Tłı̨chǫ Government

Technical Report

on the proposed Gahcho Kué diamond mine

Submitted to the Review Panel for EIR 0607-001 (2006]

October 22, 2012

Tłı̨chǫ Government

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Summary

The Tłı̨chǫ Government provides this Technical Report to the Gahcho Kué Environmental Impact Review Panel for their consideration in developing a Report of Environmental Assessment for the Gahcho Kué mine proposal (EIR0607-001). In this Technical Report, the Tłı̨chǫ Government reviews key areas of concern, including:

- Water management
- Fish habitat compensation
- Traditional knowledge engagement strategies
- Independent oversight body
- Socio-economic and wellness initiatives
- Caribou

The report is based in the review of data that has emerged in the course of the Environmental Impact Review. The summary of recommendations is listed at the end of the report.

Documents Reviewed

- DeBeers Canada Gahcho Kué Project. DFO-De Beers Records of meetings (August 29, 2012)
- DeBeers Canada Gahcho Kué Project. EIR Response to GNWT IR 2 (September 13, 2012)
- DeBeers Canada Gahcho Kué Project. EIR Responses to EC IR 2 (September 13, 2012)
- DeBeers Canada Gahcho Kué Project. EIR Response to LKDFN 1 (September 13, 2012)
- DeBeers Canada Gahcho Kué Project. EIR Response to AANDC IR 2 (September 13, 2012)
- DeBeers Canada Gahcho Kué Project. EIR GNWT response to TG IR 3 (September 13, 2012)
- EIR AANDC Response to TG 4/5 (September 13, 2012)
- DeBeers Canada Gahcho Kué Project. EIR De Beers Response to TG (September 13, 2012)
- Golder Associates, Water Quality Objectives and Sediment Quality objectives for the Proposed GK Project—Recommendations, June 27, 2012.
- DeBeers Canada Gahcho Kué Project. Response to AANDC IR's, First Round, (April 6, 2012)
- Undertaking #5 from the Technical Sessions by De Beers (June 8, 2012)

- Gahcho Kué Project Human Resources Strategy, 2012 (2012)

- DeBeers Canada Gahcho Kué Project. 2010. Environmental Impact Statement – Section 7 Key Line of Inquiry: Caribou. December 2010. 320 pp.

- DeBeers Canada Gahcho Kué Project. 2012. Letter to MVEIRB Gahcho Kué Panel – Information Request Responses Gahcho Kué Project Environmental Impact Review. 4 April 2012. 71 pp.

- DeBeers Canada Gahcho Kué Project. 2012. Letter to MVEIRB – Yellowknives Dene First Nation – Information Request Responses - Gahcho Kué Project Environmental Impact Review. 5 April 2012. 246 pp.

- DeBeers Canada Gahcho Kué Project. 2012. Letter to MVEIRB – Tłı̨chǫ Government Information Request Responses Gahcho Kué Project Environmental Impact Review. 6 April 2012. 304 pp.

- DeBeers Canada Gahcho Kué Project. 2012. Letter to MVEIRB – Environmental Monitoring and Management Framework: Adaptive Management Advisory Committee Draft Terms of Reference. 29 June 2012. 6 pp.

- DeBeers Canada Gahcho Kué Project. 2012. Conceptual Caribou Monitoring Plan. July 2012. Document #11-1365-0012. 94 pp.

- DeBeers Canada Gahcho Kué Project. 2012. Conceptual Caribou Monitoring Plan v2. August 2012. Appendix C. 227 pp.

- DeBeers Canada Gahcho Kué Project. 2012. Letter to MVEIRB regarding Government of the Northwest Territories – Round 2 Information Request Responses – Gahcho Kué Project Environmental Impact Review. 7 September 2012. 7 pp.

- DeBeers Canada Gahcho Kué Project. 2012. Letter to MVEIRB regarding Tłı̨chǫ Government – Round 2 Information Request Responses – Gahcho Kué Project Environmental Impact Review. 13 September 2012. 11 pp.

- DeBeers Canada Gahcho Kué Project. 2012. Letter to MVEIRB regarding Yellowknives Dene First Nation – Round 2 Information Request Responses – Gahcho Kué Project Environmental Impact Review. 13 September 2012. 59 pp.

