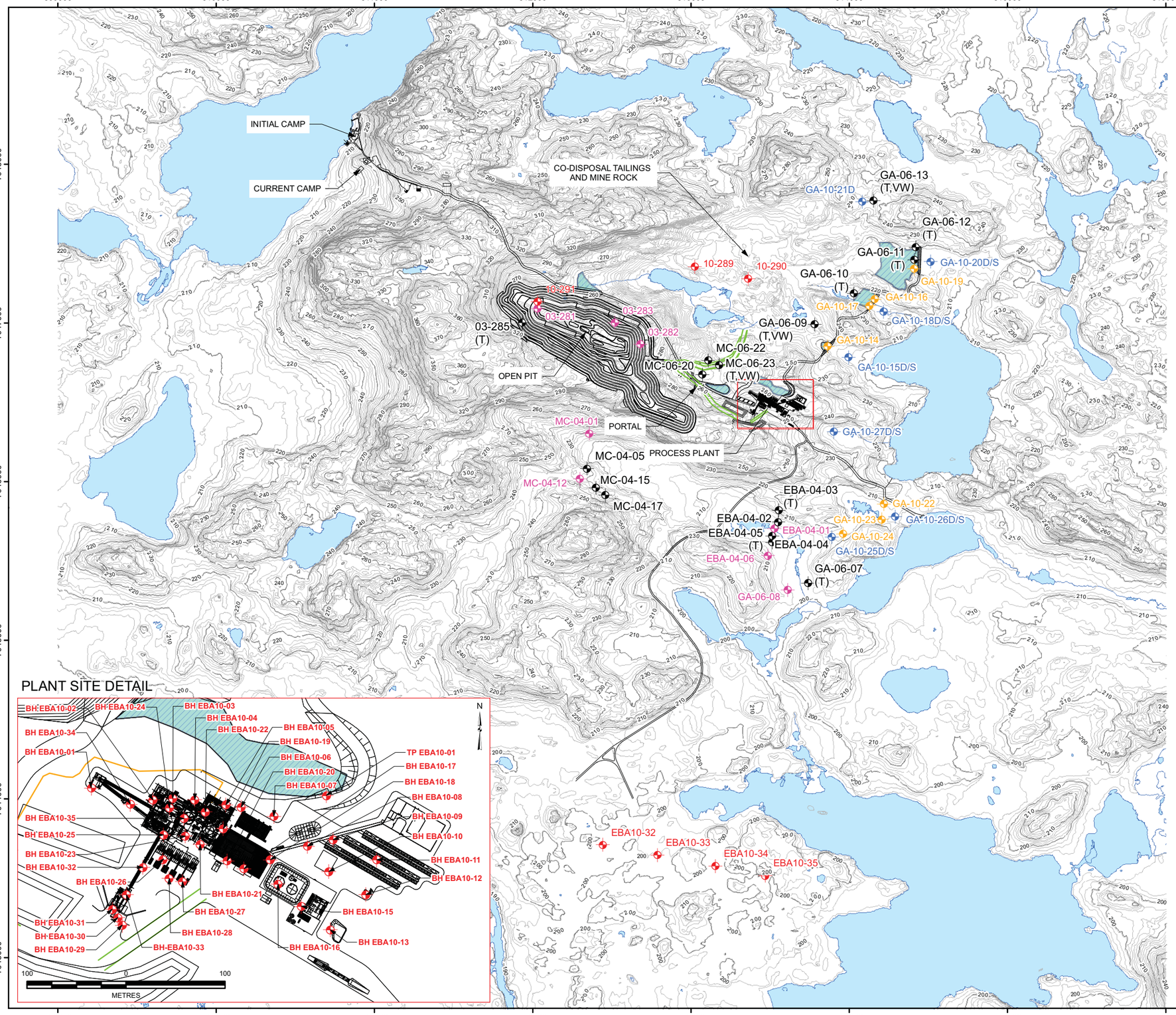
In November 2010, Golder Associates Ltd. (Golder) completed a Factual Report on the Geotechnical Investigation for the Seepage Collection Pond and Polishing Dams, submitted to Fortune Minerals as DOC135. This report included all previous borehole records and studies completed in 2003 and 2006. A pdf copy of this report is attached as Attachment A.

Please note that the Contingency Pond shown on Figure 2 of the report was removed from the Project Description prior to submission of the Developer's Assessment Report (DAR).

Additional subsurface engineering by EBA (Project No. 1700127.002) was communicated in a document issued in April of 2005, titled "NICO Tailings Dam and Process Plant Facilities: 2004 Geotechnical Site Investigation". A pdf copy of this report is attached as Attachment B.

In 2010 EBA Engineering also conducted geotechnical drilling at the plant site and at Burke Lake for a proposed airstrip. The airstrip was subsequently removed from the project description and not included in the DAR, therefore, no report will be provided.

NRCan_1-4 Figure 1 shows all geotechnical boreholes in the NICO Project area. Not shown in this figure are the locations of over 60 geotechnically-logged mineral exploration diamond drillholes, as well as the exploration drillholes.



LEGEND

EXISITING LOCATIONS

- STAND PIPE
- OTHER
- THERMISTOR
- THERMISTOR VW PEZ

DRILLED LOCATIONS

- GEOTECHNICAL BOREHOLE
- MONITORING WELLS
- EBA AND FML BOREHOLE LOCATION

- HAUL ROAD
- SERVICE ROAD
- RIVER/STREAM
- TOPOGRAPHIC CONTOUR - *2 m INTERVAL*
- TOPOGRAPHIC CONTOUR - *10 m INTERVAL*
- INFRASTRUCTURE
- LANDFARM
- LAKE/POND
- SEEPAGE COLLECTION/ SURGE POND

NOTES

1. Plant site geotechincal holes not included on this figure.
2. D = Deep Monitoring Well
3. S = Shallow Monitoring Well
4. Pending Borehole Locations were not drilled March/April 2010 due to warm weather conditions and scheduling.
5. March/April 2010 Drilling locations were obtained using a handheld GPS device. Pending Nico Survey.

REFERENCE

-Topographic mapping obtained from Eagle Mapping, Fortune Minerals Limited, 2006 (File: Basemapping (FML, 20060718).dwg)

-Open Pit Configuration - Provided by P & E Mining Consultants Inc. (File: End_of_year2031.dxf Recieved August 26, 2010)

-Advaced Exploration Infrastructure - Provided by Aker Solutions (File: 0000g001D.dwg Recieved October 25, 2010)

-Projection: UTM Zone11 Datum: NAD 83

500 0 1,000

METRES

PROJECT

FORTUNE MINERALS LIMITED
NICO COBALT-GOLD-BISMUTH-COPPER PROJECT

TITLE

GEOTECHNICAL DRILLING LOCATIONS

Golder Associates
Mississauga, Ontario

FILENAME: DisturbanceAreas.mxd				
PROJECT NO. 10-1118-0046			SCALE AS SHOWN	REV. 0
DESIGN	SC	21 Oct. 2010	NRCAN 1-4	
GIS	SC	2 Dec. 2010		
CHECK	MR	2 Dec. 2010	FIGURE: 1	
REVIEW	RS	2 Dec. 2010		

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ATTACHMENT A

Final Factual Report on the Geotechnical Investigation for the Seepage Collection Pond and Polishing Pond Dams

(please refer to supporting documents)

ATTACHMENT B

NICO Tailings Dam and Process Plant Facilities: 2004 Geotechnical Site Investigation

(please refer to supporting documents)

INFORMATION REQUEST – NRCan_1-5

Source: Natural Resources Canada (NRCan)

Request

Baseline terrain and geotechnical conditions

Please provide the following

i) a detailed large scale route alignment map for the NPAR that shows terrain types and terrain sensitivity conditions as well as potential geohazards.

ii) detailed topography along the alignment including location of watercourse crossings.

iii) Results of any geotechnical investigations conducted along the alignment including: borehole logs, results of laboratory testing, information on ground thermal conditions and ice content.

iv) Plans for additional geotechnical investigations to support final design for NPAR.

Response

Response i

Geotechnical investigations, including boreholes, laboratory testing, or information on ground thermal conditions and ice content have not yet been carried out. Geotechnical investigations to support a final design also need to be developed. Fortune Minerals Limited (Fortune) will complete these studies once the final road route has been approved by the Tłı̨chǫ Government.

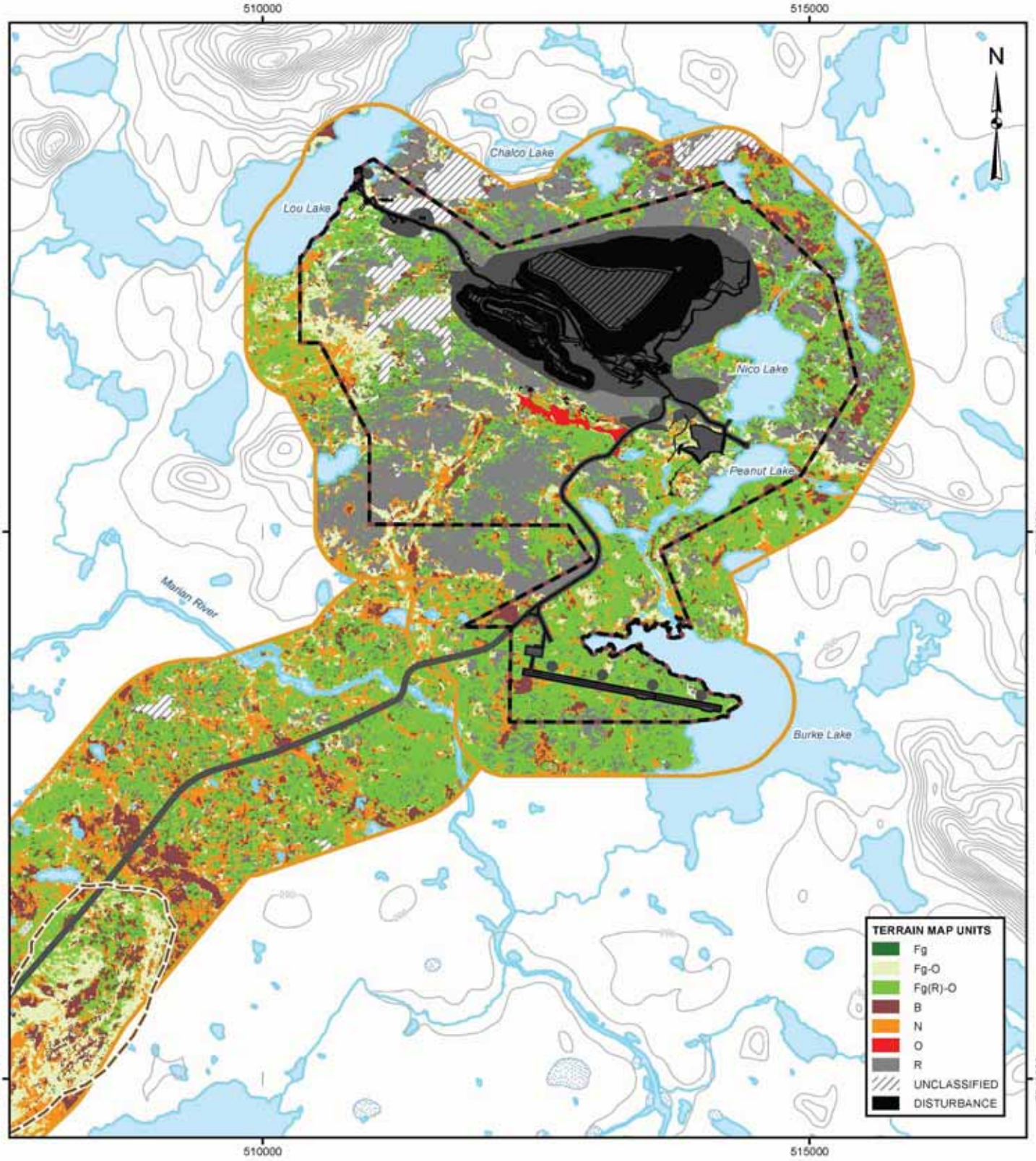
A large scale route alignment map showing terrain types along the NICO Project Access Road (NPAR) can be found in Figures 1 to 4. Locations of watercourse crossings and contour lines are shown on Figures 5 to 8.

Response ii

Terrain sensitivity conditions were determined for each terrain map unit occurring along the NPAR. Terrain sensitivities (freeze and thaw stability) were assigned to each terrain map unit based on soil drainage and texture. Thaw induced displacement includes thaw settlement and thaw slumping; Freeze induced displacement includes frost heave and frost creep. In general, as moisture content increases, the freeze and thaw stability decreases.

Coarse materials have a low susceptibility for freeze- and thaw- induced displacement, whereas finer materials, especially those in imperfectly to very poorly drained areas, have a high susceptibility to freeze and thaw induced displacement.

Overall, depressional, water saturated areas are typically characterized by a low stability under freeze and thaw conditions (Table 1). These areas will likely be affected by thaw settlement under loading and frost heave causing surface displacement. Therefore, depressional, water saturated areas, including bogs and some fens, may require design and construction methods to account for permafrost and freeze and thaw instability. Conversely, areas with glaciofluvial deposits and bedrock are more stable and therefore may not require design and construction methods to account for permafrost and freeze and thaw instability.



LEGEND

- PROJECT LEASE BOUNDARY
- PROPOSED NICO MINE SITE
- CONTOUR (10 METRE INTERVAL)
- EXISTING WINTER ROAD
- PROPOSED TŁ̨CHǪ ROAD ROUTE
- WATERCOURSE
- WATERBODY
- WETLAND
- LOCAL STUDY AREA
- POTENTIAL BORROW AREA
- AREA OF MAXIMUM DISTURBANCE FOR NICO PROJECT

NOTE: Terrain map unit descriptions can be found in Table 13.2-3 of the report. Unclassified areas are portions of the LSA for which an ELC vegetation class could not be assigned due to satellite interference.

REFERENCE

Base data obtained from GeoGratis.
Projection: UTM Zone 11 Datum: NAD 83

1 0 1
SCALE 1:50,000 KILOMETRES

FORTUNE MINERALS LIMITED
NICO DEVELOPER'S ASSESSMENT REPORT

TITLE
TERRAIN MAP UNIT DISTRIBUTION AT MAXIMUM DISTURBANCE MAPBOOK

Golder Associates
Edmonton, Alberta

FILE NO. E-Soil-019-GIS			
PROJECT No. 09-1373-1004		SCALE AS SHOWN	REV. 0
DESIGN	LV	12 Dec. 2008	FIGURE : 1
GIS	SC	25 Oct. 2011	
CHECK	JF	26 Nov. 2011	
REVIEW	DD	26 Nov. 2011	

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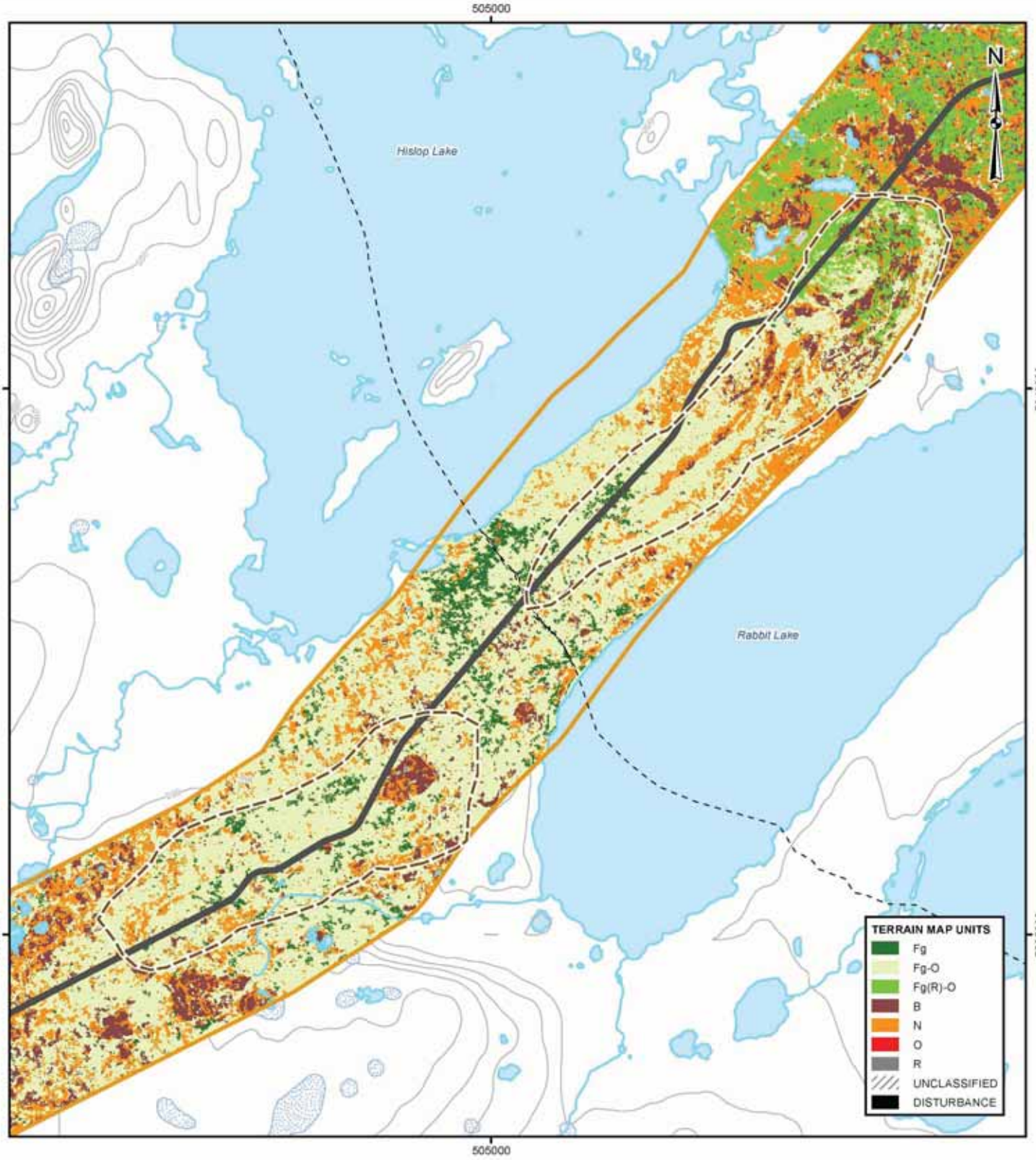

LEGEND

- PROJECT LEASE BOUNDARY
- PROPOSED NICO MINE SITE
- CONTOUR (10 METRE INTERVAL)
- EXISTING WINTER ROAD
- PROPOSED TŁ̨CHǪ ROAD ROUTE
- WATERCOURSE
- WATERBODY
- WETLAND
- LOCAL STUDY AREA
- POTENTIAL BORROW AREA
- AREA OF MAXIMUM DISTURBANCE FOR NICO PROJECT

NOTE: Terrain map unit descriptions can be found in Table 13.2-3 of the report. Unclassified areas are portions of the LSA for which an ELC vegetation class could not be assigned due to satellite interference.

REFERENCE

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Projection: UTM Zone 11 Datum: NAD 83

1 0 1
SCALE 1:50,000 KILOMETRES

FORTUNE MINERALS LIMITED
NICO DEVELOPER'S ASSESSMENT REPORT

TITLE
TERRAIN MAP UNIT DISTRIBUTION AT MAXIMUM DISTURBANCE MAPBOOK

Golder Associates
Edmonton, Alberta

FILE NO. E-Soil-019-GIS			
PROJECT No. 09-1373-1004		SCALE AS SHOWN	REV. 0
DESIGN	LV	12 Dec. 2008	FIGURE : 2
GIS	SC	25 Oct. 2011	
CHECK	JF	26 Nov. 2011	
REVIEW	DD	26 Nov. 2011	

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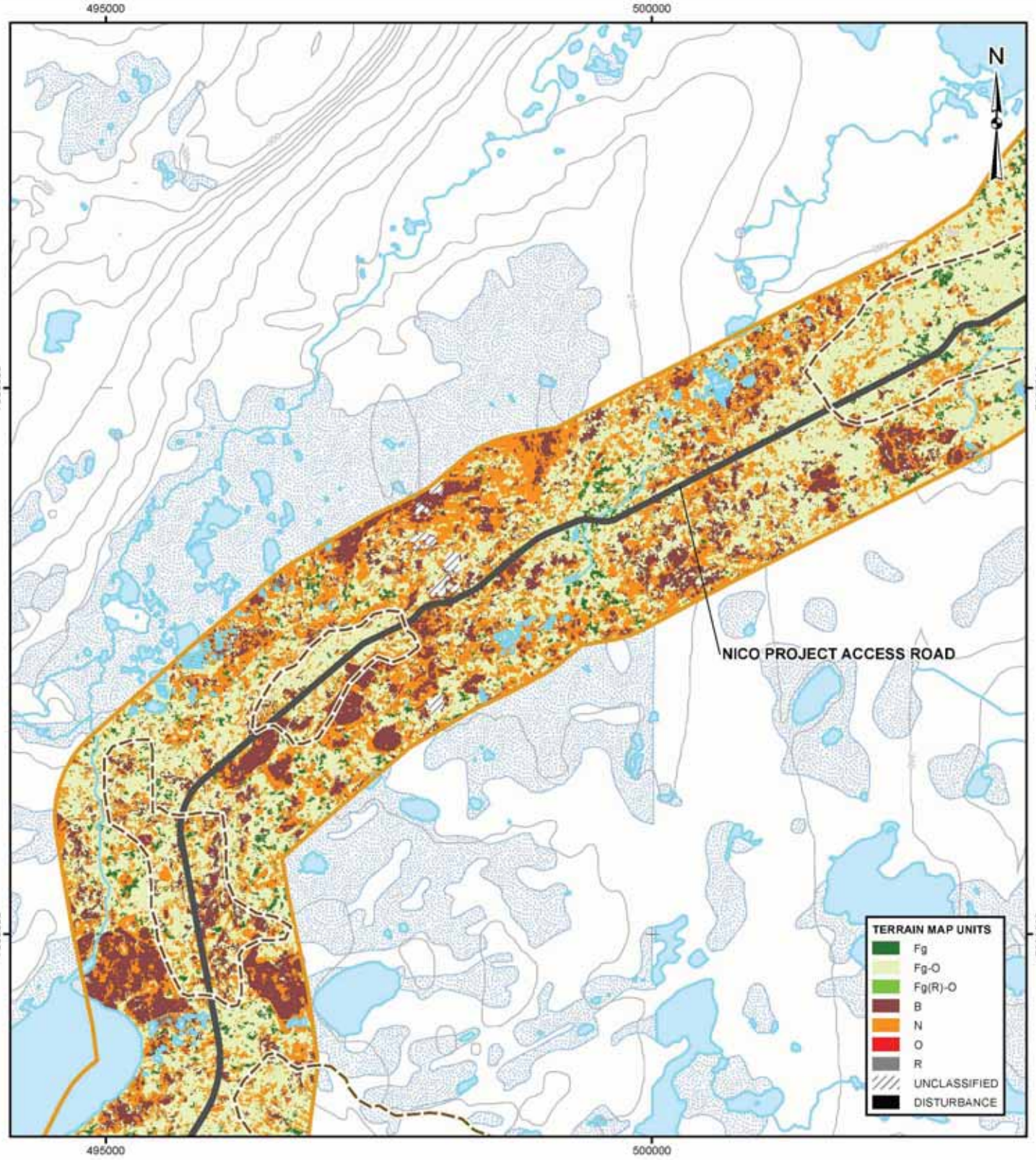

LEGEND

- PROJECT LEASE BOUNDARY
- PROPOSED NICO MINE SITE
- CONTOUR (10 METRE INTERVAL)
- EXISTING WINTER ROAD
- PROPOSED TŁ̨CHǪ ROAD ROUTE
- WATERCOURSE
- WATERBODY
- WETLAND
- LOCAL STUDY AREA
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NOTE: Terrain map unit descriptions can be found in Table 13.2-3 of the report. Unclassified areas are portions of the LSA for which an ELC vegetation class could not be assigned due to satellite interference.