- DeBeers Canada Gacho Kué Project. 2012. Wildlife Monitoring Plan. October 2012. Document #11-1365-0012. 93 pp.

- DeBeers Canada Gahcho Kué Project. 2012. Environmental Impact Statement – Wildlife Ecological Risk Assessment. October 2012. 366 pp.

Water Management

The Tłı̨chǫ Government notes that there may be "a change in trophic status within Kennady Lake, temporary or long term increases in metal and ion parameters in Kennady Lake and the downstream receiving environment, changes in species distributions within Kennady Lake and the downstream receiving environment. (De Beers Response to AANDC IR2-1-1)

The Tłı̨chǫ Government further notes that, "Monitoring will adopt a systematic adaptive management plan, which will include effects levels based on monitoring results that approach thresholds, which may trigger timely management response actions if monitoring results are unexpected." (De Beers Response to AANDC IR2-1-1)

The conclusions of the assessment remain unchanged from the 2011 EIS update with copper being now the only substance of potential concern in Kennady Lake being above chronic effects benchmark (Golder Associates, May 4, p. 56).

The Tłı̨chǫ Government notes also the De Beers June 27 memo on water quality objectives. These are the key areas that we have focused on for this analysis.

Developing SSWQOs based on traditional use and knowledge

The Tłı̨chǫ Government considers the setting of the SSWQOs in a rigorous and thorough manner to be critical to protect the water in Kennady Lake and the region. The Tłı̨chǫ Government must be confident that the monitoring program will be sufficiently robust to detect any exceedances of the SSWQOs in a timely manner.

The Tłı̨chǫ Government notes that the Traditional Knowledge studies have yet to be released from the closest First Nations, and therefore feels it is early to determine the uses and knowledge of water in the area. Once these studies are released, the values and uses of all Aboriginal people in the region should be reviewed in the formation of guidance (or of value statements) for water licensing. The statements made to date for water quality are that Kennady Lake in post-closure, and in downstream waters, including Lake N11, through the life of mine and post-closure are:

- suitable water quality to support viable aquatic ecosystems;
- abundance of desired populations of Lake Trout, Northern Pike, and Arctic Grayling; and,
- continued opportunity for traditional and non-traditional use. (De Beers Response to AANDC IRs AANDC_2-2-4, p. 10)

Once traditional uses are identified, it is appropriate to perhaps refine the narrative statements for the AEMP with these in mind. There is certainly use of the area, as discussed by Elder George Marlowe in the Technical Sessions:

> *But I said again, you got to respect Lutsel K'e people because that's just like our – our .. just like our yard right there. And we still -- people -- those young people, they still go. Like Samuel there, he still*

goes there. But I'm old, but I still go out -- out to me too. I'm old. Like I said, I'm only 73 right now. Right, Bruce? Thank you. I just wanted to share that with you a little bit.

The Tłı̨chǫ Government Traditional Knowledge report showed historic use. Lutsel K'e is the closest neighbour, and the Tłı̨chǫ Government considers the protection of water for their use to be vital. Future use, which may even be more extensive than present use, should also be protected (as is suggested by George Marlowe).

The Tłı̨chǫ Government notes that at least one metal may be at levels above guidelines, post closure (copper).

We also note that water management has been an ongoing struggle for De Beers in the context of the operating Snap Lake mine.

These challenges—the lack of TK studies on the record, the possible exceedances for copper (and possibly for cadmium pending the guideline being revised), the ongoing challenges for water management at the Snap Lake mine—lead the Tłı̨chǫ Government to ask for a thorough approach to the setting of SSWQOs in this phase of the EIR.

The basis, suggested in the Golder 2012 memo on the topic, for deriving the values is:

1. Apply generic national CCME WQGs and sediment quality guidelines or equivalent benchmarks;
2. Compare guidelines to natural, baseline/reference concentrations;
3. If baseline concentrations are above those guidelines, replace those benchmarks with those concentrations;
4. Consider the effect of ETMFs on the bioavailability and toxicity of potential WQOs and SQOs.
5. Based on the above and if necessary, additional site-specific studies, propose WQOs and SQOs that could be used for screening purposes. (Golder Associates, June 27, 2012)

This approach relies heavily on the CCME guidelines, which is appropriate. The proponent also references the natural background concentrations, but does not refer to other sources, such as the Health Canada drinking water guidelines.

Recommendations

TG RECOMMENDATION 1: The proponent will consider, in setting the SSWQOs, the traditional use of the Aboriginal people of the region and the levels will be set suitably to protect these traditional uses.

TG RECOMMENDATION 2: The proponent will consider, in deriving the SSWQOs:

- Expected receiving environment water quality based on the effluent quality;
- Existing background concentrations;

- Canadian Council of Ministers of the Environment guidelines for the protection of freshwater aquatic life;
- Health Canada drinking water quality guidelines; and
- Review of available toxicity literature and/or developing new toxicological information, conducting of ecological risk assessments, and other investigations

Fish habitat compensation plan

The Tłı̨chǫ Government notes that the fish habitat compensation plan (June 29, 2012) suggested that lakes in the vicinity of the operation would be flooded as compensation. There seems to have been some change in this approach. The Tłı̨chǫ Government concurs with other Aboriginal authorities that the flooding of adjacent lakes is not an acceptable compensation strategy.

The Tłı̨chǫ Government notes a summary of a meeting (of DFO and De Beers): DFO indicated that they are not keen on the compensation lake option because it is the only large scale compensation option proposed and will not be constructed till after closure. There are potential impacts associated with this option including construction of dyke, changes in flow, water quality considerations as well as uncertainties in fish species usage. DFO suggested looking for additional options, including off-site, as part of the compensation plan. However, they are comfortable with De Beers continuing to present this options, along with other options, as is in the draft compensation plan for the EA process (as it can still be "conceptual") and indicating that other potential or contingency options may be considered (Aug. 29, 2012, DFO and De Beers).

Recommendation

TG RECOMMENDATION 3: The proponent should consider options other than flooding of adjacent lakes, and should consider options such as off-site compensation.

Approach to Traditional Knowledge engagement

In IR TG-1-2, the proponent replies to a request for information about how TK will be integrated into monitoring in the following way, suggesting that the *Adaptive Management Advisory Committee* will include the following:

- responding to community and TK related concerns as carried out in the assessment;
- sharing information on how community and TK related concerns can be addressed through proposed monitoring studies;

- providing opportunities for TK holders to provide input into proposed plans and programs;
- implementing the monitoring programs with opportunities for aboriginal community involvement;
- reporting on and communicating the results in an appropriate and timely manner that is in a format that is community-friendly or meaningful;
- coordinating community site visits and encouraging participation in those visits by Elders, hunters and trappers to share information on site operations and to provide opportunities for direct feedback;
- providing opportunity for TK holders to propose TK studies;
- supporting TK studies and preservation projects;
- ensuring that community leaders are consulted in the development of ongoing engagement plans to facilitate meaningful engagement; and
- implementing adaptive management and mitigation measures as required based on monitoring results

The Tłı̨chǫ Government notes that De Beers is attempting to be proactive with respect to engaging traditional knowledge holders. However, the approach to TK has been selective and driven by an agenda defined by the company. The proponent has held sessions since the Technical Sessions in May that people bring together harvester, elders, and youth with no training, experience or background. The individuals are then provided with highly technical and scientific concepts (e.g., AEMP, WEMP). It is the Tłı̨chǫ Government's believe that these people are then captured in scientific sessions, and asked to respond to power point presentations about highly technical concepts. There simply must be more effective ways to work together on bringing traditional knowledge into the fore for planning.

The Tłı̨chǫ Government notes that many elements have been changed based on traditional knowledge (See Undertaking 5 from De Beers, June 8, 2012). This undertaking shows diligence in listening to traditional knowledge holders.

Recommendation

TG RECOMMENDATION 4: The proponent should work more closely with Aboriginal authorities in planning of sessions that will engage with traditional knowledge holders, particularly when there are going to be discussions for inform WEMP and/or AEMP plans.