REFERENCE

Base data obtained from GeoGratis.
Projection: UTM Zone 11 Datum: NAD 83

1 0 1
SCALE 1:50,000 KILOMETRES

FORTUNE MINERALS LIMITED
NICO DEVELOPER'S ASSESSMENT REPORT

TITLE
TERRAIN MAP UNIT DISTRIBUTION AT MAXIMUM DISTURBANCE MAPBOOK

Golder Associates
Edmonton, Alberta

FILE NO. E-Soil-019-GIS			
PROJECT No. 09-1373-1004		SCALE AS SHOWN	REV. 0
DESIGN	LV	12 Dec. 2008	
GIS	SC	25 Oct. 2011	
CHECK	JF	26 Nov. 2011	
REVIEW	DD	26 Nov. 2011	

FIGURE : 3

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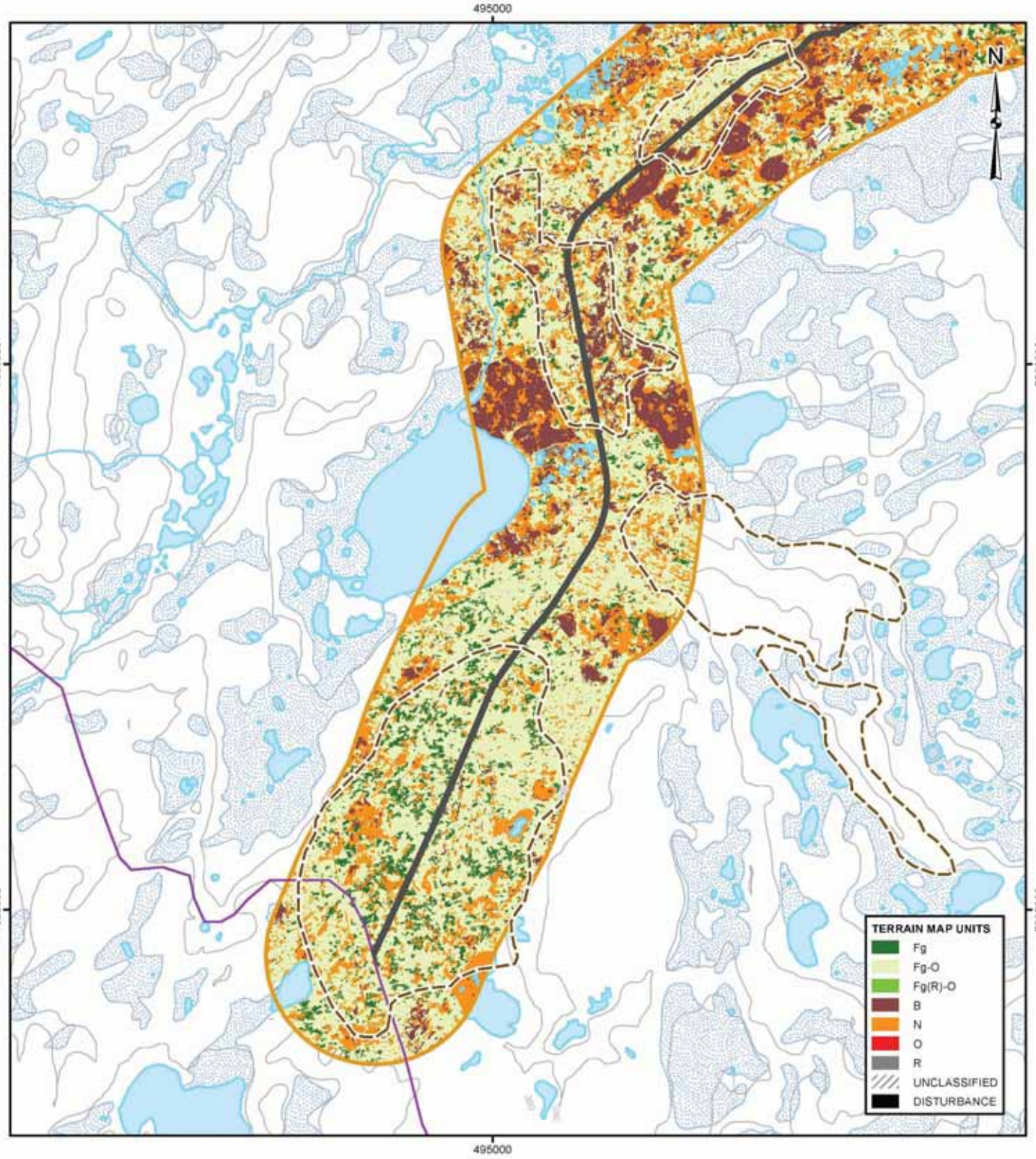

LEGEND

- PROJECT LEASE BOUNDARY
- PROPOSED NICO MINE SITE
- CONTOUR (10 METRE INTERVAL)
- EXISTING WINTER ROAD
- PROPOSED TŁ̨CHǪ ROAD ROUTE
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- WATERBODY
- WETLAND
- LOCAL STUDY AREA
- POTENTIAL BORROW AREA
- AREA OF MAXIMUM DISTURBANCE FOR NICO PROJECT

NOTE: Terrain map unit descriptions can be found in Table 13.2-3 of the report. Unclassified areas are portions of the LSA for which an ELC vegetation class could not be assigned due to satellite interference.

REFERENCE

Base data obtained from GeoGratis.
Projection: UTM Zone 11 Datum: NAD 83

1 0 1
SCALE 1:50,000 KILOMETRES

FORTUNE MINERALS LIMITED
NICO DEVELOPER'S ASSESSMENT REPORT

TITLE
TERRAIN MAP UNIT DISTRIBUTION AT MAXIMUM DISTURBANCE MAPBOOK

Golder Associates
Edmonton, Alberta

FILE NO. E-Soil-019-GIS			
PROJECT No. 09-1373-1004		SCALE AS SHOWN	REV. 0
DESIGN	LV	12 Dec. 2008	FIGURE : 4
GIS	SC	25 Oct. 2011	
CHECK	JF	26 Nov. 2011	
REVIEW	DD	26 Nov. 2011	

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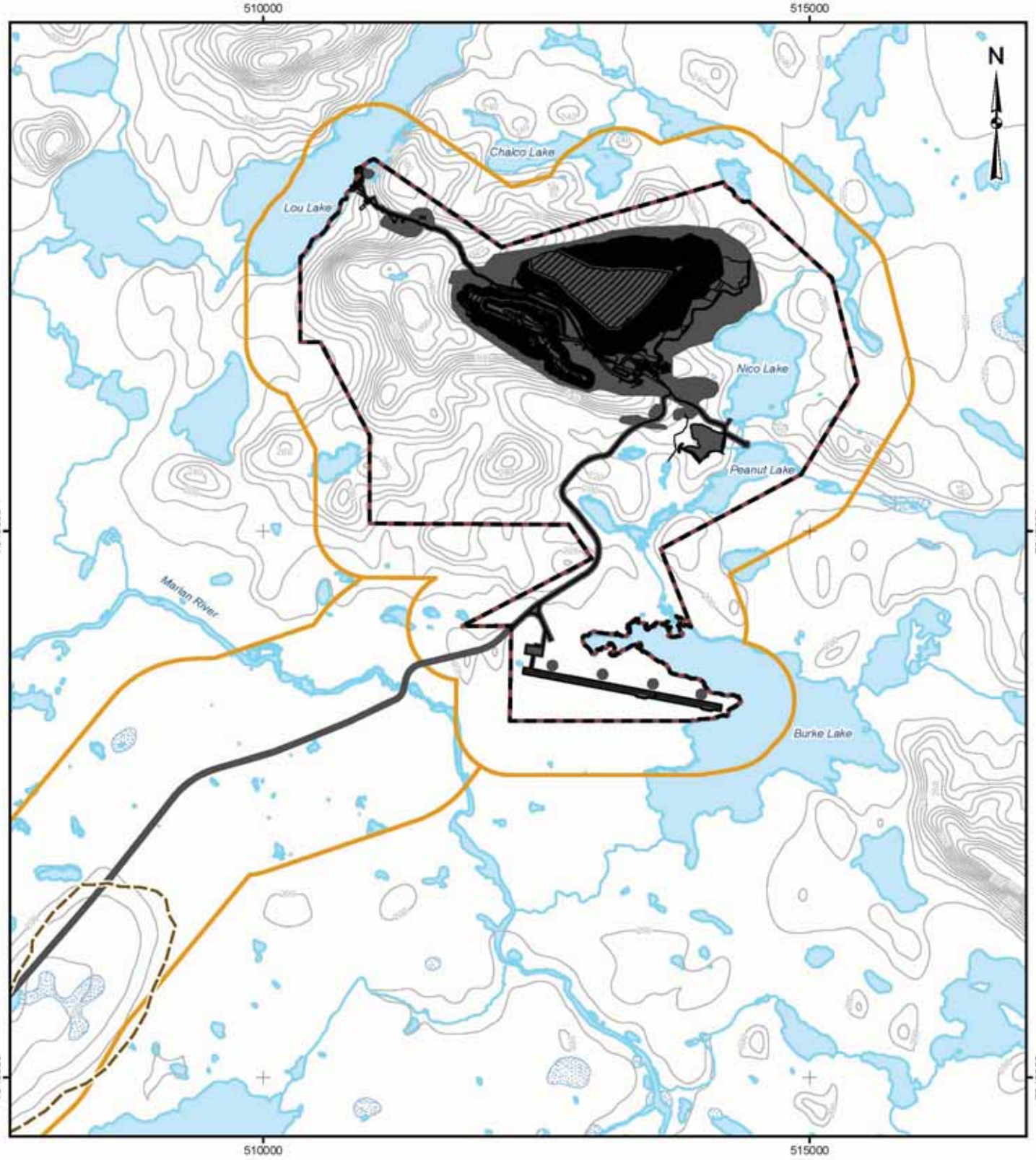

LEGEND

- PROJECT LEASE BOUNDARY
- PROPOSED NICO MINE SITE
- CONTOUR (10 METRE INTERVAL)
- EXISTING WINTER ROAD
- PROPOSED TŁ̨CHǪ ROAD ROUTE
- WATERCOURSE
- WATERBODY
- WETLAND
- LOCAL STUDY AREA
- POTENTIAL BORROW AREA
- AREA OF MAXIMUM DISTURBANCE FOR NICO PROJECT

NOTE: Legend is consistent throughout series.
Not all features appear on every map.

SCALE 1:50,000 — 1 0 1 KILOMETRES

REFERENCE

Base data obtained from GeoGratis.
Projection: UTM Zone 11 Datum: NAD 83

FORTUNE MINERALS LIMITED
NICO DEVELOPER'S ASSESSMENT REPORT

TITLE

TERRAIN CONTOURS FOR THE LOCAL STUDY AREA MAPBOOK

Golder Associates
Edmonton, Alberta

FILE NO. IR-Sal-003-GIS

PROJECT No. 09-1373-1004			SCALE AS SHOWN	REV. 0
DESIGN	JF	14 Nov. 2011	FIGURE : 5	
GIS	CW	14 Nov. 2011		
CHECK	JF	26 Nov. 2011		
REVIEW	DD	26 Nov. 2011		

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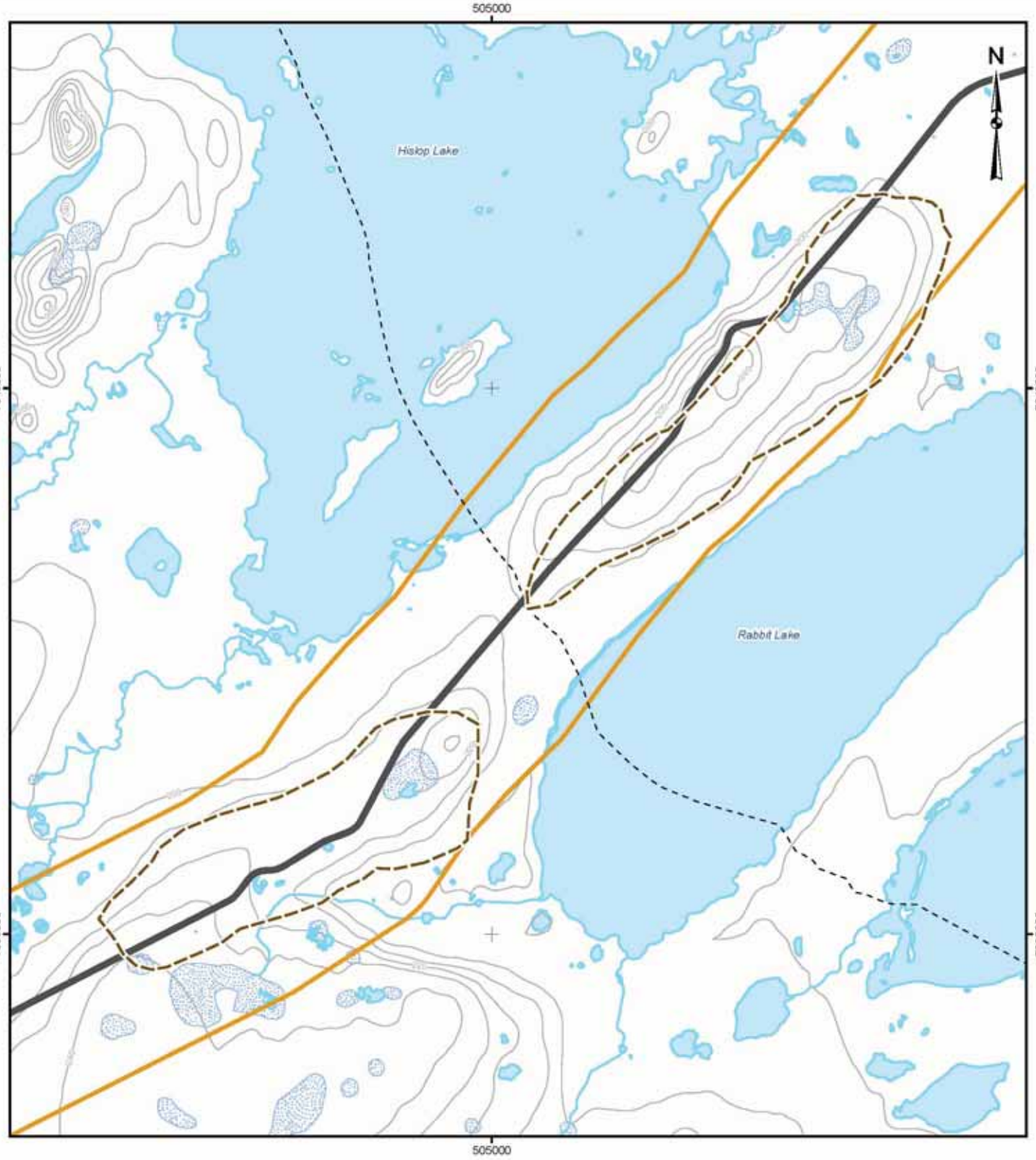

LEGEND

- PROJECT LEASE BOUNDARY
- PROPOSED NICO MINE SITE
- CONTOUR (10 METRE INTERVAL)
- EXISTING WINTER ROAD
- PROPOSED TŁĮCHǪ ROAD ROUTE
- WATERCOURSE
- WATERBODY
- WETLAND
- LOCAL STUDY AREA
- POTENTIAL BORROW AREA
- AREA OF MAXIMUM DISTURBANCE FOR NICO PROJECT

NOTE: Legend is consistent throughout series. Not all features appear on every map.

REFERENCE

Base data obtained from GeoGratis.
Projection: UTM Zone 11 Datum: NAD 83

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SCALE 1:50,000 KILOMETRES

FORTUNE MINERALS LIMITED
NICO DEVELOPER'S ASSESSMENT REPORT

TITLE

TERRAIN CONTOURS FOR THE LOCAL STUDY AREA MAPBOOK

Golder Associates
Edmonton, Alberta

FILE NO. IR-Sal-003-GIS

PROJECT No. 09-1373-1004			SCALE AS SHOWN	REV. 0
DESIGN	JF	14 Nov. 2011		
GIS	CW	14 Nov. 2011		
CHECK	JF	26 Nov. 2011		
REVIEW	DD	26 Nov. 2011		

FIGURE : 6

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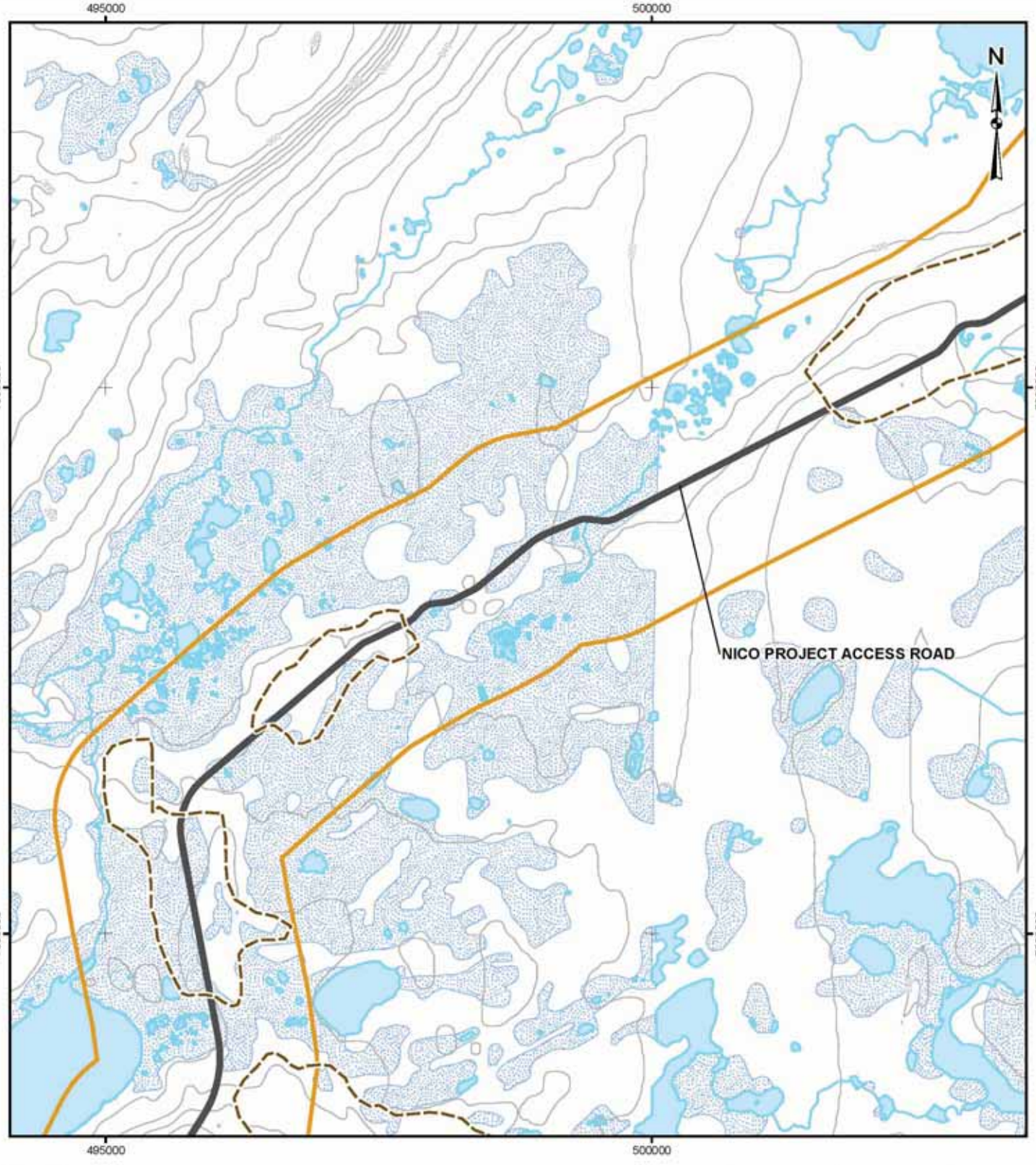

LEGEND

- PROJECT LEASE BOUNDARY
- PROPOSED NICO MINE SITE
- CONTOUR (10 METRE INTERVAL)
- EXISTING WINTER ROAD
- PROPOSED TŁ̨CHǪ ROAD ROUTE
- WATERCOURSE
- WATERBODY
- WETLAND
- LOCAL STUDY AREA
- POTENTIAL BORROW AREA
- AREA OF MAXIMUM DISTURBANCE FOR NICO PROJECT

NOTE: Legend is consistent throughout series.
Not all features appear on every map.

REFERENCE

Base data obtained from GeoGratis.
Projection: UTM Zone 11 Datum: NAD 83

1 0 1
SCALE 1:50,000 KILOMETRES

FORTUNE MINERALS LIMITED
NICO DEVELOPER'S ASSESSMENT REPORT

TITLE

TERRAIN CONTOURS FOR THE LOCAL STUDY AREA MAPBOOK

Golder Associates
Edmonton, Alberta

FILE NO. IR-Sal-003-GIS			
PROJECT No. 09-1373-1004		SCALE AS SHOWN	REV. 0
DESIGN	JF	14 Nov. 2011	FIGURE : 7
GIS	CW	14 Nov. 2011	
CHECK	JF	26 Nov. 2011	
REVIEW	DD	26 Nov. 2011	

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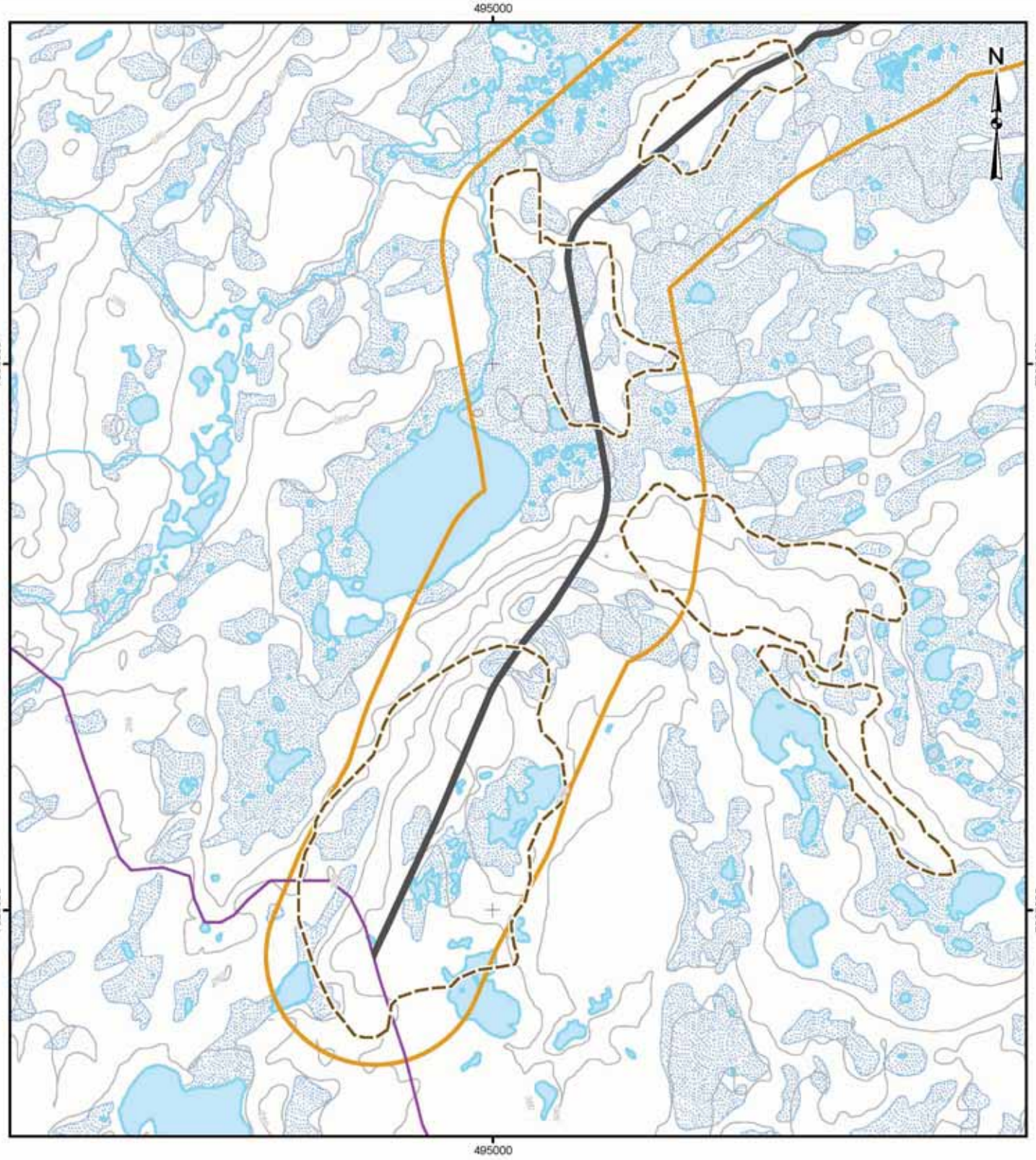

LEGEND

- PROJECT LEASE BOUNDARY
- PROPOSED NICO MINE SITE
- CONTOUR (10 METRE INTERVAL)
- EXISTING WINTER ROAD
- PROPOSED TŁ̨CHǪ ROAD ROUTE
- WATERCOURSE
- WATERBODY
- WETLAND
- LOCAL STUDY AREA
- POTENTIAL BORROW AREA
- AREA OF MAXIMUM DISTURBANCE FOR NICO PROJECT

NOTE: Legend is consistent throughout series.
Not all features appear on every map.

REFERENCE

Base data obtained from GeoGratis.
Projection: UTM Zone 11 Datum: NAD 83

1 0 1
SCALE 1:50,000 KILOMETRES

FORTUNE MINERALS LIMITED
NICO DEVELOPER'S ASSESSMENT REPORT

TITLE

TERRAIN CONTOURS FOR THE LOCAL STUDY AREA MAPBOOK

Golder Associates
Edmonton, Alberta

FILE NO. IR-Sal-002-GIS				
PROJECT No. 09-1373-1004			SCALE AS SHOWN	REV. 0
DESIGN	JF	14 Nov. 2011	FIGURE : 8	
GIS	CW	14 Nov. 2011		
CHECK	JF	26 Nov. 2011		
REVIEW	DD	26 Nov. 2011		

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Table 1: Terrain Sensitivities for Terrain Map Units Occurring in the Local Study Area

Terrain Map Unit	Description	Potential for Permafrost	Freeze/Thaw Stability	Potential Need for Permafrost Design/ Construction Methods
Fg	Glaciofluvial. Well and moderately well drained	Low - ground ice content is limited in these areas, but may occur at depth	Stable - minor freeze/thaw displacement possible	Low
Fg-O	Glaciofluvial and organic - combination of upland and depressional areas. Well drained to imperfectly drained	Low to Moderate - In sandy upland areas ground ice content is limited but may occur at depth. In lower wetter areas, ground ice content is also limited, but likely occurs at depth	Stable - minor freeze/thaw displacement possible	Low to Moderate
Fg(R)-O	Glaciofluvial(Bedrock) and organic - combination of upland and depressional areas. Well drained to imperfectly drained	Low to Moderate - in sandy upland areas ground ice content is limited but may occur at depth. In lower wetter areas, ground ice content is also limited, but likely occurs at depth	Stable - minor freeze/thaw displacement possible	Low to Moderate
B	Bog – Organic. Poorly and very poorly drained	High - ground ice is likely present in these areas	Thaw settlement likely under loading; Frost heave may result in surface displacement	High
N	Fen – Organic. Poorly and very poorly drained	Moderate - ground ice may be present in these areas	Thaw settlement likely under loading; Frost heave may result in surface displacement	Moderate to High
O	Frozen – Organic. Poorly and very poorly drained	High - ground ice likely present in these areas	Thaw settlement likely under loading; Frost heave may result in surface displacement	High
R	Rock	Low - ground ice may occur at depth	Stable	Low

Note: These are generalized interpretations. Conditions may very across map units.

Response iii

An evaluation of the route was conducted in 2004. The objectives were to:

- identify the various terrain units along the route;
- identify potential sources of borrowmaterials;
- assess surface drainage conditions along the route;
- develop conceptual cross-sections for application to the different terrain units; and
- prepare preliminary cost estimates for the road and associated drainage structures.

A visual inspection of the route was conducted, by walking its entire length, to classify terrain types. The subgrade along the route was evaluated by drilling hand probe holes at selected locations. Samples of the subgrade soils were collected for laboratory testing. Five terrain units and 7 potential borrow areas were identified. In addition to a major crossing at the Marian River and a stream crossing, 6 other locations were identified where cross-drainage structures, such as culverts, would likely be required.

This evaluation was documented in EBA (2005) and is provided in Attachment A.

Response iv

Fortune will develop a geotechnical investigation study that will meet the requirements for the detailed design of the road once the final route for the road has been chosen. This plan will be shared with the Tłı̨chǫ Government and regulatory authorities once completed to ensure it meets the necessary standards.

References

EBA (EBA Engineering Consultants Ltd.). 2005. NICO Mine Access Route Evaluation (Revision 1). Report submitted to Fortune Minerals Ltd., March 2005. EBA File: 1700127.001.

ATTACHMENT A

NICO Mine Access Route Evaluation

(please refer to supporting documents)

INFORMATION REQUEST – NRCan_1-6

Source: Natural Resources Canada (NRCan)

Request

Analysis conducted to support design of access road

Please provide the following:

i) documentation providing results of any analysis conducted to support the design of the NPAR and the assessment of environmental effects. This may include but not limited to thermal analysis, slope, and bank stability analysis

ii) Documentation providing results of any analysis conducted to assess the long-term impacts associated with environmental disturbance resulting from NPAR beyond the Project life (post-abandonment period).

Response

The previously referenced evaluation was at the conceptual level, and not a design. Consequently, there were no analyses conducted of the type suggested in the information request. The conceptual crosssections were developed by considering the terrain types and EBA Engineering Consultants Ltd.'s (EBA) prior experience with similar terrain. Of most relevance was similar work EBA conducted in connection with the reconstruction of Northwest Territoires Highway 3, from Behchokǫ̀ to Stagg River (EBA 1998). While that previous work was also conceptual in nature, thermal analyses were conducted to support the development of typical cross-sections for various terrain types.

The proposed road route is in an area of extensive, discontinuous permafrost (Hegginbottom, et al. 1995). This suggests that permafrost underlies between 50 and 90% of the terrain. The same reference indicates that generally low ice content, about less than 10% by volume, can be expected towards the Whatì end of the road, transitioning to medium, in the range of 10 to 20% by volume, towards the mine end of the road.

EBA's site-specific assessment of the terrain units refined the foregoing broad characterization, and the conceptual cross-sections were configured to take permafrost occurrence into account. However, it should be noted that the intent of the design concept was not to preserve permafrost. Thaw-related settlement of the subgrade was expected, and a requirement for maintenance was envisioned.

References

EBA (EBA Engineering Consultants Ltd.). 1998. Conceptual Road Design Study, NWT. Hwy. No. 3, km 243.9 – km 256.4. Report submitted to the Department of Transportation, Government of the Northwest Territories., August 1998. EBA File: 0701-98-13330.

Heginbottom, J.A., Dubreuil, M.-A., and Harker, P.A. 1995. Canada–Permafrost; National Atlas of Canada. Natural Resources of Canada, Ottawa (MCR 4177), scale 1:7,500,000.

INFORMATION REQUEST – NRCan_1-7

Source: Natural Resources Canada (NRCan)

Request

Properties of Underlying Materials at Proposed Borrow Sites

i) Information collected from any investigations conducted at potential borrow sites to determine material characteristics.

ii) Plans for future site investigations to finalize borrow site selections.

Response

Response i)

Proposed borrow sites related to the NICO Project Access Road are shown on Figure 3.2-2 of the Developer's Assessment Report (DAR), proposed borrow sites on the NICO Project site itself are shown on Figure 9.1-2 of the DAR. These sites have been identified by means of air photo interpretation, site reconnaissance, and a limited amount of test pitting and laboratory testing.

The main sources of information on potential borrow sources on the project site are related to the following investigations:

1) In the summer of 2010, Fortune Minerals Limited (Fortune) excavated 30 test pits in the potential borrow areas. One sample was obtained from each site and modified Acid:Base Accounting (ABA) tests and grain size tests were conducted on each sample by SGS. The results of the ABA testing are attached in Appendix A. These results indicate that all the borrow samples were net neutralizing. The results of the grain size tests are also appended.

2) In the summer of 2011, Fortune staff collected grab samples from 2 locations identified as Point 2 and Point 4 shown on NRCan 1-7 Figure 1. Point 2 had 3 samples, and Point 4 had one sample that were geotechnically-tested for grain size distribution and Atterberg limits. Results document that Point 2 material is till, and Point 4 material is glacial lacustrine clay. Records of laboratory testing are attached in Attachment A. The Point 4 site did expose ice lenses during test pit excavation, however the ice content did not interfere with excavation.

There are several borrow sites that have been used for road construction at the NICO site that can be formally investigated and characterized. Visual observations indicate that these are granular till deposits or cross-bedded alluvium.

Several potential deposits of sand and gravel have been noted in the past, and glacial till has been encountered in recent boreholes. A compilation of overburden geotechnical borehole and ground temperature data can be found with the response to NRCan_1-4.

510362 511362 512362 513362 514362

7048098 7047098 7046098 7045098

CHALCO LAKE
LOU LAKE
GRID POND
LITTLE GRID POND
NICO LAKE
PEANUT LAKE

Point 2
Point 4
03-281 (S)
03-285 (T)
03-283 (S)
03-282 (S)
10-289
10-290
MC-06-22
MC-06-20
MC-06-23 (T, VW)
MC-04-01 (S)
MC-04-05
MC-04-12 (S)
MC-04-15
MC-04-17
EBA-04-03 (T)
EBA-04-02
EBA-04-01 (S)
EBA-04-04
EBA-04-05 (T)
EBA-04-06 (S)
GA-10-21D (MW)
GA-06-13 (T, VW)
GA-06-12
GA-06-11 (T)
GA-10-19
GA-10-20D/S (MW)
GA-06-10 (T)
GA-10-16
GA-10-17
GA-06-09 (T, VW)
GA-10-18D/S (MW)
GA-10-14
GA-10-15D/S (MW)
GA-10-27D/S (MW)
GA-10-23
GA-10-26D/S (MW)
GA-10-22
GA-10-24
GA-10-25D/S (MW)
GA-06-07 (T)
GA-06-08 (S)

N

LEGEND

PREVIOUS INVESTIGATION

- 03-382 (S) (NICO 2003/ GOLDER)
- GA-06-10 (GOLDER 2006)
- MC-06-23 (GOLDER 2006)
- MC-04-01 (EBA 2004)
- EBA-04-0 (EBA 2004)

CURRENT INVESTIGATION

- GA-10-25 (GOLDER 2010)
- 10-290 (FORTUNE 2010)
  - (S) - STAND PIPE
  - (T) - THERMISTOR
  - (VW) - VIBRATING WIRE PIEZOMETER
  - (D/S MW) - DEEP OR SHALLOW MONITORING WELL
- BORROW SAMPLE
- RIVER/STREAM
- CONTOUR - *2M INTERVAL*
- CONTOUR - *10M INTERVAL*
- EXISTING POND LAKE

NOTE

1. Plant site geotechincal holes not included on this figure.
2. March/April 2010 Drilling Locations were obtained using a handheld GPS Device.
3. - Inclined Borehole

REFERENCE

1. Topographic mapping obtained from Eagle Mapping, Fortune Minerals Limited, 2006 (File: Basemapping (FML, 20060718).dwg)
2. Projection: UTM Zone11 Datum: NAD 83
3. Ground surface elevation interpreted from topographic ground contours shown on this figure.

500 0 500

SCALE 1:15,000 METRES

PROJECT
FORTUNE MINERALS LIMITED
NICO COBALT-GOLD-BISMUTH-COPPER PROJECT

TITLE
POINT 2 AND POINT 4 BORROW SAMPLE LOCATIONS

Golder Associates
Mississauga, Ontario

Filename: BorrowSampleLocations.mxd

PROJECT NO. 11-1118-0066		SCALE AS SHOWN	REV. 0
DESIGN	SC	14 Jan. 2009	NRCAN 1-7
GIS	SC	24 Nov. 2011	
CHECK	LC	24 Nov. 2011	FIGURE: 1
REVIEW	MR	24 Nov. 2011	

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Response ii)

Construction and closure of the Co-Disposal Facility for the NICO Project will require large volumes of borrow materials, including the following:

- roughly 1.0 million cubic metres of pit run sand and gravel;
- roughly 150 000 cubic metres of sand (for capillary break on covers);
- roughly 1.4 million cubic metres of fine grained fill, likely glacial till; and
- roughly 50 000 cubic metres of clay for key trenches.

These estimations assume that a sand will be used for the capillary break on the top surface, and geotextile will be used on the sideslopes (except for the starter dyke). Approximate till cover thicknesses of 0.5 metres and 1.0 metre were assumed for the top and sides of the Co-Disposal Facility, respectively although these may be reduced pending further study. Some allowance has been made for wastage.

It is intended that a more extensive program of test pitting and laboratory testing will be carried out to confirm the extent, volume, and quality of the borrow material in these areas. The plan for investigation of borrow areas on the NICO Project site is to quantify borrow sources within the existing pit footprint and determine the suitability and quantity of this material. This will be performed using a combination of test pits and auger holes, as required. Once this has been determined, additional borrow sources will be investigated if volumes are less than the required amount.

ATTACHMENT A

Records of Laboratory Testing

(please refer to supporting documents)

INFORMATION REQUEST – NRCan_1-8

Source: Natural Resources Canada (NRCan)

Request

Uncertainty in on-site climate and hydrological parameters

Please provide the following:

i) Documentation describing how uncertainty with respect to determination of on-site climate and hydrological conditions has been dealt with in determination of the water balance, design of project components, and impact assessment.

ii) Documentation of any sensitivity analysis conducted with respect to climate variability in determination of site water balance, project design and impact assessment.

Response

Response i

a) **Climate Data**

The methods used to develop the local climate record are outlined in Section 11.2.1.1 of the Developer's Assessment Report (DAR). The uncertainty of on-site climate parameters was minimized by basing it on the long-term record available of the Environment Canada Yellowknife A station. The Yellowknife A record (1943 to 2003) is much longer than that available for the local study area or other meteorological stations close by. A longer record reduces uncertainty caused by short-term climate cycles and the possible misrepresentation of a local climate by a short record. The data available has also been corrected for snowfall gauge under catch, a common source of error in precipitation measurements. A check was done to verify that the uncertainty associated with using data from Yellowknife was acceptable by comparing the monthly means and 95% confidence intervals of climate parameters at Yellowknife A to those of Snare Rapids (39 kilometres [km] from the NICO Project) and Gamètì Airport (68 km from the NICO Project). The mean fell within the confidence interval of these sites and was thus deemed to be acceptable.

Section 11.4 (page 11-35) of the DAR touches on the uncertainty in the prediction of surface water hydrology. A conservative approach was adopted to ensure that effects on surface water would not be underestimated.

b) **The Water Balance**

The site wide water balance is summarized in Section 3.9.3 of the DAR. The water balance was evaluated for an average condition, as well as wet and dry conditions expected to occur once every 25 years. The 1:25 year wet and dry conditions were developed based on monthly evaporation and precipitation values calculated from a Gumbel distribution of the monthly record.

In the site wide water balances, climate variability was also accounted for in the following aspects:

- The annual freshwater requirements for the process plant from Lou Lake were presented for a variety of conditions from 25-year wet to 100-year dry conditions in Section 3, Table 3.9-4 of the DAR.

- The various flows in the operational site water balance were summarized for the extreme cases (i.e., at start-up and just prior to closure) for 25-year wet, mean and 25-year dry conditions in Section 3, Table 3.9-3 of the DAR.
- The inflows to the Effluent Treatment Facility (ETF) were predicted for 25-year wet, mean and 25-year dry conditions in Section 3, Table 3.9-5 of the DAR.
- The various flows in the post-closure site water balance were summarized for the two cases (i.e., before the Open Pit overflows and after the Open Pit lake overflows) for 25-year wet, mean and 25-year dry conditions in Section 3, Table 3.9-6 of the DAR.
- The outflows from the Wetland Treatment Systems after closure were predicted for 25-year wet, mean and 25-year dry conditions in Section 3, Table 3.9-2 of the DAR.

c) **The Design of NICO Project Components**

The conceptual design of the NICO Project components takes into account climate variability in the following respects:

- The system for obtaining fresh water from Lou Lake will be designed with a capacity to support operations under a 100-year dry condition.
- The design capacity of the ETF (Section 3, Table 3.9-8 of the DAR) explicitly considers the 25-year wet condition at the end of the operating period.
- After closure, the Wetland Treatment Systems will be designed to treat discharges associated with the 25-year wet conditions. The Seepage Collection Ponds (SCPs) and the Surge Pond will act as a buffer to receive variable flows and to deliver relatively uniform flows to the Wetland Treatment Systems.

As discussed in the Water Management Plan (Appendix 3.III of the DAR), Section 3.III.10, the site water management system will also be designed to handle extreme precipitation events. During operations, the SCPs will be able to absorb a defined Environmental Design Storm without discharge. The SCPs will also be equipped with spillways to protect the dams against overtopping. Contingencies for water management are discussed in Section 3.III.10.3 and contingencies for water treatment in operations and closure are discussed in Sections 3.III.10.4 and 3.III.10.5.

d) **Impact Assessment**

A detailed analysis of the impact of freshwater extraction from Lou Lake during a 25-year wet, 25 year dry, and average condition was completed (Section 11.3.2.2 of the DAR). The detailed methods of the analysis are included in Appendix 11.II. In the 1:25 year dry scenario, a conservative approach was taken by simulating the 1:25 year minimum precipitation coinciding with 1:25 year maximum evaporation for each consecutive month in the year.

Response ii

Sensitivity analyses were conducted in the site water balance and impact assessment. In the site wide water balance section (Section 3.9.3 of the DAR) the primary approach to dealing with uncertainty was to evaluate water balance components under exceptionally wet, average, and exceptionally dry conditions. This is an analysis of the water balance's sensitivity to changes in evaporation and precipitation, its 2 primary climatic drivers. A similar approach was taken in assessing the impact of freshwater extraction from Lou Lake as outlined

in Section 11.3.2.2 of the DAR. An analysis of the sensitivity of Lou Lake levels to freshwater extraction was conducted by varying the evaporation and precipitation values to simulate exceptionally wet, average, and exceptionally dry conditions.

INFORMATION REQUEST – NRCan_1-9

Source: Natural Resources Canada (NRCan)

Request

Baseline hydrogeological conditions

Please provide additional information regarding hydrogeological investigations conducted in the project area that was utilized to characterize the groundwater flow regime and assessment of associated impacted on water quantity. These include (but are not limited to) the reports and technical memorandum described above by Golder (2005, 2007, 2008) that provide information on geotechnical and hydrogeological investigations in the project area and information collected from thermistors and piezometers at the site.

Response

**The following reiterates some information provided in the response to NRCan 1-4.

The requested Golder Associates Ltd. (Golder) 2005, 2007, and 2008 data is compiled in the November 2010 Golder Factual Report on the Geotechnical Investigation for the Seepage Collection Pond and Contingency Pond. A pdf of this document is attached with the response to NRCan_1-4. The Golder 2010 Factual Report provides records of boreholes, hydraulic conductivity test results, thermistor installations, and ground temperature data.

Please note that the Contingency Pond shown on Figure 2 of the report was removed from the Project Description prior to submission of the Developer's Assessment Report (DAR).

Additional subsurface engineering by EBA (Project No. 1700127.002) was communicated in a document issued in April of 2005, titled "NICO Tailings Dam and Process Plant Facilities: 2004 Geotechnical Site Investigation". A pdf copy of this report is attached with the response to NRCan_1-4.

In 2010, EBA Engineering also completed geotechnical drilling at the plant site and at Burke Lake. Note that this data was not considered in the assessment of the groundwater flow regime because of timing; however, it is referred to in this answer because some borehole completions include thermistor installations. The report can be provided if requested.

Appendix 11.I of the DAR describes the numerical groundwater monitoring undertaken for the NICO Project site. As referenced in Appendix 11.I, Table 11.I.1-1 the 17 October 2008 Technical Memorandum issued by Golder contains further information on monitoring. Specifically, Figure 1 of this Technical Memorandum shows the groundwater table in the open pit/underground mining area as it was understood in 2008. It also shows the locations of boreholes that show permafrost (low-lying areas), and boreholes that show the absence of permafrost (hills and uplands) based on ground temperature data from thermistor strings. This is memo and its attachments are attached as Attachment A.

To facilitate NRCan's review, the following 3 Attachments containing monitoring data are provided:

- Attachment B – NICO Ground Temp Profiles
  - Contains charts plotting temperature vs. depth for the thermistor installations at site.
  - Additional monitoring data for 2011 has been collected, but not plotted.
- Attachment C – Water Level Data NICO Project
  - This workbook provides open hole, standpipe, and vibrating wire piezometer water-level readings for the NICO site from September 2003 to August 2009. Note that most open holes were, and continue to be very difficult to access. Consequently, readings have been taken only opportunistically at most locations. The 3 inclined geotechnical holes installed on the hill, completed with PVC standpipes, however, were more regularly monitored.
  - Additional monitoring data for 2010 and 2011 has been collected, but not plotted.
- Attachment D – Borehole Locations and Groundwater Elevations
  - NRCan_1-9 Figure 2: This Figure presents data from Appendix C as groundwater elevations (metres above sea level) on a contour map of the NICO site. To assist interpretation of the water levels and groundwater contours, the bulk sample portal and the decline are shown. Specifically, open exploration hole 97-51 shows a groundwater elevation approximately 40 metres lower than surrounding open holes. This low is interpreted to be due to the connection of 97-51 to the existing underground workings through fractures. The portal elevation approximately coincides with the elevation of the water at 97-51.

ATTACHMENT A

Technical Memorandum
Monitoring Update - August 2008, Thermistor Strings and Piezometers NICO Site, Northwest Territories

(please refer to supporting documents)

ATTACHMENT B

NICO Ground Temperature Profiles

(please refer to supporting documents)

ATTACHMENT C

Water Level Data NICO Project

(please refer to supporting documents)

ATTACHMENT D

Borehole Locations and Groundwater Elevations

(please refer to supporting documents)

INFORMATION REQUEST – NRCan_1-10

Source: Natural Resources Canada (NRCan)

Request

Terrain Mapping

i) explain why no suitable ground verification was conducted to confirm the remote predictive terrain mapping, and, if such verification is planned, when it will occur.

ii) provide maps of terrain units within and surroundings some of the potential borrow areas indicated on Figure 13.4-1b.

iii) provide the locations of fine grained lacustrine/glaciolacustrine sediment on terrain maps. Confirm if the extent of this materials may be greater than anticipated between 200-300 masl.

Response

Response i

Ground verification was completed during the field surveys. Terrain information was collected and included parent material, landform, surface expression, and slope class. Parent material information has been added to Table 1. As part of the mapping process, correlations of Ecological Landscape Classification (ELC) vegetation units with field observations of terrain features and soil types were completed and applied to generate the terrain map (Section 13.2.1.1 of the Developer's Assessment Report). The soil map unit delineations were largely inferred from the interpretation of landscape features (i.e., elevation contours and landform) and ELC units, and then correlated to field survey results. Terrain information is located in Table 1 and parent material information has been added to this table.