Independent oversight

Proponent's approach: The proponent believes regulatory instruments and processes, pans and programs tabled by De Beers, and the commitments made by De Beers on the public record, fulfill the needs of environmental monitoring (TG 2-4).

This conclusion was echoed by other parties, but has not found purchase with the Aboriginal authorities.

The needs of communities can be best met through an independent oversight model, which is a fundamental requirement if this project is to proceed without causing ongoing significant concern and environmental impact.

The Tłı̨chǫ Government is attending a two day session on this topic and anticipates a joint submission on this topic before the public hearings.

Recommendation

TG RECOMMENDATION 5: The proponent and respective Parties should collaboratively develop an agreement that creates an independent oversight body. The oversight body will review environmental monitoring and management proposals as well as activities and reports from the proponent and the regulators, and develop appropriate recommendations or submissions for follow-up action.

Socio-economic and wellness initiatives

Aboriginal hiring

The Tłı̨chǫ Government is aware of the many mines that are currently operating, and is concerned there may be so many operating mines that there will be a high dependence on southern labour to construct and operate the proposed NICO mine. If this is the case, the question of net gains to the Tłı̨chǫ people comes to the forefront. Without further evidence of beneficial returns to offset adverse impacts, natural questions emerge about the desirability of a project that is subject to diminishing returns to Tłı̨chǫ citizens.

> *The Gahcho Kué mine will provide between 360-380 jobs during operations and up to 690 jobs during construction.* (De Beers Human Resources Strategy 2012, p. 6)

The economic benefits from this mine would be much greater if the project began construction phase in 2018 or later. Both Ekati and Diavik are approached their final stages of operation and this site could provide an important employment opportunity for Tłı̨chǫ people whose

employment would come to an end in 2022. At present, the projected northern employment for Gahcho Kué is very low. As noted by De Beers,

> *We have made employing Aboriginal and NWT residents a priority here in the NWT, and we have had considerable success, despite a number of challenges we have faced. When hiring workers from the NWT has not been possible, we have encouraged southern workers to relocate to the NWT and we have trained NWT residents to fill important roles.* (De Beers Human Resources Strategy 2012, p. 2)

The company predicts very low hiring rates for northern and aboriginal people. This is primarily because most of the eligible workforce is already employed at one of the existing operations. The Tłı̨chǫ Government notes that relocation of southern workers constitutes an impact on the north, causing higher property prices, increased demand for social, health and educational services, among other impacts.

The logic of having this mine be brought into operations concurrent to the other operations provides little employment opportunity for Tłı̨chǫ people. If Tłı̨chǫ people were able to move from one of the existing sites to a new Gahcho Kué mine, this would meet the test of maximizing employment opportunities.

On another topic, Tłı̨chǫ rates of unemployment are documented:

> *Community unemployment rates are still high in the NWT. For example, in 2009 the Tłı̨chǫ Region, had an unemployment rate of 23.3% compared to 5.6% in Yellowknife. (2012 GNWT Bureau of Statistics: Community Indicators.) While this number represents a negative social indicator it is also an indication of an untapped potential labour force. While many of the individuals represented by this statistic have significant barriers to employment, there are opportunities to assist some individuals within this group to become job-ready. Aboriginal employment in the three NWT diamond mines was 850 employees in 2008, 25% of the total employment in these mines.* (De Beers Human Resources Strategy 2012, p. 2)

However, the barriers are not clearly demonstrated, and an in-depth labour force survey with these unemployed populations has not been done (despite requests in all of the existing EA and EIR processes). Thus, the barriers to employment are not clearly understood. This, combined with the barrier of non-engagement of the GNWT (illustrated below) with the Tłı̨chǫ Government, means that there can be no strategic approach from De Beers to bring the aboriginal population into the workforce in a meaningful way.

Training

With a workforce of 360 people, the Tłı̨chǫ Government anticipates similar barriers to the Gahcho Kué mine that have been faced at Snap Lake There is generally a lack of accommodations at the minesite, which has prevented the Tłı̨chǫ businesses from enacting their own apprenticeship program.

This also applies to summer students, in that when space is not available the contractors are unable to train students. This space issue has proven a significant barrier to the northern contractors.