Response ii

Terrain map units within and surrounding some of the potential burrow areas are provided in Figures 1 to 4 in NRCan_5.

Response iii

Fine grained lacustrine and glaciolacustrine deposits are associated with waterbodies and watercourses. They are also present under organic materials occurring in low lying areas. These materials are typically located below 200 to 300 metres above sea level.

Table 1: List of Soil Inspection Sites and Selected Site Characteristics

Site	NAD	Zone	Easting	Northing	Surface Expression	Landform	Drainage	Slope Class (%)	Peat/LFH Depth (cm)	Parent Material	Soil Subgroup	Soil Series
NAS001	83	11V	498049	7006053	Undulating	Upland	Well	2 to 5	7	glaciofluvial	O.EB	RAB
NAS002	83	11V	498044	7006212	Level	Fen	Imperfect	0 to 0.5	33	organic over glaciofluvial	O.Rpt	MAR
NAS003	83	11V	497983	7006603	Level	Fen	Poor	0 to 0.5	42	organic	O.Gpt	MAR
NAS004	83	11V	497809	7007594	Hummocky	Upland	Rapid	2 to 5	5	glaciofluvial	O.EB	TUM
NAS005	83	11V	497527	7010530	Undulating	Upland	Well	2 to 5	4	glaciofluvial	O.EB	TUM
NAS006	83	11V	497582	7010115	Level	n/d	Poor	0.5 to 2	35	organic over glaciofluvial	O.Rpt	KIL
NAS008	83	11V	497466	7011575	Level	Bog	Poor	5 to 10	35	organic over glaciofluvial	R.Gpt	MAR
NAS009	83	11V	496993	7012448	Undulating	Fen	Poor	2 to 5	30	organic over glaciofluvial	R.Gpt	MAR
NAS010	83	11V	496337	7013539	Level	Fen	Very Poor	0 to 0.5	67	organic	T.M	MUS
NAS011	83	11V	495880	7014916	Undulating	Upland	Imperfect	0.5 to 2	3	glaciofluvial	E.EB	RAB
NAS012	83	11V	495559	7016233	Level	Bog	Poor	0 to 0.5	20	organic over glaciofluvial	R.Gpt	MAR
NAS013	83	11V	495200	7017786	other	Upland	Imperfect	0.5 to 2	10	glaciofluvial	O.EB	TUM
NAS018	83	11V	495723	7029608	Level	Fen	Very Poor	0 to 0.5	30	organic over glaciolacustrine	R.Gpt	MAR
NAS020	83	11V	495585	7030672	Ridged	Upland	Imperfect	0.5 to 2	5	till	GL.EB	HIS
NAS022	83	11V	497117	7032461	Inclined	Upland	Imperfect	2 to 5	3	glaciofluvial	O.EB	TUM
NAS024	83	11V	498147	7033069	Level	Bog	Very Poor	0 to 0.5	32	organic over glaciolacustrine	GL.SC	BEA
NAS026	83	11V	499475	7033718	Level	Bog	Poor	0 to 0.5	2	till	O.G	HIS
NAS028	83	11V	500288	7034130	Level	Fen	Very Poor	0 to 0.5	23	organic over glaciofluvial	R.Gpt	MAR
NAS030	83	11V	501884	7034947	Ridged	Upland	Well	2 to 5	6	glaciofluvial	O.EB	RAB
NAS032	83	11V	507222	7040154	Ridged	Upland	no data	0 to 0.5	5	bedrock	O.R	KIL
NAS034	83	11V	507710	7040780	Undulating	Upland	Imperfect	0.5 to 2	5	till	O.R	RAB

Table 1: List of Soil Inspection Sites and Selected Site Characteristics (continued)

Site	NAD	Zone	Easting	Northing	Surface Expression	Landform	Drainage	Slope Class (%)	Peat/LFH Depth (cm)	Parent Material	Soil Subgroup	Soil Series
NAS036	83	11V	508500	7041420	Ridged	Upland	no data	2 to 5	4	glaciofluvial	O.EB	RAB
NAS038	83	11V	508995	7042130	Level	Bog	Very Poor	0 to 0.5	100	organic	TFI.OC	BUR
NAS040	83	11V	509819	7042650	Ridged	Upland	no data	2 to 5	2	bedrock	O.R	KIL
NAS044	83	11V	510660	7042972	Level	Other wetland	Poor	0 to 0.5	4	glaciolacustrine	R.G	HIS
NAS046	83	11V	511286	7043575	Ridged	Upland	no data	5 to 10	2	bedrock	O.R	KIL
NAS048	83	11V	511849	7045475	Inclined	Upland	Rapid	10 to 15	3	glaciofluvial	O.EB	RAB
NAS050	83	11V	511985	7045895	Inclined	Other wetland	Imperfect	0.5 to 2	26	glaciofluvial	O.Gpt	MAR
NAS052	83	11V	512359	7046172	Level	Fen	Very Rapid	0 to 0.5	28	organic	GL.SC	BEA
NAS053	83	11V	511276	7043617	Hummocky	Swamp	Poor	0 to 0.5	18	organic over till	R.Gpt	MAR
NAS054	83	11V	511379	7044485	Level	Fen	Poor	0 to 0.5	30	organic	R.Gpt	MAR
NAS055	83	11V	513981	7045697	Inclined	Swamp	Very Rapid	0.5 to 2	10	till	GL.SC	BEA
NAS056	83	11V	513841	7045358	Ridged	Upland	no data	5 to 10	3	bedrock	O.R	KIL
NAS057	83	11V	513977	7045327	Level	Other wetland	Very Poor	0 to 0.5	40	organic over lacustrine	T.M	MUS
NAS058	83	11V	513627	7045951	Inclined	Upland	Well	2 to 5	2	glaciofluvial	O.EB	RAB
NAS059	83	11V	512838	7046736	Inclined	Upland	no data	2 to 5	3	bedrock	R	KIL
NAS060	83	11V	512713	7046051	Level	Fen	Very Poor	0 to 0.5	30	organic	GL.SC	BEA
NAS061	83	11V	513219	7045711	Level	Fen	Very Poor	0 to 0.5	22	organic	TME.OC	BUR
NAS062	83	11V	512578	7046973	Inclined	Upland	no data	2 to 5	8	bedrock	O.R	KIL
NAS063	83	11V	512719	7047280	Level	Other wetland	Very Poor	0 to 0.5	45	organic over till	O.Rpt	MUS
NAS064	83	11V	512731	7047397	Inclined	Upland	no data	2 to 5	8	bedrock	O.R	KIL
NAS065	83	11V	512578	7047489	Inclined	Upland	Very Rapid	15 to 30	10	bedrock	O.R	KIL
NAS066	83	11V	512470	7047298	Inclined	Upland	Rapid	2 to 5	4	bedrock	O.R	KIL
NAS067	83	11V	512386	7047272	Level	Bog	Poor	0 to 0.5	37	organic	TME.OC	BUR
NAS068	83	11V	512226	7047185	Inclined	Upland	Well	0.5 to 2	8	glaciofluvial over bedrock	O.EB	KIL

Table 1: List of Soil Inspection Sites and Selected Site Characteristics (continued)

Site	NAD	Zone	Easting	Northing	Surface Expression	Landform	Drainage	Slope Class (%)	Peat/LFH Depth (cm)	Parent Material	Soil Subgroup	Soil Series
NAS070	83	11V	512006	7047376	Inclined	Upland	Rapid	10 to 15	2	bedrock	O.R	KIL
NAS071	83	11V	511856	7047374	Inclined	Upland	Rapid	10 to 15	2	bedrock	O.EB	KIL
NAS072	83	11V	511879	7047173	Inclined	Other wetland	Poor	0.5 to 2	45	organic	TME.OC	BUR
NAS073	83	11V	512129	7046768	n/d	Upland	Well	2 to 5	8	glaciofluvial	O.EB	TUM
NBS015	83	11V	494952	7018781	Undulating	Upland	Moderately Well	0.5 to 2	4	glaciofluvial	O.EB	RAB
NBS017	83	11V	494726	7019737	Undulating	Upland	Imperfect	0.5 to 2	8	glaciofluvial	O.EB	RAB
NBS019	83	11V	494531	7020733	Undulating	Upland	Imperfect	0.5 to 2	32	organic over glaciofluvial	R.Gpt	MAR
NBS021	83	11V	494332	7021700	Undulating	Bog	Poor	0.5 to 2	49	organic over bedrock	T.M	MUS
NBS023	83	11V	494106	7022727	Level	Upland	Moderately Well	0 to 0.5	6	glaciofluvial	O.EB	RAB
NBS025	83	11V	493925	7023649	Undulating	Upland	Well	0.5 to 2	5	glaciofluvial	O.EB	RAB
NBS027	83	11V	493987	7024529	Level	Upland	Well	0 to 0.5	2	glaciofluvial	O.EB	RAB
NBS029	83	11V	494452	7025451	Level	Other wetland	Moderately Well	0 to 0.5	10	glaciofluvial	O.EB	RAB
NBS031	83	11V	494766	7026409	Undulating	Upland	Well	2 to 5	6	bedrock	O.EB	RAB
NBS033	83	11V	495090	7027365	Level	Other wetland	Poor	0 to 0.5	36	organic	R.Gpt	MAR
NBS035	83	11V	503064	7035264	Level	Bog	Poor	0 to 0.5	50	organic over glaciofluvial	THU.M	MUS
NBS037	83	11V	503888	7035918	Undulating	Upland	Well	0.5 to 2	16	bedrock	O.R	KIL
NBS039	83	11V	504247	7036833	Undulating	Upland	Moderately Well	2 to 5	22	organic over glaciofluvial	R.Gpt	MAR
NBS041	83	11V	504960	7037574	Level	Upland	Well	0 to 0.5	6	glaciofluvial	O.R	RAB
NBS043	83	11V	505510	7038451	Undulating	Upland	Well	0.5 to 2	8	glaciofluvial	O.R	RAB
NBS045	83	11V	506285	7039119	Undulating	Upland	Moderately Well	5 to 10	17	organic over glaciofluvial	O.Ebpt	TUM

Table 1: List of Soil Inspection Sites and Selected Site Characteristics (continued)

Site	NAD	Zone	Easting	Northing	Surface Expression	Landform	Drainage	Slope Class (%)	Peat/LFH Depth (cm)	Parent Material	Soil Subgroup	Soil Series
NBS047	83	11V	506935	7039880	Level	Upland	Imperfect	0 to 0.5	36	organic over glaciofluvial	R.Gpt	MAR
NCS001	83	11V	500174	7011015	Hummocky	Fen	Very Poor	2 to 5	15	glaciofluvial	GL.SC	BEA
NCS002	83	11V	500402	7011305	Ridged	Upland	Imperfect	2 to 5	15	glaciofluvial	R.G	HIS
NCS003	83	11V	500254	7011565	Hummocky	Fen	Poor	0.5 to 2	40	organic over glaciofluvial	R.Gpt	MAR
NCS004	83	11V	500047	7011430	Level	Bog	Very Poor	0 to 0.5	55	organic over till	TME.OC	BUR
NCS005	83	11V	499763	7011967	Undulating	Bog	Very Poor	0.5 to 2	55	organic over till	T.M	MUS
NCS006	83	11V	499742	7012333	Undulating	Upland	Well	2 to 5	20	till	R.Gpt	RAB
NCS007	83	11V	499869	7012803	Undulating	Upland	Imperfect	2 to 5	15	till	R.G	RAB
NCS008	83	11V	493222	7012634	Ridged	Upland	Rapid	5 to 10	5	glaciofluvial	O.R	RAB
NCS008a	83	11V	493206	7012638	Undulating	Upland	Well	0 to 0.5	25	glaciofluvial	O.R	RAB
NCS009	83	11V	492932	7013219	Undulating	Upland	Well	2 to 5	10	till	O.EB	TUM
NCS010	83	11V	493190	7013654	Undulating	Upland	Moderately Well	2 to 5	6	glaciofluvial	O.R	RAB
NCS010A	83	11V	493201	7013763	Level	Fen	Poor	0 to 0.5	30	organic over glaciofluvial	R.Gpt	MAR
NCS011	83	11V	493179	7014320	Undulating	Upland	Well	2 to 5	12	till	O.EB	RAB
NCS012	83	11V	490452	7025861	Undulating	Upland	Well	0.5 to 2	8	till	O.EB	RAB
NCS013	83	11V	490320	7026314	Undulating	Upland	Well	2 to 5	15	glaciofluvial	O.EB	RAB
NCS014	83	11V	489879	7027066	Level	Fen	Very Poor	0 to 0.5	125	organic	TY.F	MUS
NCS015	83	11V	489670	7027595	Level	Fen	Very Poor	0 to 0.5	30	organic over glaciofluvial	R.Gpt	MAR
NCS016	83	11V	490455	7028027	Level	Bog	Very Poor	0 to 0.5	50	organic over glaciofluvial	T.M	MUS
NCS017	83	11V	490457	7028074	Undulating	Upland	Moderately Well	2 to 5	15	glaciofluvial	O.R	RAB
NCS018	83	11V	500582	7039258	Level	Fen	Poor	0 to 0.5	20	lacustrine	R.G	HIS
NCS019	83	11V	500822	7040309	Undulating	Upland	Rapid	5 to 10	2	glaciofluvial	O.EB	RAB
NCS020	83	11V	501071	7041170	Level	Bog	Very Poor	0 to 0.5	125	organic	FI.OC	BUR

Table 1: List of Soil Inspection Sites and Selected Site Characteristics (continued)

Site	NAD	Zone	Easting	Northing	Surface Expression	Landform	Drainage	Slope Class (%)	Peat/LFH Depth (cm)	Parent Material	Soil Subgroup	Soil Series
NCS021	83	11V	501319	7041914	Undulating	Bog	Poor	2 to 5	50	organic	FI.OC	BUR
NCS022	83	11V	503772	7053997	Level	Bog	Poor	0.5 to 2	50	organic	FI.OC	BUR
NCS023	83	11V	504389	7054720	Undulating	other	Very Rapid	2 to 5	0	bedrock	O.R	KIL
NCS024	83	11V	504137	7055319	Level	Fen	Very Poor	0 to 0.5	100	organic	FI.OC	BUR
NCS025	83	11V	517847	7038714	Ridged	Upland	Rapid	10 to 15	5	bedrock	O.R	KIL
NCS026	83	11V	517911	7038832	Level	Bog	Poor	0.5 to 2	50	organic	FI.OC	BUR
NCS027	83	11V	517581	7038892	Ridged	other	Rapid	10 to 15		bedrock	O.R	KIL
NCS028	83	11V	517326	7039098	Undulating	other burn	Poor	2 to 5	10	glaciofluvial	GL.SC	BEA
NCS029	83	11V	517080	7039532	Level	Bog	Poor	0.5 to 2	30	organic over glaciofluvial	GL.SC	BEA
NCS030	83	11V	496856	7023883	Level	Bog	Poor	0 to 0.5	125	organic	ME.OC	BUR
NCS031	83	11V	499296	7025334	Level	Other wetland	Very Poor	0 to 0.5	125	organic	TY.F	MAR
NCS032	83	11V	499112	7026979	Level	Fen	Poor	0 to 0.5	50	organic over glaciofluvial	T.F	MUS
NCS033	83	11V	513196	7051248	Inclined	Upland	Rapid	15 to 30	8	glaciofluvial	O.EB	RAB
NCS036	83	11V	515062	7051853	Level	Bog	Very Poor	0 to 0.5	65	organic	FI.OC	BUR
NCS037	83	11V	514805	7052578	Inclined	Upland	Very Rapid	30 to 45	0	bedrock	O.R	KIL
NCS038	83	11V	513914	7047118	Ridged	Upland	Very Rapid	0.5 to 2	0	bedrock	O.R	KIL
NCS040	83	11V	513809	7047053	Inclined	Upland	Rapid	2 to 5	6	glaciofluvial	O.EB	RAB
NCS041	83	11V	512695	7045123	Ridged	Upland	Rapid	2 to 5	15	glaciofluvial	O.EB	RAB
NCS042	83	11V	513640	7044635	Undulating	Bog	Poor	2 to 5	35	organic over glaciofluvial	R.Gpt	MAR
NCS043	83	11V	513848	7047038	Inclined	Upland	Rapid	5 to 10	10	glaciofluvial	O.EB	TUM
NCS044	83	11V	512947	7045725	Inclined	Upland	Moderately Well	5 to 10	10	glaciofluvial	O.EB	RAB

For Soil Subgroup and Series Codes, Refer to Annex H (Baseline Soil and Terrain Resources), Appendix I, Tables I-1 and I-2.

INFORMATION REQUEST – NRCan_1-11

Source: Natural Resources Canada (NRCan)

Request

Please provide the following information related to geotechnical conceptual design:

i) Reports/information about structural rock conditions (including material properties, description of faults and fractures, illustrated by maps, cross-sections, drilling logs and test results) around the open pit slops and underground mine stopes collected from drilling programs.

ii) ground temperature data from the installed thermistors.

iii) reports/information about the in-situ hydraulic conductivity test results.

iv) any report/information that addresses expected pit slope thermal, groundwater/ice and stability conditions.

v) any report/information that addresses expected temperature (freeze-thaw) conditions in the CDF deposit and how extreme weather, construction sequence and long-term climate change will affect the CDF slope stability.

vi) please provide also the geotechncial report referenced in the DAR. In particular, the following reports should provide some of the information listed above:

- Golder, 2004. Tailings basin site selection study NICO Project Northwest Territories. Submitted to Fortune Minerals Limited. July 2004.
- Golder, 2005. Factual report on Geotechnical and Hydrogeological Investigations for the Proposed Open Pit and Underground Mine Workings, NICO Deposit, Northwest Territories. 03-1117-029. Submitted to Fortune Minerals Limited. February 2005.
- Golder, 2007a. Final Summary Report on Open Pit, Underground and Mine Waste, Geotechnical Engineering Studies and Environmental Baseline Data Collection for NICO Project, Fortune Minerals, Northwest Territories. 05-1117-032. Submitted for Fortune Minerals Limited. April 2007.
- Golder, 2007b. Report on NICO tailings dams and process plant facilities 2006 geotechnical site investigation. 05-1117-032 (9100). Submitted to Fortune Minerals Limited. 16 April 2007.
- Golder, 2008. Technical Memorandum – Re: Monitoring Update – August 2008, Thermistor Strings and Piezometeres NICO Site, Northwest Territories. 05-1117-032. Submitted to Fortune Minerals Limited. 17 October 2008.
- Golder, 2010a. Trade off evaluation of tailings and mine rock alternatives. Submitted to Fortune Minerals Limited. February 2010.
- Golder, 2010b. Tailings and Mine Rock Do=disposal Facility FEED Study. Submitted to Fortune Minerals Limited. October 2010. (Doc 129)

- Golder, 2010c. Factual report of the geotechnical investigation for the seepage collection pond and polishing pond dams. Prepared for Fortune Minerals Limited by Golder Associates Ltd. November 2010.
- Lim, D.H., and B. Dershowitz. 2010. NICO – Derivation of Rock Mass Porosity from Packer Test on Fractured Rock. FracMan Tehcnology Group (Golder Associates). 12 November 2010.
- PasteTech (Golder Paste Technology Ltd.), 2010. FEED study draft report on tailings dewatering, distribution, and return water systems for Fortune Minerals NICO Project. Report Number 10-1118-0046 (1000), dated August, 2010.

Response

Response i

Attached to this Information Request (IR) are the following documents, which address structural rock conditions around the Open Pit slops and underground mine stopes collected from drilling programs.

- Golder 2004. Project No. 03-1117-0029. Technical Memorandum - Open Pit Slope Design Recommendations, Fortune Minerals Limited, Gold-Bismuth-Cobalt Project. November 2004.
- Golder 2005. Project No. 03-1117-0029. Technical Memorandum - Stoping Dimensions Based on Matthews/Potvin Stability Graph Analysis. January 2005.

Notes on structural rock conditions and further documents outlining these conditions:

- The requested Golder 2007a is a summary report that relies on the 2004 and 2005 technical memos provided above for pit and underground. These 2 documents provide more detail than the requested 2007a.
- As per the IR, Golder 2010c provides all factual information from 2003, 2006, and 2010. This report has been provided in NRCan_1-4.
- The underground mine working geometries have been adjusted relative to the position of the final open pit, as part of ongoing detailed design engineering. Documentation on these changes and on the geotechnical stability assessments will likely be completed by the end of 2011.
    - The upcoming 2011 report will provide an overview of stability assessments for the pit shell shown in the Developer's Assessment Report (DAR) and the revised underground workings.

Response ii

Detailed ground temperature data and documentation is provided in the response to NRCan_1-9.

Response iii

Reports and information about the in-situ hydraulic conductivity test results for the open pit/underground area, and for the Co-Disposal Facility (CDF) are addressed in both NRCan_1-4 and NRCan 1-9.

Response iv

The documentation provided in response to NRCan_1-4 and NRCan_1-9 addresses expected pit slope groundwater and pit rock slope stability conditions.

The Open Pit slope will only expose a very limited amount of overburden slope on the north-east wall in the depression upstream of Grid Pond (the Bowl Zone), if any. No specific slope designs for overburden open pit slopes have been prepared for this reason. It appears that overburden exposures on the final walls may not exist because of the way the open pit is to be excavated in a hill.

Response v

Section 19.2.1.3.1 of the Developer's Assessment Report (DAR) discusses the expected thermal regime in the CDF deposit. The construction of the CDF will change the thermal regime that pre-existed in the Grid Ponds area. After closure, the active freeze-thaw zone will be near the surface of the CDF. Permafrost will likely form and agrade up into the CDF structure itself. This would have positive effects of decreasing the seepage of water through the CDF and also decreasing the ingress of oxygen into the tailings and mine rock contained within. Freezing of the CDF will increase the shearing resistance of the tailings; however, the CDF is designed to be stable without the effects of freezing. Future thawing due to climate change could therefore not result in instability.

Frozen sediments intercepted in the key trenches of CDF Seepage Collection Ponds 1, 2, and 3 will be removed prior to construction so that the key trenches are founded on competent bedrock. This is discussed in Section 3.III.2.3.2of the DAR. Thawing of frozen sediments will not affect the water tightness of the Seepage Collection Pond dykes.

Response vi

- Provided as an attachment to NRCan_1-4 is the requested Golder 2010c.
- The requested Golder 2008 is attached as Appendix A of the response to NRCan_1-9.
- The other requested documents either do not address geotechnical stability, or have since been updated and integrated into single, different documents, provided as part of this NRCan_1-11 i), or in Golder 2010c. They are therefore not included as part of this response.
- The FEED Study does include stability analyses of the CDF; however, the same information is presented in detail in the DAR, in Section 3.II.5.4. Similarly, CDF construction and geotechnical instrumentation are covered in Section 3.II.5.6 and 3.II.5.7, respectively.

ATTACHMENT A

Golder 2004. Project No. 03-1117-0029. Technical Memorandum - Open Pit Slope Design Recommendations, Fortune Minerals Limited, Gold-Bismuth-Cobalt Project. November 2004.

(please refer to supporting documents)

ATTACHMENT B

Golder 2005. Project No. 03-1117-0029. Technical Memorandum - Stoping Dimensions Based on Matthews/Potvin Stability Graph Analysis. January 2005

(please refer to supporting documents)

INFORMATION REQUESTS

FISHERIES AND OCEANS CANADA

INFORMATION REQUEST – DFO_1

Source: Fisheries and Oceans Canada (DFO)

Request

Marian River Bridge

In order for DFO to determine if any in-stream works may be required for the construction of the bridge, please provide details on how the "survey water level" was determined. Please also provide a short explanation of a "survey water level" in comparison to a "high water mark".

Response

The survey water level (170.1 metres above sea level) is the elevation of the Marian River in the direct vicinity of the planned bridge crossing on 25 October 2006 when a topographic field survey was conducted by Subarctic Surveys for EBA Engineering Consultants Ltd. The survey water level was determined using differential Global Positioning System methods, with 2 Global Positioning System units, and a local base station set-up at each abutment area.

The high water mark was taken to be the 100 year high water level. The 100 year high water level (172.4 metres above sea level) was theoretically evaluated based on an estimate of flood flows (148.1 cubic metres per second) expected to occur in the Marian River at the site of the bridge crossing with a return period of 100 years. The bankfull water level (171.01 metres above sea level) was approximated based on 1:2 year flood flows (49.5 cubic metres per second) as recommended by Dunne and Leopold (1978). The Manning's equation (Maidment 1993) for turbulent flow in an open channel was used to estimate the water surface elevation during flood flows based on local channel characteristics and geometry.

References

Dunne, T., and L. Leopold. 1978. Water in environmental planning. W.H. Freeman and Company, New York.

Maidment, D.R. 1993. Handbook of hydrology. McGraw Hill, Toronto.

INFORMATION REQUEST – DFO_2

Source: Fisheries and Oceans Canada (DFO)

Request

Ponds 3, 4, 5 - Contingency Pond

Since ponds 3, 4, and 5 could be directly impacted by the contingency pond, please provide a rationale for why these ponds were not included as part of the local study area.

Figure 7.2-2 in Annex C of the Aquatic Baseline Reports, shows the location of where fisheries baseline surveys were conducted. Ponds 3, 4, and 5 were not included in the fisheries baseline surveys. Please provide rationale for not conducting baseline fisheries works in the ponds since they are not only directly impacted by the project but also seen to be connected to Peanut Lake that is known to contain fish.

Response

Ponds 3, 4, and 5 were not considered as part of the local study area for the fish and fish habitat assessment. The first reason follows the position in the Developer's Assessment Report (DAR) and the Project Description where it is stated that the Contingency Pond will not be constructed unless deemed necessary and unless something unexpected happens during water treatment. This is described in Section 3.9 in the DAR

Second, scoping-level assessments of the system during baseline surveys indicated that the ponds were poor-quality habitats. This conclusion was drawn from the numerous visits to the area in 2003 and 2009 when there were surveys and sampling for bathymetry, benthic macroinvertebrate and water quality (see Annex C; Table 1.2-1). Most of this work emphasized Pond 4, which is the largest of the 3-pond complex that also includes Ponds 3 and 5 (Figure 1). Pond 4 is no bigger than 4 hectares in size. The substrate of Pond 4 appears to be entirely peat/organic material, and Pond 4 appears to be no deeper than depths of 0.2 to 0.3 metres during the summer (see Annex C; Table 4.2-1; Table 6.2-1).

Thus, it is unlikely that the pond complex supports waters deep enough for overwinter survival of local species of fish. The ponds likely freeze to the bottom during winter. Further, it is unlikely that the pond complex supports spawning habitats for species such as lake whitefish given the organic substrate descriptions, and the fact that there are numerous beaver impoundments in in the region that would restrict upstream movements of fish from Peanut Lake (also see Section 12.2 of the DAR).

Figure 1: Photograph of Pond 4 (facing north) from "2003 Environmental Surveys at Fortune Minerals NICO Property. Draft Report. December 2003. Prepared by Golder Associates, YK."

INFORMATION REQUEST – DFO_3

Source: Fisheries and Oceans Canada (DFO)

Request

Sediment and Erosion Control

It is referenced throughout the DAR that Fortune will use "standard erosion control measures" but specific details on where and what kinds of measures will be utilized to mitigate potential sediment and erosion issues are not provided. Areas of interest include the installation of the Peanut Lake diffuser, the installation of the water intake

Response

Best management practices for erosion and sediment control will be employed through the design, procedural planning, and construction of project components (TAC 2005). Measures taken to limit sedimentation and erosion will be specific to the NICO Project component, as well as the associated flow quantity and velocity, soil characteristics, topography, climate, and season of construction. In this response, potential sediment and erosion control measures discussed will be limited to those planned for the installation of the Peanut Lake Diffuser, the water intake at Lou Lake, and all watercourse crossings along roadways.

Installation of Peanut Lake diffuser

Prior to installation, worksite entrances will be stabilized. Silt fencing will be installed on shore to limit transport of erodible sediment from the access area into Peanut Lake. Prior to the installation of the Peanut Lake diffuser, a Type II or Type III turbidity curtain will be installed around the area of concern. The area of concern being a continuous semi-circle encompassing any trenching required for pipes and the diffuser installation. A fish salvage operation will be conducted within the silt curtain boundary. Construction work should be done during relatively dry conditions and outside restricted activity timing windows which have been identified for Northwest Territories lakes, rivers, and streams to protect fish during spawning and incubation periods when spawning fish, eggs and fry are vulnerable to disturbance or sediment. This will reduce the likelihood of erosion and sediment transport and minimize impacts to fish in Peanut Lake. Erosion from the diffuser itself will be limited as it will be 1 metre above the lake bottom with a port angle of approximately 30 ° from horizontal and directed into deep water.

Installation of Lou Lake Freshwater Intake

The freshwater intake for the NICO Project will be located in Lou Lake. Prior to the installation of the water intake structure at Lou Lake, a Type II or Type III turbidity curtain will be installed around the area of concern. Fish will be salvaged from within the perimeter of the turbidity curtain. The worksite entrances will be stabilized and on-shore silt fences will be installed to limit the introduction of sediment from the access area into Lou Lake. The intake itself will be screened according to Department of Fisheries and Oceans (DFO) Guidelines (DFO 1995). Work will be conducted outside fisheries timing windows.

Watercourse Crossings

Some erosion control measures will be specific to individual watercourse crossings. In general though, work will be done during relatively dry conditions and an open fishery window in late July and early August to maximize favourable weather and minimize potential effects on fish and fish habitat. The construction sequence will be

optimized through proper planning to reduce the duration of disturbances. Worksite entrances will be stabilized prior to commencing construction and installation of erosion control measures will be installed early. On shore silt fences will be installed and maintained during the execution of constructing watercourse crossings. The construction area will be isolated using cofferdams and dewatered. Clean water from upstream will be diverted or pumped around the construction zone. Where needed, the watercourse crossings themselves will be armoured with rip rap to limit erosion of the channel bottom. Where there are concerns about erosion due to elevated flow velocities, rip rap armouring will be supplemented with an underlying geotextile. Every effort will be made to preserve natural riparian vegetation. Because the work is to be done in an environment where the development of vegetation is slow, it is recommended that some sort of rolled erosion control product be used where vegetation is disturbed along the banks. Where large bodied fish occur, cross-drainage structures will be designed so that flow velocities do not become a barrier to fish passage.

References

DFO (Department of Fisheries and Oceans). 1995. Freshwater Intake End-of-Pipe Fish Screen Guideline. Department of Fisheries and Oceans, Ottawa.

TAC (Transport Association of Canada). 2005. National Guide to Erosion and Sediment Control on Roadway Projects. Transportation Association of Canada, Ottawa.

INFORMATION REQUEST – DFO_4

Source: Fisheries and Oceans Canada (DFO)

Request

Water Quantity

Please submit a clear summary of the collective impacts of alterations to water quantity on Nico and Peanut Lakes and a prediction of how that may impact downstream lakes such as Burke and downstream into Marian River (including connecting waterways) at the various stages of the project (pre-development, constructions, operation, closure before an after filling of the pit). This could include a summary of predicted inflows and outflows as well as water levels at the major waterbodies during the various stages of mine life as well as an assessment of potential impacts on fish and fish habitat that may result.

Response

In the Fortune Minerals Limited Developer's Assessment Report (DAR) for the NICO Project, the collective impacts of alterations to water quantity at various stages of the NICO Project are explored in Appendix 11.III: Effect of the NICO Project on Surface Water Quantity. The approach taken was to evaluate the impact on daily average outflow hydrographs for the sub-basins in the Lou Creek and Burke Creek watersheds. Alterations to flows in the Marian River and the streams connecting major waterbodies are summarized there. However, with the exception of Lou Lake, the appendix did not directly address changes to lake level that would result from project operations.

Thus, to address the information request DFO_4, Golder has summarized the collective impacts of alterations to lake levels in Nico, Peanut, and Burke lakes resulting from the various stages of the NICO Project. The daily average hydrographs were used to develop daily average lake stage records using empirical relationships between lake stage and discharge (Appendix 11.III.I of the DAR). By adjusting the natural flows according to NICO Project influences, the corresponding lake levels are determined using the lake stage-discharge rating curve.

Nico Lake

During operations, Nico Lake level will be altered most during the spring freshet when annual snowmelt will be slightly decreased due to the removal of the Grid Lakes Drainage Area (GLDA) from the Nico Lake gross drainage area (Figure 1). Nico Lake levels are expected to be depressed by a maximum of 4 millimentres (mm) in the spring and less than 2 mm over the remainder of the year. On average, Nico Lake levels will be depressed by 2 mm relative to average conditions during this time. Post-operations, the loss of gross drainage area from the GLDA will be partly offset by contribution of runoff from Wetlands 1, 2, and 3 (Figure 1). The maximum increase to water levels will be 2 mm, maximum decrease in water levels will be 2 mm, and the average (daily) change will be a decrease in water levels of 1 mm (Table 1).

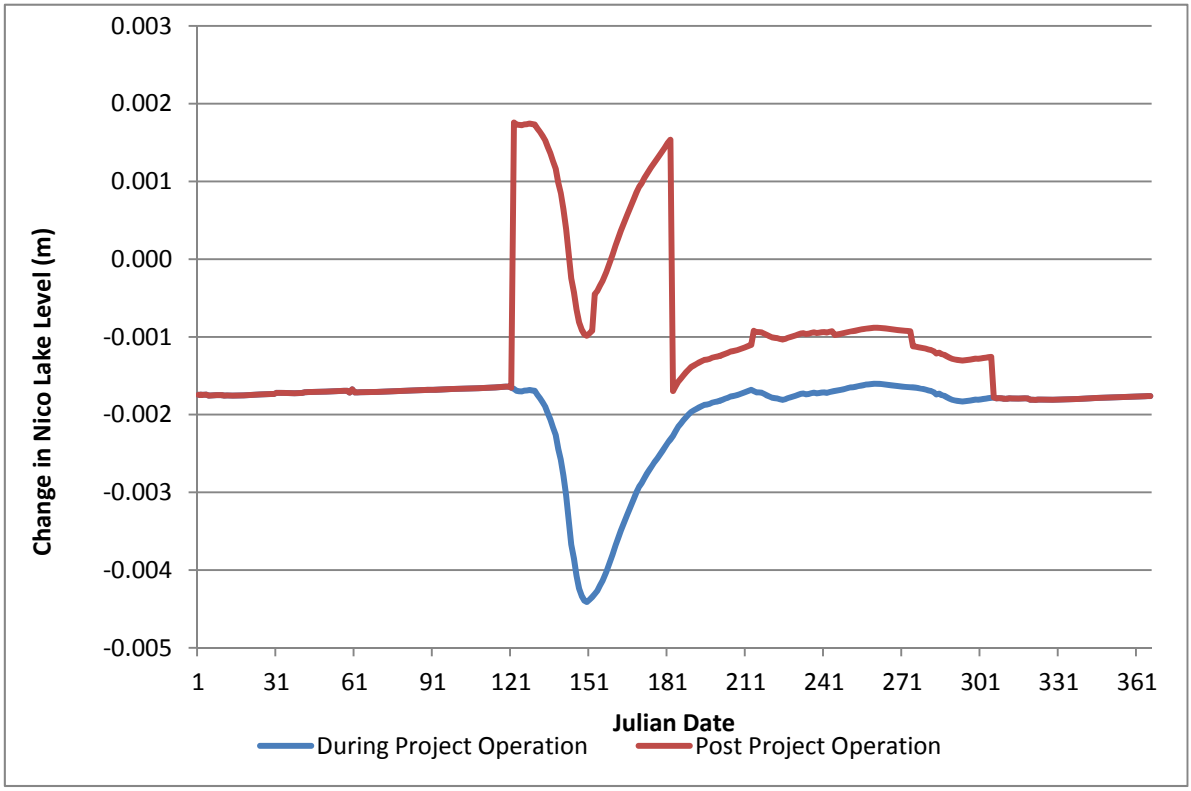

Figure 1: Alterations to the Historic Average Nico Lake Level (m) During Various Phases of the NICO Project

Table 1: Summary of (daily) Alterations to Nico Lake Stage (Station B-E) Relative to the Historic Average Resulting from Various Stages of the NICO Project

Summary Statistic	During Operations (m)	Post Operations (m)
Maximum	-0.002	0.002
Minimum	-0.004	-0.002
Average	-0.002	-0.001

m = metre

Peanut Lake

Peanut Lake will receive discharge from the Effluent Treatment Facility during operations that will result in increases to water level throughout the year. The increase is slightly less in the spring and summer as a result of decreased inflow from Nico Lake. The maximum change to lake levels will be an increase of approximately 4 mm occurring in the end year of operations. On average, the daily increase to lake levels will be 1 mm at the start of operations and 4 mm at the end of operations (Table 2 and Figure 2).

Post-closure and prior to Open Pit overflow, changes to the level of Peanut Lake are expected to be negligible, averaging less than 1 mm. After Open Pit overflow, Peanut Lake will receive overflow from the Open Pit resulting in daily increases up to 11 mm, but averaging approximately 5 mm.

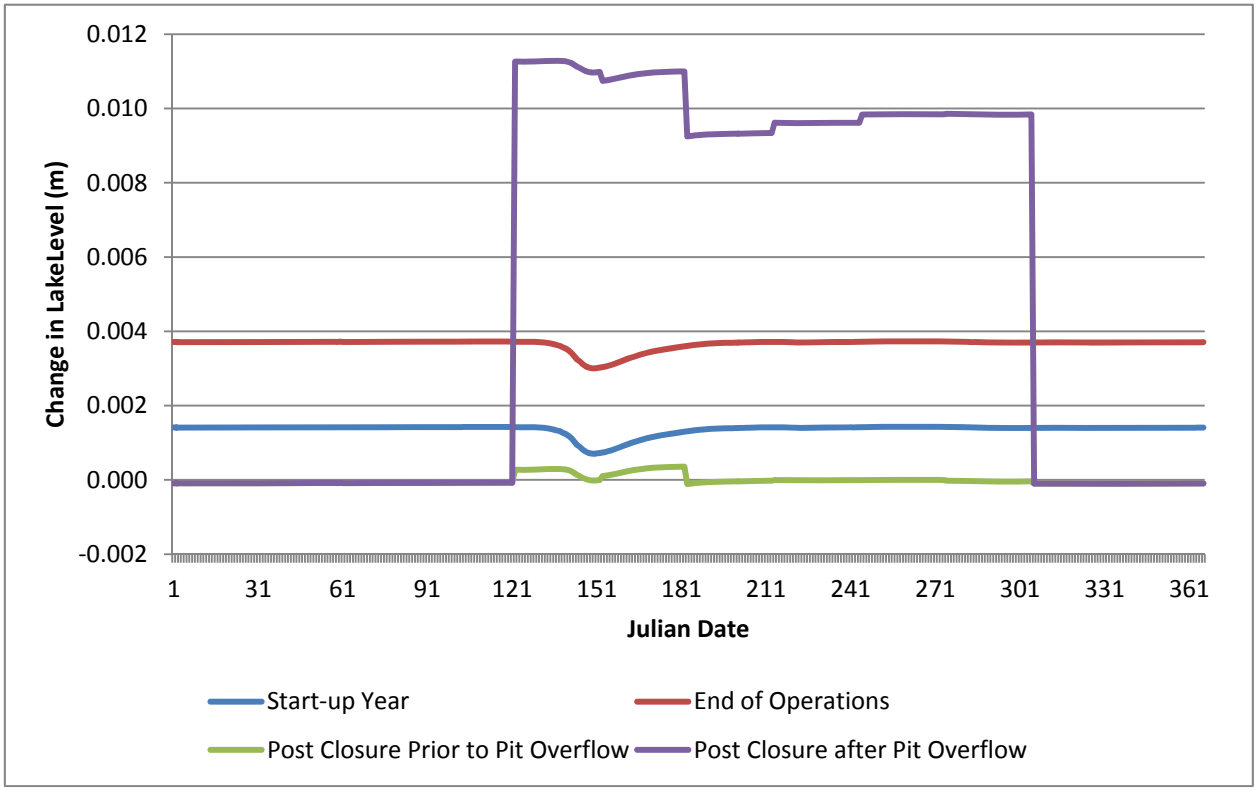

Figure 2: Alterations to the Historic Average Peanut Lake Level (m) During Various Phases of the NICO Project

Table 2: Summary of (daily) Alterations to Peanut Lake level (Station B-D) Relative to the Historic Average During Various Stages of the NICO Project

Summary Statistic	Start-up Year (m)	End of Operations (m)	Post-Closure Prior to Open Pit Overflow (m)	Post-Closure after Open Pit Overflow (m)
Maximum	0.001	0.004	<0.001	0.011
Minimum	0.001	0.003	<0.001	<0.001
Average	0.001	0.004	<0.001	0.005

m = metre

Burke Lake

The impact of NICO Project operations on the levels of Burke Lake is the result of changes to inflows originating at Peanut Lake (Table 3 and Figure 3). As in Peanut Lake, the largest change to historic average lake levels will be post-closure after the filling of the Open Pit. At this time the average daily increase in lake levels is 3 mm and is not expected to exceed 7 mm.

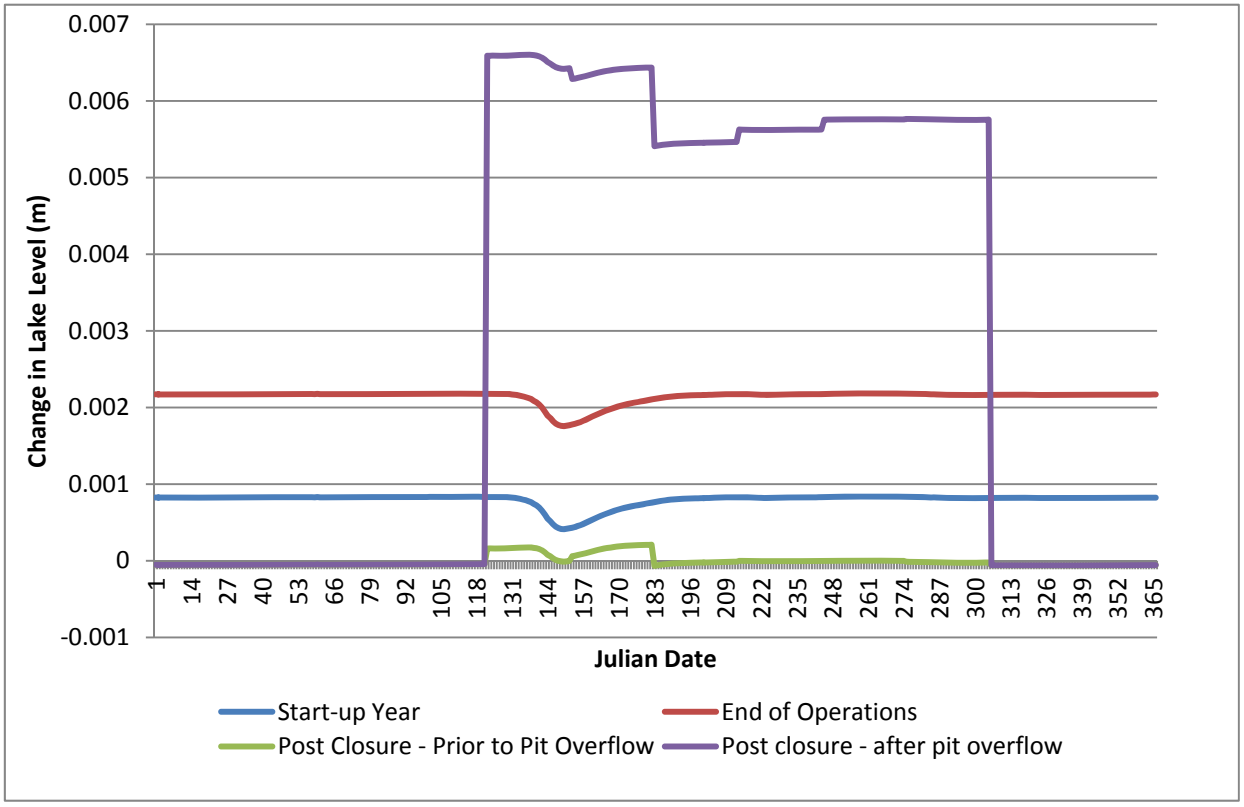

Figure 3: Alterations to the Historic Average Burke Lake Level (m) During Various Phases of the NICO Project

Table 3: Summary of Alterations to Burke Lake Level (Station B-A) Relative to the Historic Average During Various Stages of the NICO Project

Summary Statistic	Start Up Year (m)	End of Operations (m)	Post Closure Prior to Open Pit Overflow (m)	Post Closure after Open Pit Overflow (m)
Maximum	0.001	0.002	<0.001	0.007
Minimum	<0.001	0.002	<0.001	<0.001
Average	0.001	0.002	<0.001	0.003

m = metre

Summary

The maximum change in lake level is expected to occur at Peanut Lake following the overflow of the Open Pit (post-closure). During this period the increase in water level attributable to the project are not expected to exceed 11 mm.

The anticipated changes to lake levels are negligible when considering natural daily and annual fluctuations in lake levels. Beaver activity has a larger influence on lake levels in the region. Thus, changes to water levels is expected to have a negligible residual effects to fish and fish habitat relative to baseline conditions.

INFORMATION REQUEST – DFO_5

Source: Fisheries and Oceans Canada (DFO)

Request

Water Intake Screen

Provide any current information on anticipated pump rates and intake designs proposed for Lou Lake. DFO will continue to work with Fortune in this area to ensure that any potential impacts to fish species within Lou lake are minimized.

Response

The design of the freshwater intake pipe to be constructed at Lou Lake will consider recommendations and input from Fisheries and Oceans Canada. The design will include the installation of a fish screen for the protection of resident fish in Lou Lake and will follow the specifications in ”Freshwater Intake End-of-Pipe Fish Screen Guidelines” (Fisheries and Oceans 1995). Emphasis will be placed on the protection of resident fish with a minimum fork length of 25 millimetres (mm) from entrainment and impingement due to water extraction activities. Thus, the fish screen mesh size will be 2.54 mm (Fisheries and Oceans 1995). For more information see the attached invoice from Johnsons Screens Inc.

The total annual water volume required from Lou Lake is anticipated to be less 146 000 cubic metres, and therefore the anticipated average intake pump rate will be less than 400 cubic metres per day (m^3/day) or less than 4.6 litres per second. This estimate is based on a conservative assessment using a 25-dry year scenario. For more information refer to DAR Section 11, Appendix 11.II and 11.III.

If considering the average intake pump rate the open screen area required for the intake pipe should be a minimum of 0.13 square metres (m^2) for species characterized by the anguilliform swimming mode (based on Table 2 in Fisheries and Oceans 1995). Thus, the effective screen area for a screen similar to a #60 Wedge Wire and a 0.13 m^2 open screen area is calculated as no smaller than 0.21 m^2 (0.13 m^2 divided by 63% [value in Table 3 in Fisheries and Oceans 1995]). Given this area specification, the intake screen being designed for the Lou Lake pipe will meet the appropriate requirements. For more information see the attached invoice from Johnsons Screens Inc.

References

Fisheries and Oceans 1995. Department of Fisheries and Oceans Freshwater Intake End-of-Pipe Fish Screen Guideline. Ottawa, Ontario. ISBN 0-662-23168-9.

ATTACHMENT A

Screen Specification – Johnsons Screens Inc.

(please refer to supporting documents)

INFORMATION REQUEST – DFO_6

Source: Fisheries and Oceans Canada (DFO)

Request

Habitat Alterations at Lou Lake and Peanut Lake

While Table 12.3-2 and Table 12.3-3 summarize the net changes in habitat units at Lou Lake and Peanut Lake, respectively, detailed information regarding these calculations are not provided. DFO requests that a detailed summary of these Habitat Units (HU) calculations be provided, including areas and rationales for selected habitat suitability indices (HSIs), to assist in evaluating the summaries provided in the DAR.

Response

This response expands on the pathway analysis in the Developer's Assessment Report (DAR) (Section 12), provides tables summarizing the habitat suitability indices (HSIs), and provides a detailed description of how habitat losses and gains were calculated. It is important to note that the HSIs that were applied in the DAR have been refined based on recent work by Golder (Jacek Patalas, Associate, Senior Biologist, Edmonton Office) and feedback from DFO related to the fish habitat gains/losses assessment for the Meliadine Project, north of Rankin Inlet, Nunavut. The implication of these change were minor for the total number of habitat units that were gained post-construction. For example, for the overall anticipated change in habitat units (HUs) for all fish species upon the installation of the intake pipe in Lou Lake was 360.1 HU in the DAR, but has since been recalculated as 345.4 HU.

This information request response is related to the following secondary pathways in the DAR:

- **Physical loss of fish habitat from Lou Lake as a result of water intake structures established in the lake.**
- **Physical loss of fish habitat from Peanut Lake as a result of water discharge structure (i.e., diffuser) established in the lake.**

The Approach

As stated in the DAR (Section 12.3.2.1.2), the NICO Project will require an intake pipe for processing and potable water requirements, as well as a diffuser pipe extending from the Effluent Treatment Facility. Thus, a modified Habitat Evaluation Procedure (HEP; USFWS 1980) was used to assess fish habitat gains, or losses, from the installation of these pipes for the NICO Project. The HEP approach combines HSIs with information on habitat quantity for the calculation of HUs. In brief, HSIs are analytical tools or models for determining the relative potential of an area to provide quality habitat and to support a population, and can be calculated per species and life history stage. Habitat suitability indices scores range from 0 to 1.0, with a rating of 1.0 being optimum and 0 being unsuitable habitat. Predicted scores from the HSIs are often assumed to be linearly related to the carrying capacity of aquatic habitats in the region (Ackakaya et al. 2004).

The HSIs in this assessment were based on previously published models (e.g., USFWS models; Inskip 1982; Edwards 1983; Twomey et al.1984; McMahon et al. 1984; De Beers 2004; Golder 2008; Golder 2009). Habitat

suitability scores from these models were then combined with surface areas (expressed in units of square metres [m^2]) for specific locations within the lakes for the calculation of HUs. To determine the total number of HUs lost or gained for each fish species affected by the NICO Project, the number of HUs available under baseline conditions (pre-construction) were compared to those available post-construction.

Baseline descriptions considered the location of the proposed pipes and existing habitat at those locations. As stated in the DAR (Section 12.3.2.1.2), the intake pipe will be installed at a shoreline location on the east side of Lou Lake, and the diffuser will be positioned west of the entrance of the Nico Lake outlet, entering Peanut Lake from a north-northwesterly direction (see Figures 12.3-1 and 12.3-2 in the DAR). For calculation of HUs, the affected areas were determined to be approximately 160 m^2 in Lou Lake and 110 m^2 in Peanut Lake (Table 1). Two distinct habitat types were identified at the proposed locations during field reconnaissance in late summer 2009: a shoreline area where depths were less than 4 metres (m), and a deepwater area where depths exceeded 4 m (R. Schryer, Fortune, 2011, pers. comm.). The shoreline areas had sparse cover of emergent and submergent macrophytes (about 5% cover or less). Vegetation cover was lacking in deepwater locations. The majority of habitat to be affected by the proposed pipes (90% of affected habitat at Lou Lake, and 87% of affected habitat at Peanut Lake) is shallow water habitat <4 m in depth. Substrate at the Lou Lake location is a mix of boulder with some cobble, silt, and organic detritus in the shallow locations (144.7 m^2). In the deeper area, the substrates are largely of silt and detritus with some intermittent boulders (15.6 m^2). The substrate at the Peanut Lake location is generally homogenous and dominated by silt and detritus with some intermittent boulder.

Table 1: Affected Habitat Areas per Depth at Proposed Lake Locations for the Water Intake and Diffuser Pipes at the NICO Project

Depth	Lou Lake Water Intake Habitat (m^2)	Peanut Lake Diffuser Habitat (m^2)
0 to 0.5 m	21.2	18.8
0.5 to 1 m	21.2	18.8
1 to 2 m	42.3	37.5
2 to 3 m	34.7	9.4
3 to 4 m	26.2	9.4
4 to 5 m	9.7	3.9
> 5 m	5.9	10.3

m^2 = square metre

The anticipated length of submerged pipe for the water intake at Lou Lake will be about 53 m, and the length of submerged pipe at Peanut Lake will be about 86 m. Both pipes will be installed over the lake bottom. The entire length of the pipe in Lou Lake will be covered with aggregate. In Peanut Lake, the diffuser pipe will be covered by aggregate fill up until a depth of about 4 m. The proposed aggregate will include fine aggregate (2 to 5 centimetres [cm] in diameter) immediately over the pipe and lake bottom, with an outer layer of coarse rock (5 to 15 cm in diameter) and protective rip-rap. It is anticipated that the aggregate fill (i.e., gravel/cobble) will create spawning and rearing habitat for coldwater fish species (e.g., Machniak 1975; Richardson et al. 2001; Golder 2009), and therefore, offset any harmful alteration, disruption, or destruction of existing habitat that might occur during pipe installations in Lou and Peanut lakes. Other design details to note, but not considered in the calculation of HUs include the following:

1) a high capacity water intake screen of a design in accordance with DFO (1995);

2) a diffuser (at the end of the pipe) with a nozzle depth of 8.75 m, and 25 cm off the bottom;

3) a diffuser nozzle that is anchored, and at a 30 degree angle from the bottom; and

4) a diffuser with an expected exit velocity of about 4 metres per second from the Effluent Treatment Facility for average conditions during operations.

Changes to the quality and quantity of fish habitat in Lou Lake were evaluated for 4 classes of fish habitat (spawning, nursery, rearing, and foraging) (see definitions further below), and 6 species of resident fish in the affected lakes including the following (see Annex C, Section 7.3.7):

- longnose sucker (*Catostomus catostomus*);
- white sucker (*Castostomus commersoni*);
- walleye (*Sander vitreus*);
- northern pike (*Esox lucius*);
- lake whitefish (*Coregonus clupeaformis*); and
- cisco (*Coregonus artedi*).

Lou Lake supports all 6 species of fish, whereas Peanut Lake supports only northern pike and lake whitefish. Lake whitefish is the most abundant species in each lake. It is important to note that subtle refinements were made to the assessment of gains/losses such that values reported in this report will be slightly different than those reported in the DAR. However, the conclusion remains the same as that reported in the DAR.

NICO Project Habitat Suitability Indices

The HSIs for fish were based on previously published models (e.g., USFWS models and others). Models for sucker species, lake whitefish, and cisco were based on those developed for lakes in the Canadian Arctic (De Beers 2004; Golder 2009), as well as the peer-reviewed scientific literature (e.g., Machniak 1975; Richardson et al. 2001; Langhorne et al. 2001; Scott and Crossman 1973). Existing models for walleye and northern pike are generally constructed for waterbodies at lower latitudes, and therefore, they were modified for arctic/subarctic conditions that characterize the study region (e.g., Inskip 1982; Golder 2008). Also, modifications were made to existing HSIs such that substrate and water depth were the primary defining characteristics of suitability for each fish species (Tables 2 to 6). Scores were assigned to habitat areas delineated according to 0.1 m increments (or contours) of water depths. The tables shown below are intended to provide supplementary information to that provided in the DAR.

The life stage definitions used to develop HSIs followed those used in previous assessments (De Beers 2004):

- spawning habitat = used by fish for the specific act of spawning;
- nursery habitat = used by developing embryos and young-of-the-year (YOY);
- rearing habitat = used by sub-adult fish other than YOY for foraging and refuge from predators; and
- foraging habitat = used by adult fish for feeding or periods between feeding events.

Table 2: Habitat Suitability Index (HSI) for Longnose Sucker and White Sucker in Lou Lake

Lou Lake	Depth	Substrate Type	Vegetation Cover	SP	NU	RE	FO
Pre-Construction	<1 m	Bo (Co, Si)	5 to10%	0.25	0.5	0.5	0
	1 to 4 m	Bo (Co, Si)	5 to 10%	0	0.25	0.5	0.5
	4 to 5 m	Si (Bo)	0%	0	0.25	0.5	1
	>5 m	Si (Bo)	0%	0	0.25	0.25	1
Post-Construction	<1 m	Gr (Co)	0%	0.5	1	0.25	0
	1 to 4 m	Gr (Co)	0%	0	0.25	0.75	0.5
	4 to 5 m	Gr (Co)	0%	0	0.25	0.75	0.25
	>5 m	Gr (Co)	0%	0	0.25	0.5	0.25

Note: HSI model modified from DeBeers (2004); it was assumed that lake shoreline areas may not be optimum habitats for spawning and nursery stages (see Annex C, Section 2.3.16; Edwards 1983; Twomey and Nelson 1984).

Bo = boulder (>25 cm); Co = cobble (>6.5 cm); G = gravel (>0.2 cm); S = sand (>0.06 mm); Si = silt/detritus; HSI = habitat suitability index; m = metre; cm = centimetre; SP = spawning habitat, NU = nursery habitat, RE = rearing habitat and FO = foraging habitat.

Table 3: Habitat Suitability Index for Walleye in Lou Lake

Lou Lake	Depth	Substrate Type	Vegetation Cover	SP	NU[a]	RE	FO
Pre-Construction	<1 m	Bo (Co, Si)	5 to 10%	0.25	0.25	0.25	0.25
	1 to 4 m	Bo (Co, Si)	5 to 10%	0	0.25	0.25	0.25
	4 to 5 m	Si (Bo)	0%	0	0.25	0	0
	>5 m	Si (Bo)	0%	0	0	0	0
Post-Construction	<1 m	Gr (Co)	0%	0.5	0.75	0.25	0.25
	1 to 4 m	Gr (Co)	0%	0	0.75	0.25	0.25
	4 to 5 m	Gr (Co)	0%	0	0.75	0.25	0.25
	>5 m	Gr (Co)	0%	0	0	0.25	0.25

Note: HSI model derived from the literature (Maloney and Johnson 1957; R.L. & L. 1992; Lane et al. 1996; Kerr et al. 1997; Golder 2008); it was assumed that the proposed location maintained optimum temperature levels during the spring (8 to15°C) and early summer (15 to 24°C) (Golder 2008). Also, it was assumed that lake shoreline areas may not be optimum habitats for spawning and nursery stages (see Annex C, Section 2.3.16, also see McMahon et al. 1984).

[a] Assuming that fry are not yet photosensitive and that cover is largely unimportant.

Bo = boulder (>25 cm); Co = cobble (>6.5 cm); G = gravel (>0.2 cm); S = sand (>0.06 mm); Si = silt/detritus; HSI = habitat suitability index; m = metre; cm = centimetre; SP = spawning habitat, NU = nursery habitat, RE = rearing habitat and FO = foraging habitat.

Table 4: Habitat Suitability Index for Northern Pike in Lou Lake and Peanut Lake

Lou Lake	Depth	Substrate	Vegetation Cover	SP	NU	RE	FO
Pre-Construction	<0.5 m	Bo (Co, Si)	5 to10%	0.25	0.25	0.25	0.25
	0.5 to 4 m	Bo (Co, Si)	5 to 10%	0	0	0.25	0.25
	>4 m	Si (Bo)	0%	0	0	0	0
Post-Construction	<0.5 m	Gr (Co)	0%	0	0	0	0
	0.5 to 4 m	Gr (Co)	0%	0	0	0	0
	>4 m	Gr (Co)	0%	0	0	0	0
Peanut Lake							
Pre-Construction	<0.5 m	Si (Bo)	0 to 5%	0.25	0.25	0.25	0.25
	0.5 to 4 m	Si (Bo)	0 to 5%	0	0	0.25	0.25
	>4 m	Si (Bo)	0%	0	0	0	0
Post-Construction	<0.5 m	Gr (Co)	0%	0	0	0	0
	0.5 to 4 m	Gr (Co)	0%	0	0	0	0
	>4 m	Gr (Co)	0%	0	0	0	0

Note: HSI model modified from Inskip (1982).

Bo = boulder (>25 cm); Co = cobble (>6.5 cm); G = gravel (>0.2 cm); S = sand (>0.06 mm); Si = silt/detritus; HSI = habitat suitability index; m = metre; cm = centimetre; SP = spawning habitat, NU = nursery habitat, RE = rearing habitat and FO = foraging habitat.

Table 5: Habitat Suitability Index for Lake Whitefish in Lou Lake and Peanut Lake

Lou Lake	Depth	Substrate Type	Vegetation Cover	SP	NU	RE	FO
Pre-Construction	0 to 1 m	Bo (Co, Si)	NA	0	0.25	0.75	0.75
	1 to 2 m	Bo (Co, Si)	NA	0	0	0.5	0
	2 to 4 m	Bo (Co, Si)	NA	0.5	0.5	0.5	0
	4 to 5 m	Si (Bo)	NA	0.25	0.25	0.5	0
	>5 m	Si (Bo)	NA	0	0	0.5	0
Post-Construction	0 to 1 m	Gr (Co)	NA	0	0.25	1	1
	1 to 2 m	Gr (Co)	NA	0	0.25	0.5	0
	2 to 4 m	Gr (Co)	NA	1	1	0.5	0
	4 to 5 m	Gr (Co)	NA	1	1	0.5	0
	> 5 m	Gr (Co)	NA	0	0	0.5	0
Peanut Lake							
Pre-Construction	0 to 1 m	Si (Bo)	NA	0	0.25	0	0
	1 to 2 m	Si (Bo)	NA	0	0	0.5	0
	2 to 5 m	Si (Bo)	NA	0.25	0	0.5	0
	> 5 m	Si (Bo)	NA	0	0	0.5	0
Post-Construction	0 to 1 m	Gr (Co)	NA	0	0.25	1	1
	1 to 2 m	Gr (Co)	NA	0	0.25	0.5	0
	2 to 5 m	Gr (Co)	NA	1	1	0.5	0
	> 5 m	Gr (Co)	NA	0	0	0.5	0

Note: HSI model modified from Golder (2009); the assumption was made that both lakes maintainslate winter dissolved oxygen levels that meet the criteria for optimum habitat for spawning and nursery (i.e., that levels remain above 7 mg/L) (Golder 2008).

Bo = boulder (>25 cm); Co = cobble (>6.5 cm); G = gravel (>0.2 cm); S = sand (>0.06 mm); Si = silt/detritus; HSI = habitat suitability index; m = metre; cm = centimetre; SP = spawning habitat, NU = nursery habitat, RE = rearing habitat and FO = foraging habitat.

NA = not applicable for %vegetation cover which was not considered in assigning suitability ranks.

Table 6: Habitat Suitability Index for Cisco in Lou Lake

Lou Lake	Depth	Substrate Type	%Veg. Cover	SP	NU	RE	FO
Pre-Construction	0 to1 m	Bo (Co, Si)	NA	0	1	0.5	0.5
	1 to 2 m	Bo (Co, Si)	NA	0	1	0.5	0.25
	2 to 4 m	Bo (Co, Si)	NA	0.5	0.5	0.5	0.25
	4 to 5 m	Si (Bo)	NA	0.25	0.25	0.5	0.25
	> 5 m	Si (Bo)	NA	0	0	0.25	0.25
Post-Construction	0 to 1 m	Gr (Co)	NA	0	1	1	1
	1 to 2 m	Gr (Co)	NA	0	1	1	0.25
	2 to 4 m	Gr (Co)	NA	1	1	1	0.25
	4 to 5 m	Gr (Co)	NA	1	0.5	1	0.25
	> 5 m	Gr (Co)	NA	0	0	0.25	0.25

Note: HSI model modified from Golder (2009).

Bo = boulder (>25 cm); Co = cobble (>6.5 cm); G = gravel (>0.2 cm); S = sand (>0.06 mm); Si = silt/detritus; HSI = habitat suitability index; m = metre; cm = centimetre; SP = spawning habitat, NU = nursery habitat, RE = rearing habitat and FO = foraging habitat.

NA = not applicable for %vegetation cover which was not considered in assigning suitability ranks.

Results

Lou Lake Intake

Species-specific summaries of net changes in HUs resulting from the installation of the water intake are provided in Table 7. The analysis indicated that there will be a net loss of habitat for northern pike under the assumption that habitat is limiting for populations in the region. The net loss of combined habitat for spawning and nursery habitat will be about 10.6 HUs (Table 7). For sucker species, there will be a small loss of 11.7 HUs of foraging habitat that should be offset by a gain of 18.9 HUs of rearing habitat. There were also small gains for spawning and nursery habitat; however, it is important to note that lake shorelines are generally not optimum spawning habitats for these species (Annex C, Section 2.3.16; Edwards 1983; Twomey et al. 1984).

Table 7: Summary of Net Change in Habitat Units After the Installation of the Water Intake Pipe at the Lou Lake Location

Lou Lake	Pre-Construction (HUs)				
Species	**Spawning**	**Nursery**	**Rearing**	**Foraging**	**Total Per Species**
White Sucker	10.6	50.7	78.7	66.8	206.7
Longnose Sucker	10.6	50.7	78.7	66.8	206.7
Northern Pike	5.3	5.3	36.2	36.2	82.9
Walleye	10.6	38.6	36.2	36.2	121.5
Lake Whitefish	32.9	43.5	90.7	31.7	198.8
Cisco	32.9	116.7	78.7	71.8	300.1
Total Per Stage	102.8	305.4	399.2	309.5	1116.9
	Post-Construction (HUs)				
Species	**Spawning**	**Nursery**	**Rearing**	**Foraging**	**Total Per Species**
White Sucker	21.2	71.8	97.6	55.1	245.7
Longnose Sucker	21.2	71.8	97.6	55.1	245.7
Northern Pike	0.0	0.0	0.0	0.0	0.0
Walleye	21.2	115.8	40.1	40.1	217.1
Lake Whitefish	70.6	91.6	101.3	42.3	305.8
Cisco	70.6	149.6	155.9	71.8	447.9
Total Per Stage	204.7	500.6	492.5	264.4	1462.3
	Post-Construction (HU Gains - HU Losses)				
Species	**Spawning**	**Nursery**	**Rearing**	**Foraging**	**Total Per Species**
White Sucker	10.6	21.2	18.9	-11.7	39.0
Longnose Sucker	10.6	21.2	18.9	-11.7	39.0
Northern Pike	-5.3	-5.3	-36.2	-36.2	-82.9
Walleye	10.6	77.2	3.9	3.9	95.6
Lake Whitefish	37.7	48.1	10.6	10.6	107.0
Cisco	37.7	32.9	77.2	0.0	147.8
Total Per Stage	101.9	195.2	93.3	-45.1	345.4
	Post-Construction (HU Gains - HU Losses) Reported in DAR				
Species	**Spawning**	**Nursery**	**Rearing**	**Foraging**	**Total Per Species**
White Sucker	5.6	11.2	0	45.6	62.4
Longnose Sucker	5.6	11.2	0	45.6	62.4
Northern Pike	11.2	49.3	-36.3	-36.3	-12.1
Walleye	-11.2	-11.2	-9.3	-9.3	-41.0
Lake Whitefish	45.6	45.6	11.2	11.2	113.5
Cisco	40.9	81.9	40.9	11.2	174.9
Total Per Stage	97.7	188.0	6.5	68.0	360.1

DAR = Developer's Assessment Report; HU = habitat units

The results for walleye were expected given the change in substrate type upon intake instalment, and the differences in requirements between walleye life history stages (e.g., RL&L 1992; Kerr et al. 1997; Langhorne et al. 2001). The anticipated change in walleye habitat will be a 77.2 HU gain of nursery habitat and a 10.6 HU gain in spawning habitat, due to higher suitability of coarse substrates over silt for these functions. Negligible changes in rearing and foraging habitat are expected. Large habitat gains are also expected for key life history stages of lake whitefish and cisco. For lake whitefish, it is expected that upon installation of the water intake pipe, there will be a net gain of about 85.8 HUs of spawning and nursery habitat combined. Similar gains are expected for cisco: 70.6 HUs of spawning and nursery habitat combined (Table 7); however, changes in foraging habitat will be marginal for cisco. The moderate gains in habitat units for walleye, cisco, and lake whitefish following construction should benefit local populations. Across all species, the largest gains will be for nursery habitat, followed by spawning habitat. These habitat types are often limiting factors for fish species in lakes (e.g., Minns 2003).

The overall anticipated change in habitat units for all fish species combined upon installation of the intake pipe is an HU gain of about 345.4 HUs (Table 7). This value is more conservative than the gain reported in the DAR (which was a 360.1 HU gain). The gains were expected given the proposed placement of aggregate and rip-rap over the intake pipe. Gravel, cobble, and boulder substrate are key habitat features for many coldwater fish species in lakes (e.g., Machniak 1975; Richardson et al. 2001; Golder 2009). It is also important to highlight results from baseline studies that did not find spawning and rearing habitats at the proposed intake location, which is located on the east side of the lake (Annex C; Section 2.3.16 of the DAR). Potential spawning and rearing habitats for lake whitefish, walleye, cisco, and sucker species were identified in cobble/gravel areas at the south end of Lou Lake. Also, previously completed baseline work showed that the Lou Lake outflow (at the south end of Lou Lake) provides key spawning and rearing habitat for northern pike, sucker spp., and walleye, whereas the north end of the lake has abundant emergent vegetation for northern pike spawning and rearing requirements. Thus, this pathway is expected to have negligible residual effects to fish habitat and the persistence of fish populations.

Peanut Lake Diffuser

Species-specific summaries of net changes in HUs resulting from the installation of the diffuser pipe are provided in Table 8. This table expands on Table 12.3-3 in the DAR. Results indicate that the installation of the diffuser pipe and use of aggregate and rip-rap fill will result in the loss of shoreline habitat for northern pike spawning, nursery, rearing, and foraging habitat types. For example, the replacement of shoreline emergent and submergent vegetation with gravel/cobble fill will reduce the suitability of shallow water habitat for this species. Northern pike require aquatic vegetation for spawning, nursery, rearing, and foraging (e.g., Franklin and Smith 1963; Inskip 1982; Nelson and Paetz 1992). Thus, there will be a small, net loss of habitat for northern pike, which may reduce the carrying capacity of lake under the assumption that habitat is limiting for the resident population. The net loss of habitat for northern pike will be about 23.4 HUs for each rearing and foraging habitat types (Table 8). The total net loss of habitat for northern pike will be about 56.3 HUs.

In contrast to reductions in the availability of northern pike habitat, the installation of the diffuser pipe is expected to result in an increase of suitable spawning, nursery, rearing, and foraging habitat for lake whitefish (Table 8). Although some boulder cover is present along the shoreline, existing habitat conditions lack large accumulation of gravel or cobble substrate, which are key habitat features for lake whitefish populations (e.g., Machniak 1975; Golder 2009). Thus, it was assumed that the current location is not optimum spawning and nursery habitats (Table 8), and was assigned a low HSI value. The addition of the gravel and cobble fill should increase the

suitability of the substrate for all life history stages. However, the suitability of deeper water (>4 m) will not noticeably change in quality. Thus, it is expected that there will be a net gain of about 32 HUs for the nursery stage and about 38 HUs each for rearing and foraging stages upon installation of the diffuser pipe. The total net gain of habitat for lake whitefish will be about 124 HUs. These gains will benefit the local population assuming that the availability of nursery and rearing habitat is limiting in the lake (Table 8).

Table 8: Summary of Net Change in Habitat Units After the Installation of the Diffuser Pipe at the Peanut Lake Location

Peanut Lake	**Pre-Construction (HUs)**				
Species	**Spawning**	**Nursery**	**Rearing**	**Foraging**	**Total Per Species**
Northern Pike	4.7	4.7	23.4	23.4	56.3
Lake Whitefish	5.7	9.4	35.2	0.0	50.3
Total per Stage	10.4	14.1	58.7	23.4	106.5
	Post-Construction (HUs)				
Species	**Spawning**	**Nursery**	**Rearing**	**Foraging**	**Total Per Species**
Northern Pike	0.0	0.0	0.0	0.0	0.0
Lake Whitefish	22.7	41.4	72.7	37.5	174.3
Total per Stage	22.7	41.4	72.7	37.5	174.3
	Post-Construction HU Gains/Losses				
Species	**Spawning**	**Nursery**	**Rearing**	**Foraging**	**Total Per Species**
Northern Pike	-4.7	-4.7	-23.4	-23.4	-56.3
Lake Whitefish	17.0	32.0	37.5	37.5	124.0
Total per Stage	12.3	27.3	14.1	14.1	67.8
	Post-Construction HU Gains/Losses Reported in DAR				
Species	**Spawning**	**Nursery**	**Rearing**	**Foraging**	**Total Per Species**
Northern Pike	-4.7	-4.7	-23.4	-23.4	-56.3
Lake Whitefish	0	9.4	37.5	37.5	84.4
Total per Stage	-4.7	4.7	14.1	14.1	28.1

DAR = Developer's Assessment Report; HU = habitat units

The overall anticipated gain in habitat units in Peanut Lake will be about 67.8 HUs. This number is higher than that reported in the DAR (see Section 12.3.2.1.2). It is important to note that baseline surveys did not identify key habitats in the vicinity of the proposed diffuser location (Annex C; Section 2.3.16). The northeast and southwest ends of the lake supported extensive emergent vegetation suitable for spawning and rearing northern pike. Additionally, spawning habitat for lake whitefish (a gravel/cobble shoal) was observed along the northwest shoreline south of the proposed diffuser location. Thus, this pathway is expected to have negligible residual effects to fish habitat and the persistence of fish populations.

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INFORMATION REQUESTS

GOVERNMENT OF THE NORTHWEST TERRITORIES

INFORMATION REQUEST – GNWT_1

Source: Government of the Northwest Territories (GNWT)

Request

Socio-Ec Impact Mitigation - Training Commitments

1) Please describe how the financial management, alcohol and substance abuse, family adaptation and coping mechanisms workshops will be implemented? For example, how often will they be made available to each employee and what are the resources (resource materials, counselling, etc.) available outside of scheduled workshops if needed by employees?

2) In which communities will the workplace orientation sessions be held?

3) Will the workplace orientations be made available only to new workforce entrants (i.e. for those whose first job is the mine) or to each new employee to the mine?

4) Will such training be extended to contractors' employees?

5) Will such training be available for the life of the mine?

Response

Response 1

The financial management, alcohol and substance abuse, family adaptation, and coping mechanisms workshops will be implemented as part of each employee's orientation procedure. Therefore, there will be a large training session prior to the start-up of the mine, as all new employees will be brought to the mine site for this orientation. The training will be conducted by outside parties who are experienced in their field. As an example, Fortune Minerals Limited (Fortune) would bring a representative from a bank to conduct the financial management component of the orientation. After the initial wave of employees being trained prior to the mine start-up, new employees will receive this orientation when they first start at the mine site.

Response 2

The workplace orientation sessions will take place at the mine site.

Response 3

The workplace orientations will be made available to each new employee at the mine.

Response 4

The workplace orientations will only be made available to each new employee to the mine because it also involves policies and procedures that are specific to Fortune.

Response 5

After the initial wave of employees being trained prior to the mine start-up, new employees will receive this orientation when they first start at the mine site. This will continue for the life of the mine.

INFORMATION REQUEST – GNWT_2

Source: Government of the Northwest Territories (GNWT)

Request

1) Fortune is requested to confirm/describe which of the following approaches will be developed to help retain and support Northwest Territories' (NWT) residents before, during and after the project life:

   a) Supervisor and mentor training;

   b) On-the-job training and advancement opportunities for all employees;

   c) Participation in apprenticeship and trades training and ensuring the necessary work hours for employees to achieve trade and/or occupation certification;

   d) On site apprenticeship and trades training opportunities including a salary and time off while away taking technical training;

   e) On-site literacy, financial management, WHMIS and SHE (safety, health and environment training) training programs, health and wellness;

   f) Training programs schedule, including literacy, so potential employees will be ready and prepared to take advantage of immediate employment opportunities;

   g) Training for new employees;

   h) Professional development opportunities for all employees to facilitate career advancement;

   i) Programs and initiatives that address barriers to hiring and retaining employees including Local Study Area residents, women in non-traditional jobs, and/or single parents that support their participation in the workforce;

   j) Cultural awareness and diversity training to recognize, respect and support cultural differences;

   k) Approach to addressing limited training capacity in the communities and access to training;

   l) Ability to meet NWT hiring goals based on LSA/NWT communities' employment pool and degree of workplace readiness;

   m) Training, recruitment and retention approaches/incentives;

   n) Identification of potential training and development partners.

Response

The following approaches will be developed to help retain and support Northwest Territories' (NWT) residents before, during, and after NICO Project life:

Response a

Fortune Minerals Limited (Fortune) will train supervisors for the work. They will be provided with all mandatory safety training including WHMIS, and other Occupational Health and Safety standards and procedures. In addition, Fortune will provide all supervisors with an intensive orientation at the commencement of employment or to employees when promoted to a supervisory position. Fortune will seek opportunities to encourage and support Aboriginal workers who would like to pursue supervisory or management roles. Workers selected for supervisor positions as a developmental opportunity will be provided the training for all safety, health, and environment procedures. They will also be trained in supervisory skills such as conflict management, problem solving, decision making, and communications. They will be made familiar with all company policies including human resources, environment health and safety. They will be mentored and coached by their supervisor or manager to further enhance their skills and abilities. In addition, they will be provided with performance feedback for learning purposes. Training will be provided for supervisors during the NICO Project life and for those promoted during NICO Project life.

Response b

All employees will receive on-the-job training in their workplace to enhance their knowledge, skills, and competencies. All employees will have opportunities for advancement through further training, work experience, performance review, and coaching to determine their interests and abilities. Employees will be offered opportunities for on-the-job training to advance to a different role and also opportunities to upgrade their skills and qualifications. On-the-job training is provided during the NICO Project life. In some areas, such as heavy equipment where workers have had experience in other industries or the communities, they will be provided with on-the-job training to adapt their skills to the mining industry.

Response c

There will be limited opportunities for Fortune to participate in fully developed apprenticeship and trades training due to the very small operation (with a projection of approximately 175 employees). With a 24-hour operation, (half of that number of employees may be on days off and a half of those on site will be resting after their shift) there will be only a small number of journeyman workers available to provide the necessary training and oversight for an apprenticeship program. Fortune will make every effort to accommodate any apprentice where there is a journeyman available to provide the training and supervision.

Response d

It is not expected that there will be a formal apprenticeship and trades training program on-site due to the small operation. If there is an opportunity for an individual, this will be arranged on a one-on-one basis to provide any support for an apprentice to continue their training with a journeyman and be provided with a salary and time-off during the NICO Project life. Fortune will provide and encourage opportunities for apprenticeships where there are sufficient available journeymen and eligible apprentices.

Response e

Fortune does not expect to provide any formal on-site literacy training or education in a classroom. The operation is very small and will not permit hiring a group of professional staff who would be available to accommodate all employees for literacy education. Fortune will have computers available for those who might wish to participate in on-line education programs at site while on their time-off. All efforts will be made to support individuals in any literacy programs. Any community resources that could provide literacy education for employees on their days off will be supported. While policy has not yet been developed, it is anticipated that there will be a component for reimbursing some tuition for work related training or education that an employee

might wish to participate in. This would be available for employees during their employment with Fortune. Efforts will be made to support literacy in the communities to prepare employees for employment.

Financial management programs will be made available to employees during their orientation and this would include such procedures as the opening of bank accounts. Fortune also plans to offer financial management workshops for family and any interested community members in all the communities as appropriate.

Safety, health, and environment training programs including WHMIS will be mandatory for all employees as part of their orientation to the job on commencement of employment.

Health and wellness programs will be integrated into the workforce as appropriate during the work time. These may include site-based workshops on diet and exercise, general hygiene, or specific health issues as they are of interest and pertinent to the workforce. These programs would also be provided to individuals through the health care providers on-site.

Response f

Fortune is not in a position to provide training schedules at this time. They are prepared to support any community-based initiatives to increase literacy which is a long-term educational issue. When the NICO Project is approved, Fortune will be in a position to provide training schedules. Programs will be repeated to accommodate the shift work. From NICO Project approval to start of construction there will be time to initiate training programs so that the trainees are ready to use their skills at the end of the training. Training undertaken at this time would likely be discouraging for trainees who could not immediately use their skills and programs would likely have low retention rates. Training for heavy equipment operators, introduction to open pit mining and open pit miner training, and pre-trades training will be part of the programs negotiated at the time of NICO Project approval. Experience with other mining companies has been that if the training is provided too soon, there is a high degree of discouragement with no immediate jobs and low retention of the knowledge and skills. A number of training opportunities are being investigated and negotiated but cannot be confirmed until the NICO Project is approved and the training time frame requirement is confirmed.

Response g

All new employees will be provided with an extensive orientation to Fortune. This will include review of all policies and procedures related to their work including human resources, environment, health and safety, on-the-job training for the specific role that they have been hired for, and orientation to the work site. There will be additional training provided for entry level roles and those new to the workforce to verify their success. In some cases, additional training will be provided to new workforce entrants and women entering the workforce to provide skills training.

Response h

While employed with the Fortune there will be a policy to define the process for career development for employees. Professional development will be encouraged and financially supported by Fortune. These opportunities will include attendance at professional conferences or seminars, membership in professional associations, on-line training, and webcasts. Access to internet on-site will facilitate the employees' ability to pursue much of the development.

Response i

Before and during the mine operations, there will be educational programs conducted in the communities by Fortune officials to encourage students and other community members to consider careers in mining. There will

be a direct appeal to women who might not have previously considered a career in mining. During the operations, school visits will be made and students will be brought to the site to experience the possibilities of employment after they leave school or consider options for further education. Fortune will develop a strategy directed at women to draw them into the mining workforce. More flexibility of shifts is being proposed as it might remove barriers for women with a young family. This would be a significant attraction to draw more women into the mining work force. It will be critical to have a safe and secure workplace that will attract women into the workforce and retain them and this will include the management of the Sexual Harassment policy.

Response j

Cultural awareness and diversity training will be part of the initial orientation for employees. Opportunities will be sought to bring elders and community members to the site for cultural events to further support the First Nations employees to share their culture and also to support diversity for employees from other cultures. This training will be provided on an annual basis for all employees. Local elders and cultural experts will be engaged to design and provide the training. Cultural awareness and diversity training will be part of the supervisors' training and orientation.

Response k

Potential employees will be provided with training through Aurora College in Yellowknife and Fort Smith. Sponsorship of individuals for this training will be decided on a case by case basis. It is difficult to provide much of the training in the local communities because of the need for large equipment and simulators. The opportunity to travel outside the community for some of the training may prepare workers for travel outside the community for employment. Some training, such as computer training, may be able to be conducted on-site in the communities. Fortune will make every effort to bring training to any of the communities as is practicable.

Internet technology (e.g., Skype and webcasts) will provide additional training in the community.

It might be possible to take a training simulator to some of the communities to provide residents with a opportunity to experience the equipment and their aptitude for being an equipment operator. It might also be possible to bring potential employees to site prior to operations to commence training on heavy equipment.

Response l

There will be challenges to meet the NWT hiring goals based on the local study area/NWT communities' employment pool and degree of workforce readiness. Many workers who are available or willing to work outside their communities have been employed with the diamond mines. There is an opportunity, because the NICO Project is closer to the communities, that it might attract some workers to enter the workforce who may not have previously been available. Considerable work has been done in the communities by the diamond mines to encourage mining careers for students. It is possible that Fortune will be able to leverage some of the efforts in terms of workforce readiness by other companies over the last 10 to 15 years.

Response m

Training will be negotiated and scheduled as the NICO Project is approved. Recruitment strategies have been drafted and will be put in place as needed, with a local study area office opened in Behchokǫ̀ to assist recruitment as the time to recruit is closer. A Tłı̨chǫ human resources professional will be hired to lead the recruitment efforts in the communities. Numerous retention approaches are being set-up, such as creating a safe, secure and respectful workplace, training and promotion opportunities, an advantageous shift rotation, and work availability close to local study area communities. There will be some incentives, such as production bonuses provided for some of the mining roles. The compensation and benefits packages will be developed to

be a factor in attraction and retention. Other retention incentives will be developed and incorporated closer to the time of production commencement.

Response n

There have been on-going discussions with the Mine Training Society regarding a number of training initiatives. Aurora College already offers a number of programs, such as heavy equipment driver training, the introduction to mining program, the underground miner program, the Trades Access program, numerous office administration programs, and environmental monitoring. Nuna Training Technologies has 2 mobile simulators that can be used for determining interest and aptitude and training equipment operators, which Fortune is a potential partner. Other options will be explored to secure the best workforce drawn from the local study area.

INFORMATION REQUEST – GNWT_3

Source: Government of the Northwest Territories (GNWT)

Request

Employment - Definitions

1) Please define and/or qualify the following:

   a) Regional

   b) Hiring preference/priority

   c) Tłı̨chǫ citizen

   d) NWT First Nations

   e) NWT resident

   f) Canadian resident

   g) Aboriginal

   h) Aboriginal Community

2) Please provide information on how many and what types of jobs associated with the mine are anticipated to be located outside of the Northwest Territories (NWT) during each phase of the project.

Response

Response 1

Definitions are provided in the order in which they appear above, as follows:

In Section 16 and Figure 16.1-1 of the Developer's Assessment Report (DAR), Human Environment regional is defined as including the NWT.

a) Hiring preference or priority means that preference will be given to local northern and Aboriginal residents as part of Fortune Minerals Limited's (Fortune) commitment to provide employment and business opportunities to Northerners.

b) A Tłı̨chǫ citizen is a beneficiary to the Tłı̨chǫ Agreement, whose name is on the Tłı̨chǫ Citizens Register, and is defined in the Agreement to be a person who is:

   i) "Tłı̨chǫ person", or meets the conditions of the "community acceptance process" set out in the Tłı̨chǫ Constitution;

   ii) a Canadian citizen, or a permanent resident of Canada, or is Tłı̨chǫ and as a result of adoption became a citizen of a country other than Canada; or

   iii) is not enrolled under a different land claims agreement.

c) NWT First Nations collectively refers to various Indigenous peoples within the NWT who are neither identified as Inuit nor Métis.

d) A NWT resident is a person who is "ordinarily resident" in the NWT (i.e., has lived in the NWT for one year or more).

e) Canadian resident. As defined by the Canadian Income Tax Act, an individual is resident in Canada for tax purposes if Canada is the place where he, in his settled routine of his life regularly, normally or customarily lives.

f) An Aboriginal person, referring to the NWT, is any Dene, Métis or Inuit person who was born in the NWT (defined by its present boundaries). Aboriginal is a collective name for the original peoples of North America and their descendants. The Canadian Constitution (the Constitution Act, 1982) recognised three groups of Aboriginal Peoples - Indians, Métis, and Inuit - with unique heritages, languages, cultural practices, and spiritual beliefs.

g) An Aboriginal community means a First Nation, tribal council, band, community, organization or other group with a predominantly aboriginal leadership.

Response 2

The types of jobs associated with the mine that are anticipated to be located outside of the NWT during the construction phase of the NICO Project are those associated with the owner's managerial team (approximately 4 to 5 people). These positions will be based in London, Ontario. Additionally, some administrative roles (approximately 65 people) will also be located in London, Ontario; however, these administrative roles are also responsible for Fortune projects other than the NICO Project. During the production phase of the NICO Project, there will not be an owner's team but there will continue to be administrative roles located in London, Ontario managing other projects as well as NICO. Construction and operating costs of the Saskatchewan Metals Processing Plant in Saskatoon for mine processing were excluded from the economic analysis as they occur outside the NWT, and since the plant was not part of the DAR.

There will be less administrative staff required during the closure phase. However, the exact number of employees during this phase of the NICO Project has yet to be determined.

INFORMATION REQUEST – GNWT_4

Source: Government of the Northwest Territories (GNWT)

Request

Employment - Calculations

1) Please confirm whether the calculations for employment (such as that in Table 16.2-5) include indirect jobs created from processing of mined material out-of territory.

2) Please confirm which method of calculating employment (FTE or person years) will be used when publicly reporting data annually if the development is approved.

3) Please describe the differences (both quantitative and qualitative) of each method so that we can better evaluate the data provided in the DAR.

4) Please also confirm whether the hiring goals described by Fortune (50-60% regional (NWT) and 30-50% Aboriginal) are calculated from annual FTE or person year estimates.

Response

Response 1

Indirect jobs in Table 16.2-5 and elsewhere referred to in the Developer's Assessment Report (DAR) mean only those indirect jobs which are expected to be generated within the Northwest Territories (NWT) from the NICO Project.

Response 2

As stated in Section 16.2.4 of the DAR, the results were provided in full-time equivalent (FTE) terms. This method of reporting will be used in the future when reporting data annually if the NICO Project is approved.

Response 3

Person-years and FTEs use the same information. One FTE may be thought of as one person-year. As described in Section 16.2.4 of the DAR, "This means that 1 person working full time for an entire year is counted as 1 FTE job. Likewise, 12 people employed full time for 1 month translates into 1 FTE job, as would someone working double time for half the year." A common definition of an FTE is 2000 hours per year (40 hours times 50 weeks).

Response 4

These hiring goals were not calculated from FTEs or person years, but rather were estimated by Fortune Minerals Limited (Fortune) and relate to the programmatic goals for the NICO Project. Fortune understands the present labour supply is not large enough to be able to accommodate most of the employment and contracting opportunities, but will adopt strong management practices to support local and regional hiring.

INFORMATION REQUEST – GNWT_5

Source: Government of the Northwest Territories (GNWT)

Request

Public Reporting

1) Please confirm whether Fortune will collect and publicly report annually on:

   a) hiring by hiring priority and job category in total numbers and percentage of total hires;

   b) hiring by Northwest Territories community in total numbers and percentage of total hires;

   c) total employment in person years by hiring priority and job category in total numbers and percentage of the workforce;

   d) total employment in person years by Northwest Territories community in total numbers and percentage of the workforce;

   e) total number of NWT resident employees who resigned or who were laid off, fired or otherwise terminated in the previous year;

   f) participation in and results of training activities

   g) report on the gross value of goods and services purchased during the calendar year by major category of purchase in relation to each phase of the project. ('Purchases' based on the gross value of all purchases of goods and services including both goods and services produced in the Northwest Territories and goods and services produced outside the Northwest Territories that are purchased through NWT Businesses); and

   h) business forecast and assessment for the upcoming year

2) What steps will Fortune take to ensure it can collect, evaluate and report information annually?

Response

Response 1

Fortune Minerals Limited (Fortune) will collect and publicly report annually on training, employment, and business spending information.

Fortune will collect and publicly report annually on hiring by hiring priority and job category in total numbers and percentage of total hires;

a) Fortune will collect and publicly report annually on hiring by Northwest Territories (NWT) community in total numbers and percentage of total hires;

b) Fortune will collect and publicly report annually on total employment in person years by hiring priority and job category in total numbers and percentage of the workforce;

c) Fortune will collect and publicly report annually on total employment in person years by NWT community in total numbers and percentage of the workforce;

d) Fortune will collect and publicly report annually on total number of NWT resident employees who resigned or who were laid off, fired, or otherwise terminated in the previous year;

e) Fortune will collect and publicly report annually on participation in and results of training activities;

f) Fortune will collect and publicly report annually on the gross value of goods and services purchased during the calendar year by major category of purchase in relation to each phase of the NICO Project. ('Purchases' based on the gross value of all purchases of goods and services including both goods and services produced in the NWT and goods and services produced outside the NWT that are purchased through NWT Businesses); and

g) Fortune will collect and publicly report annually on business forecast and assessment for the upcoming year.

Response 2

To ensure it can collect, evaluate, and report information annually, Fortune will establish the above listed measurements as key performance indicators that will be tracked through human resources and supply chain personnel at site.

INFORMATION REQUEST – GNWT_6

Source: Government of the Northwest Territories (GNWT)

Request

Employment Policies and Mitigation - Aboriginal and Other Northern Women

1) Please describe the anti-harassment policy and procedures currently in place and how they will be communicated and enforced on site to employees.

2) Should the development be approved and shorter shifts not be made available for whatever reason, how would this affect women's (including single parent's) ability to participate in the workforce?

3) Please describe the strategy that Fortune will develop directed at women to create more opportunities or remove barriers to working on site (as proposed in section 16.2.4.2.3 and 16.2.7.2.6 of the DAR).

4) Please describe the professional development opportunities for women to facilitate advancement in non-traditional occupations and career development and advancement in other positions.

Response

Response 1

Fortune Minerals Limited (Fortune) has a Harassment and Discrimination Policy which clearly states that there is zero tolerance for harassment of any kind. The policy covers a full range of potential harassment behaviours. It covers harassment during both working and non-working hours, as well as the immediate worksite as may be found in a living arrangement at site. It has a formal process for reporting any harassment and an investigation process. The policy also provides an informal process for any person who might feel uncomfortable with the formal process and need human resources support. The policy will be strictly enforced to provide a safe, secure, and respectful working environment. The policy will be communicated as part of the orientation process for any employees. All policies will be re-communicated to all employees on an annual basis and employees will be asked to sign-off that they have knowledge of and understand the policies. Supervisors will be trained in how to recognize any harassment incident and manage the process sensitively.

Response 2

A longer shift rotation may preclude some women or some single parents from participating in the workforce at the site because of emotional challenges with the length of the time away from a young family or the difficulty of child care arrangements. If there are a number of women from the same community on alternative shifts they may be able to support each other's child care needs. The advancing use of electronic technology will be a factor in providing parents, particularly women, with more regular contact with families while working. This would include the use of phone, e-mail, mobile phones or smart phones, Skype for a visual contact with family, and the use of social media such as Facebook and Twitter, instant messaging, and blogs. The company will consider a computer and mobile phone purchase program to make these types of communications media available to employees. Parents will be able to speak with children, family, and caregivers on a daily basis. Numerous communications means will be available to employees to communicate with family while at the worksite. As the

use of electronic media becomes universal, it will create better communication options for those who work away from their families for extended periods.

Response 3

The relative closeness of Whatì to the NICO Project is expected to generate work and business opportunities there. This creation of NICO spinoff work opportunities in Whatì will allow more people to gain employment without having to leave their families and as such would increase opportunities for women. During the construction phase, Fortune will require bidders to include gender equity provisions in their tenders that comply with Fortune's Women's Employment Plan. Contractors will be required to sign-on to respectful workplace policies. During construction and operations, orientation sessions will focus on gender sensitivity. There will be on-going monitoring of the Women's Employment Plan. Female-friendly accommodations will be made available. During construction and operations, women's employment will be supported by anti-harassment and discrimination policies. The human resources management system will support the Women's Employment Plan. Fortune will work with post-secondary institutions, women's organizations, and the Government of the Northwest Territories to ensure ready access to basic training in literacy and numeracy skills that will enable workers to increase their core competencies. Fortune will develop and implement a human resources strategy for recruitment, retention, and promotion that will contribute to the creation of a diversified workforce. Fortune will communicate and promote the employment of women through Fortune's newsletters and website, and in the communities through information meetings and community outreach. A school program will be initiated to inform students of potential employment opportunities and educational pathways to pursue employment in the mining sector. There will be an emphasis on women considering non-traditional employment and discussion of the benefits. There will be gender equity for employee wages. There will be mentoring and coaching for women in their current roles and to facilitate promotion. Policies that will be family-friendly will be in place including flexible work hours and family leave. There will be support for child care initiatives of local community organizations and employee groups. Women will be engaged in ways to improve or increase employment conditions and employment opportunities.

Response 4

Professional development opportunities will include the following:

- Fortune supported attendance at relevant professional conferences;
- seminars and workshops;
- support for membership in professional organizations;
- support for participation in on-line courses, webcasts, and training and, in some cases, support for attendance at courses relevant to the work; and
- time off for writing exams and preparing for professional opportunities.

To facilitate women in non-traditional occupations, Fortune will provide the opportunity to increase the interest level, rate of participation and retention in the workforce. Women will be given the opportunity to experience the work in different areas of the site to determine interest in training for other roles. Fortune will make provision for on-line educational upgrading, where possible. While there will be professional development opportunities for all, there will be additional programs and emphasis on opportunities for women to create a more diverse workforce.

INFORMATION REQUEST – GNWT_7

Source: Government of the Northwest Territories (GNWT)

Request

Employment Mitigation - Transportation

1) Given the stated intention to transport employees from Wekweètì by air to the mine site (DAR section 16.2.4.2.3) and the recent decision to not build an airstrip on site, please describe how employees from Wekweètì will be transported to the mine site?

2) Please describe the method of transportation intended for residents of Yellowknife working at the mine-site.

3) Given their proximity and accessibility by road, will Fortune provide free scheduled round-trip work-related transportation to other NWT communities (including but not limited to: N'dilo, Dettah, Fort Providence, Hay River)?

4) Will Fortune draw from available labour pools in any other communities within the NWT? What form of transportation will be provided for potential employees in other NWT communities?

5) Will Fortune provide round-trip mileage and parking for employees wanting to access bus service to the mine site and who live in road accessible communities in the NWT (Fort Simpson, Jean Marie River, Kakisa, Enterprise, Hay River, Fort Resolution, Fort Smith and Fort Providence)?

Response

Response 1

Employees from Wekweètì will travel by air to the Whatì airport and will then travel by bus to the mine site.

Response 2

Residents of Yellowknife who will be working at the NICO Project, will travel via multi-passenger road transport.

Response 3

At this time, Yellowknife, Behchokǫ̀, Whatì, and Gamètì (when the proposed Tłı̨chǫ Road Route is in) are the only bus routes contemplated to provide free scheduled work related transportation to and from the mine site.

Response 4

Yes, Fortune Minerals Limited (Fortune) will draw on available labour pools in other communities within the Northwest Territories. They will be provided with bus transportation from the locations identified in response 3.

Response 5

There are no current plans for Fortune to provide round-trip mileage and parking for those who live in the communities identified (i.e., Hay River, Fort Smith, Kakisa, etc.); however, further consideration will be given once the workforce has been determined.

INFORMATION REQUEST – GNWT_8

Source: Government of the Northwest Territories (GNWT)

Request

Socio-Ec Impact Mitigation - Shift Rotation

1) Please provide a definition or qualification of a Tłı̨chǫ resident.

2) Please provide details on the potential shorter shift rotations including length, and an assessment of the negative and/or positive effects to the employee and company.

3) Will the potential shorter shift rotations be made available to Tłı̨chǫ residents exclusively or to all employees, non-Tłı̨chǫ residents included, within a certain distance of the mine?

Response

Response 1

A Tłı̨chǫ resident is a person recognized by the Tłı̨chǫ people as a member of their nation.

Response 2

Various shift rotations are being contemplated and subject to negotiation with all employees. Possible rotations are 14/14 (hours/days), 7/7, 4/4, and daily into site. All efforts will be made to practically satisfy the requirements of the employees and the needs of the company. Although this will present a significant scheduling challenge to Fortune Minerals Limited (Fortune), the goal is to minimize the impact on the employee's lifestyle. The distance that the employee lives from the mine will be a significant factor in determining a practical schedule for that employee.

Response 3

Fortune will discuss the various possible shorter shift rotations with all employees.

INFORMATION REQUEST – GNWT_9

Source: Government of the Northwest Territories (GNWT)

Request

Human Resources and Procurement

1) Will Fortune have a local procurement and human resources office located in the NWT to optimize local opportunities?

2) If yes, please provide the expected location of Fortune's offices. If no, please provide a rationale for the decision.

3) What steps will Fortune take to ensure that businesses from the Local Study Area and elsewhere in the NWT have an opportunity to compete for and are considered for procurement contracts before those located out of territory? (i.e. how will contracts associated with the development be awarded?)

4) Please provide a prediction of annual local, NWT and total procurement expenditures for each phase of the development.

Response

Response 1

Fortune Minerals Limited (Fortune) will locate a business office in the Northwest Territories (NWT) to support the operational activities of procurement and human resources. This will be done to maximize involvement of the local businesses and potential local employees. Fortune's goal is to optimize local opportunities by having NWT resources involved in our sourcing process at the onset of the NICO Project. Fortune has, and will continue to use the Tłı̨chǫ communities employment counsellors to help ensure the success of the NICO Project.

Response 2

Fortune will be locating a centralized office for the Nico operation at site or in Yellowknife, NWT to maximize the involvement of northern businesses and government services. Fortune will also continue to use the offices and services of the First Nations communities in the NICO Project area.

Response 3

Fortune will ensure that businesses from the NWT will have the opportunity to compete for procurement contracts by developing clear standards and operation procedures for current and potential suppliers. By doing so, suppliers will have the opportunity to prepare competitive quotes and supply relevant information enabling Fortune to fairly evaluate goods and services offered. With the support of Fortune's supplier development efforts, suppliers from the NWT will be better prepared to participate in sourcing activities. Fortune currently uses Tłı̨chǫ services, such as The Tłı̨chǫ Investment group, Tłı̨chǫ Logistics, and Tłı̨chǫ community level resources to identify NWT suppliers. Fortune will continue to expand this key relationship to identify and award Northern contracts. Fortune will always reserve the right to award contracts based on competitiveness, quality of goods or services, commercial benefit to the NICO Project, and the Northern communities.

Response 4

The development of the NICO Project has 3 phases, construction, operation/production, and reclamation. Based of the NICO Project planning and forecasts Tables 1 and 2 illustrate the areas of procurement expenditure.

Table 1: Northwest Territories Forecasted Procurement Expenditures

Operational Area	Construction Phase	Production Phase
Labor	$33,047,423	$18,712,866
Housing & Accommodations services	$7,072,650	$3,421,875
Trucking	$4,443,000	$4,884,000
Transportation (Employees)	$1,300,000	$750,000
Roads (main access road)	$2,100,000	Construction only
Fuel	$4,000,000	$7,136,863
Equipment	$2,600,000	$5,288,826
Supplies & Services	$20,323,000	$19,630,573
Totals	**$74,886,073**	**$59,825,003**

Table 2: Estimated Total Project Procurement (excluding capital equipment)

Total NICO Procurement		
Construction Phase	**Production Phase**	**Reclamation Phase**
$132,348,639	$119,827,191	$34,943,978

The above figures are based on forward looking estimates and assumptions. The figures represent potential opportunities for NWT suppliers as well as all suppliers including local (nearby) Aboriginal (First Nation and Métis) communities to provide goods, services, and labour to support the NICO project during construction and annual recurring operational expenditures during production years of the facility.

INFORMATION REQUEST – GNWT_10

Source: Government of the Northwest Territories (GNWT)

Request

Adaptive Management

1) Please describe the steps Fortune will take to adapt to issues identified during socio-economic monitoring and in its socio-economic monitoring plan.

Response

Monitoring relates to uncertainty of impact predictions and mitigation measures. As described in Section 16.2.12 of the Developer's Assessment Report (DAR), several sources of uncertainty were considered in the analyses and predictions of socio-economic effects from the NICO Project. Among these, management of socio-economic impacts as a result of the NICO Project must include effective monitoring, responsiveness, and adaptability (adaptive management).

The DAR Terms of Reference require that Fortune Minerals Limited (Fortune) describe its adaptive management systems to deal with issues identified during monitoring. As stated in Section 16.2.12, "Adaptive management systems are needed where there is rapid knowledge acquisition, and the means are put in place to provide effective information flow and suitable processes for creating shared understanding and to facilitate adaptive learning. Fortune will incorporate knowledge from multiple sources, make use of multiple systems models, and support new forms of cooperation among people interested in the NICO Project. Any opportunity for improvement will be acted upon accordingly. Fortune will liaise with relevant federal, territorial, and Tłı̨chǫ Government agencies and relevant transportation, health, social, education, and other relevant regional agencies in the planning process and during construction and operations. More specific steps for adaptive management on socio-economic monitoring issues have been detailed in various sections" (for example, see Section 16.2.13.1.8).

INFORMATION REQUEST – GNWT_11

Source: Government of the Northwest Territories (GNWT)

Request

Socio-ecomic Transitioning measures for closure and/or temp shut-down

1) When considering unforeseen closure, including temporary or early closure, please describe the method and timing of notice given to employees and GNWT program departments (in addition to requirements under the Employment Standards Act) should the need for lay-offs occur.

2) When will Fortune establish the Human Resources Closure Plan and Sustainable Development Strategy (DAR section 16.2.9) and how long will each be in effect after closure?

3) How far into operations and before closure does Fortune intend to form its mine closure committee (DAR section 16.2.9) and how long after closure will the committee still function?

4) Please describe where Fortune intends to establish its transition centre (DAR section 16.2.9) and how long before and after closure it will be open?

5) Please describe what steps Fortune will take to mitigate the negative effects of mine closure for local and regional businesses and communities.

Response

Response 1

If there is unforeseen closure, including temporary or early closure, Fortune Minerals Limited (Fortune) will advise employees as soon as possible after a decision is made, if it is unforeseen. Fortune has a value to be as transparent as possible with employees regarding the company condition and its circumstances, thereby establishing a sense of trust and loyalty. It is expected that if there is lead time, senior management will come to the site and communicate with employees in a face-to-face meeting. Otherwise, available site managers will communicate the message. Employees at home will be contacted using a number of media including telephone, e-mail, and social media to verify they have any information very quickly and prior to hearing of changes in the news media. Management representatives would go to the local communities to meet with employees and local officials to communicate such information. Written communication would follow.

If the closure is immediate, due to an extraordinary event or circumstance beyond the control of the management, any notice may be immediate, if the situation is a critical and unforeseen event. However, employees would be paid for an appropriate notice period which is difficult to determine at this time, without specific information regarding the situation. It would also be dependent on the expected time for any temporary closure. The GNWT program departments would be notified at the same time as the employees are apprised of the situation. Discussion meetings would be immediately arranged to communicate the situation, as well as seeking advice and input. The government departments would be advised by telephone and followed-up with written communications, as well. Employees would be advised using the most expedient communications methods to advise them of the situation and the impact on their jobs. An early closure would likely be seen with

adequate advance time to communicate fully with employees in a planned way and a plan for lay-offs and notice would be developed at that time.

Response 2

The framework of the Human Resources Closure Plan will be established as the operation commences. With a life of mine of approximately 18 years, it is premature to have a finalized plan. Having a framework in place will provide the ability to accelerate a Plan if there is a premature closure. It would be expected to be in effect to prepare for the cessation of operations and continue for the expected 2-year closure period as decommissioning and reclamation takes place. The Sustainable Development Strategy will be established when the NICO Project is approved so that decisions will be made with the construction of the mine. It will be implemented prior to the commencement of operations. It will be in effect for the life of mine operations, the closure, and the decommissioning and reclamation time frame. Fortune plans progressive reclamation and decommissioning over the life of the operations.

Response 3

The mine closure committee will be expected to be in place soon after operations commence as it will work to further develop the closure plan in the event of an unforeseen closure or project hiatus. It would not expect to be active in a planned capacity until approximately 24 months prior to a scheduled cessation of operations when it would begin more detailed plans for the wind-up of the operations and the scheduled lay-off of employees. A smaller committee would remain in effect until the final decommissioning and reclamation is complete and all employees have completed employment.

Response 4

The transition centre would not necessarily initially be a physical entity with a permanent location, but it would be mobile. It would consist of a team of professionals who could assist the employees with a range of options including resume writing, interview skills, and contacts with other employers to seek opportunities, and providing assistance to develop opportunities in their local communities. This mobile office would initially provide a much better service than a physical office in one community. The transition centre would be set-up and would commence at site, assuming that the closure was a scheduled event. Employees would be engaged while at the worksite on their regular shifts, determining their individual needs for such assistance as resume writing, interviewing skills, and referrals to other employers. The transition centre would include a team of professionals that would travel through the local study area communities when employees have finished work and continue to assist those who have been laid off and who might still need assistance with any employment prospects or training opportunities. The team may then set-up in a centre such as the office in Behchokǫ̀ where they would continue assisting people using electronic technology such as e-mail, telephone, and Skype to advance their employment searches or assist them in opportunities in their own communities or with further training.

Employees from outside the immediate area or outside the Northwest Territories could be assisted using electronic means after the closure for a specified period of time. It would be expected that a transition team would be in place 3 months prior to any scheduled lay-offs. As layoffs will likely be on a staggered schedule, the team would be expected to be in place until the final employees who will be laid off have finished work. At that time, it would be determined how much further assistance any individuals would require. Most of the communities have a career centre that has a staff that will be able to assist individuals on an on-going basis.

Response 5

There will be on-going dialogue with the communities and local and regional businesses well in advance of the scheduled closure. A team will be engaged in identifying the negative effects and engaged in seeking solutions to mitigate these effects. During the life of the mine, Fortune will make every effort to support businesses that are suppliers to Fortune and help them diversify their customer base in order that they are not as significantly impacted when Fortune ceases operations. Fortune will make every effort to find alternative sources of business for any local and regional businesses, where possible, and make referrals to other companies on behalf of any of the impacted businesses. Fortune will assist and support any business with business and financial advice to help further develop their businesses in any other areas. The impact on most of the smaller communities will be the loss of disposable income from wages that would have been in the community. Fortune will work with the communities to assist in leveraging any other projects that might be in development.

INFORMATION REQUEST – GNWT_12

Source: Government of the Northwest Territories (GNWT)

Request

Employee Assistance Program (EAP)

1) Please provide details regarding the services that will be covered in the EAP.

2) Please provide information regarding the immediate family members of the employee's ability to access the services entailed in the EAP.

Response

Response 1

Employee assistance programs (EAP) offer employees professional, confidential help before problems reach a crisis point; thereby, affecting health, family life, and job performance. The services that are typically covered in the EAP include the following:

- crisis counselling;
- psychological and social counselling;
- financial counselling;
- Eldercare information;
- teen/parent hotline;
- child care information; and
- legal advisory service.

Response 2

Direct access to professional counselling staff through toll-free telephone lines or web-based sites, will allow the immediate family members of the employee the services entailed in the EAP.

INFORMATION REQUEST – GNWT_13

Source: Government of the Northwest Territories (GNWT)

Request

Employee Health Care Coverage

1) Please provide information regarding whether or not medical insurance will be required to be carried by employees that are not NWT residents (and non-NWT contracted workers). For example, will Fortune Minerals ensure that their employees working in the NWT will all carry provincial or territorial health insurance from their home province (and be within their portability rules while working in the NWT) and that non-Canadian employees (and non-Canadian contracted workers) carry health insurance while working in the NWT?

Response

All non-Northwest Territories (NWT) workers and contractors will have to demonstrate physical proof of active medical coverage from a non-NWT jurisdiction. Non-Canadians will have to be enrolled by a 3rd party insurance underwriter, such as Blue Cross, before being allowed to work.

INFORMATION REQUEST – GNWT_14

Source: Government of the Northwest Territories (GNWT)

Request

Reference (Citation) Clarification

1) Please provide a reference for the following quotes from the DAR or if no reference is available, please substantiate the statements:

   a) "While not all communities have experienced the same level of educational achievement, improved health, or reduced crime rates, for example, progress has been made overall in almost all of these areas." (DAR section 2.2).

   b) "Rotational shift work and increased income have had positive impacts on some traditional activities." (DAR section 2.3.1).

Response

Response 1a

In the sentence prior to this quote in the question, references were provided in Section 16.2.10; namely, the Communities and Diamonds reports (e.g., Government of the Northwest Territories 2008a; 2009a). Section 2 of the Developer's Assessment Report (DAR) is intended to provide development alternatives. Section 16.2.2.of the DAR provides other reports and statistics backing this statement. The majority of socio-economic indicators for small communities in the Northwest Territories (NWT) generally have been improving since the first diamond mines began (e.g., higher incomes, more employment, less crowding in houses). For example, in Section 16.2.4 or the DAR "These and other challenges aside, the feeling among businesses that were interviewed during the baseline study was that substantial progress has been made within the communities." Some exceptions were reported on, for example, the percentage of households in core need in Tłįchǫ communities increased by 13% (see Annex K, Section 4.5.6 of the DAR).

Response 1b

Fortune Minerals Limited acknowledges that change has been occurring related to rotational work for some employees and contractors on their time-off, and that this change has both negatives and positives. With increasing numbers of community members on rotation, especially young adults, the possibility exists that participation in traditional activities will decline further than it already has in the past 2 decades. If skilled harvesters are on a different rotation from each other, traditional skills may not be passed on as easily as before.

However, some evidence has shown that the converse is also true for many cases. In the DAR Section 16.2.11 "Surveys of mine employees in the NWT indicate that they have adjusted to the rotation and that participation in the wage economy has allowed them to pursue activities on the land such as hunting and fishing, which they might not have been able to do without wage employment". The surveys referred to are those produced by the Government of the Northwest Territories, which are used for the annual Communities and Diamonds reports. Likewise, as explained in the DAR Section 16.2.10, for some workers, the extra income and time off during the 2-week rest periods may allow some workers from the communities to engage more in traditional activities,

including hunting, fishing, and trapping. Participation in the wage economy may not interfere with the pursuit of traditional activities and may actually provide the needed inputs (i.e., money for gas and equipment) to continue with hunting and fishing. Workers with more disposable cash have the ability to purchase more amenities, such as vehicles and recreational vehicles for pursuing traditional cultural activities (i.e., trapping and hunting). Some other evidence can be cited. For example, “the rotation schedule of 2 weeks on and 2 weeks off protects against this [vulnerability], providing the harvester/miner with a long period of time off for harvesting” (Gibson 2008). Also, long distance rotational commuting has been implemented to enable Aboriginal employees to return home, hunt for food, and otherwise participate in family and community life before returning to work (Pierce and Hornal 1994).

References

Gibson, V.V. 2008. Negotiated spaces: work, home and relationships in the Dene diamond economy. PhD Thesis, Faculty of Graduate Studies (Mining Engineering), University Of British Columbia, Vancouver, BC. p. 32.

GNWT (Government of the Northwest Territories). 2008a. Communities and diamonds 2007: socio-economic impacts in the communities of Behchokǫ̀, Gamètì, Whatì, Wekweètì, Detah, N'Dilo, Lutsel K'e and Yellowknife. Prepared by the Departments of Health and Social Services; Education, Culture and Employment; Finance; Industry, Tourism and Investment; and Justice; the NWT Bureau of Statistics; and the NWT Housing Corporation. 2007 Annual Report of the Government of the Northwest Territories under the BHP Billiton, Diavik, and De Beers Socio-economic Agreements. Yellowknife, NWT.

GNWT. 2009a. Communities and diamonds 2008: socio-economic impacts in the communities of Behchokǫ̀, Gamètì, Whatì, Wekweètì, Detah, N'Dilo, Lutsel K'e, and Yellowknife. Prepared by the Departments of Health and Social Services; Education, Culture and Employment; Finance; Industry, Tourism and Investment; and Justice; the NWT Bureau of Statistics; and the NWT Housing Corporation. 2008 Annual Report of the Government of the Northwest Territories under the BHP Billiton, Diavik, and De Beers Socio-economic Agreements. May 2009. Yellowknife, NWT.

Pierce, J., and R. Hornal. 1994. Aboriginal people and mining in Nunavut, Nunavik, and Northern Labrador. Report for Royal Commission on Aboriginal Peoples, Ottawa

INFORMATION REQUESTS

TRANSPORTATION CANADA

INFORMATION REQUEST – TC_1

Source: Transport Canada (TC)

Request

NICO Project Access Road

In order for Transport Canada to determine if the waterway considered navigable and therefore may have an indirect effect to navigation, please provide the following:

i) A map identifying the culvert locations with the latitude/longitude coordinates.

ii) Depth and width of the watercourse and number of culverts associated with those crossings.

iii) Also please provide the erosion control measures that may be placed at these locations.

Response

Response i

Appendix A of the attached report entitled “Fish and Fish Habitat Assessment of Watercourses Along the Proposed Nico All-Weather Road” has the coordinates for the stream culvert locations along the NICO Project Access Road (NPAR). Figure 1 of this same report shows the locations of the stream crossings. Please note that this study was completed when Fortune Minerals Limited was still considering construction of a 51 kilometre (km) access road from the proposed mine to the turn-off of the existing road 10 km east of Whatì. As such, only the crossings labelled C6-C9 are applicable for the NPAR.

Response ii

Habitat assessments including depth and width were completed for all crossings and can be found in the report cited above.

Response iii

Section 4.0 of the above cited report details the proposed construction schedule (winter) and any proposed erosion control measures.

ATTACHMENT A

Fish and Fish Habitat Assessment of Watercourses Along the Proposed Nico All-Weather Road

(please refer to supporting documents)

INFORMATION REQUEST – TC_2

Source: Transport Canada (TC)

Request

Marian River Bridge

In order for Transport Canada to determine if any part of the bridge structure will be in the water which may have an impact to navigation, please provide the following:

i) Additional details to clarify what type of bridge will be installed and the associated structures that will be within the water.

ii) If applicable, please provide any erosion control that may be placed around those structures.

Response

Response i

Details on bridge construction and potential environmental impacts during construction, operation, and decommissioning are detailed in the attached report entitled “Supporting Environmental Report for the Marian River Bridge Crossing at the NICO Mine Site.” In summary, the bridge will be a clear span design that will not affect fish habitat or navigation.

Response ii

Not applicable.

ATTACHMENT A

Supporting Environmental Report for the Marian River Bridge Crossing at the NICO Mine Site

(please refer to supporting documents)

INFORMATION REQUEST – TC_3

Source: Transport Canada (TC)

Request

Temporary Works in Water

Please provide the following details for the temporary cofferdams that are to be installed

i) The type of cofferdam to be installed

ii) The dimensions and installation methods

iii) Drawing with the exact location

iv) Construction timing for when the temporary cofferdams will be required.

Response

Response i

Fortune Minerals Limited (Fortune) has not yet contacted a contractor to obtain the specifications on which type of cofferdam would be most suitable for installation of the water intake and diffuser. Once the proposed designs have been approved by Fisheries and Oceans Canada and the NICO Project as a whole is allowed to proceed, Fortune will hire a contractor experienced in these installations. Materials and methods for construction will be communicated to Transport Canada prior to construction. Fortune commits to using appropriate sediment control measures (i.e., cofferdams) in Lou and Peanut lakes during installation of the water intake and diffuser (see information request DFO_3).

Response ii

See above response i.

Response iii

The exact location of the cofferdams cannot be provided at this time. Fortune will provide Transport Canada with the exact location of the cofferdams once construction details have been confirmed with the contractor.

Response iv

Timing of construction will depend on when permits are received for construction. Construction methods will be modified according to season. Transport Canada will be notified as to the timing of construction prior to initiation.