The Tłı̨chǫ Government notes the "tactics" (See Tactic 2 below) that the proponent has outlined in the Human Resource Strategy, and suggests that fine tuning of these strategies could be achieved in dialogue with the Tłı̨chǫ Investment Corporation (a major service provider in the north) and with the Tłı̨chǫ Government.

> *Tactic # 2 – Remain an NWT Employer of Choice in a highly competitive Canadian labour market while Maximizing Hiring Priorities*

Socio-economic commitments at the mine

The proponent and the GNWT met to consider the current capacity to provide social services in the potentially affected communities (p. 17) (GNWT ENR Oct 19 meeting of GNWT and De Beers). The Tłı̨chǫ Government acknowledges the work done by the GNWT and the proponent, and sees many important components in it for delivering benefits to the Tłı̨chǫ people and protecting from impacts.

The Tłı̨chǫ Government notes that there is very little engagement and dialogue with the GNWT on precisely these components, even though these services will be managed and delivered through the Tłı̨chǫ Government in the future.

The Tłı̨chǫ Government operates a daycare as well as providing social/wellness programs in the communities. The Tłı̨chǫ Community Services Agency provides health, education and social services. It will be vital to ensure strong services and infrastructures are available to families. No real analysis of programing, infrastructure or services was made during the course of this EIR.

The Tłı̨chǫ Government notes that the proponent commits to use of EFAP, but we have not seen any evaluation of the proposed EFAP program (or indeed of any of this type of program in the north), but does know from experience that the programs offered by and for Tłı̨chǫ people are the type of programs that work well. For example, the land can be an excellent counsellor, as are elders.

The Tłı̨chǫ Government notes that there is a commitment to ensure that foods provided at the Project site promote healthy living, and, are particularly appropriate for those who have or are at risk for developing diabetes (Meeting record of GNWT and De Beers, 2012, p. 4). The Tłı̨chǫ Government notes that country foods are served at the other diamond mines, and are an essential element of well-being for Dene workers.

Recommendations

TG RECOMMENDATION 6: The Tłı̨chǫ Government asks the Panel to require the commissioning of an independent economic analysis and labour force study that evaluates a series of likely scenarios to determine what options would provide maximum benefits for the residents of the Mackenzie Valley and to identify the labour force and barriers to this Aboriginal labour force in particular.

TG RECOMMENDATION 7: The proponent will work with the Tłı̨chǫ Government to provide adaptive support to social wellness programming, in partnership with the Tłı̨chǫ Community Services Agency regarding health, education and social services.

TG RECOMMENDATION 8: The proponent will ensure there is sufficient space on site for contractors to pursue and maintain training programs.

TG RECOMMENDATION 9: The proponent will fund and support on-the-land counselling programs, and prioritize them over dependence upon standard EFAP programs delivered through services in Yellowknife or through telephone-based counselling, and provide country foods at the mine.

Closure

The lack of component based closure objectives and criteria make it difficult to review the emerging plan for the Gahcho Kué mine.

The Tłı̨chǫ Government notes that it will be conducting its own closure research this year on mine components (and this year will specifically be on waste rock piles), and hopes to provide guidance on closure to the diamond mines, based on the research.

TG RECOMMENDATION 10: The proponent will work together with aboriginal authorities to develop a closure plan based on each component with guidance from the Tłı̨chǫ Government.

Caribou

DeBeers conducted an EIS for the Gahcho Kué Project and concluded that:

> *The weight of evidence from the analysis of the primary pathways predicts that the incremental and cumulative impacts from the Project and other developments should not have a significant negative influence on the resilience and persistence of caribou populations. Most of the incremental and cumulative impacts were predicted to be negligible to low in magnitude and reversible. The persistence of caribou herds during large fluctuations in population size indicates that the species has the capability to adapt to different disturbances and environmental selection pressures. Migration routes, and survival and reproduction rates appear to have the flexibility to respond to changes through time and across the landscape. This resilience in caribou populations suggests that the impacts from the Project and other developments should be reversible and not significantly affect the future persistence of caribou populations. Subsequently, cumulative impacts from development also are not predicted to have a significant adverse affect on continued opportunities for use of caribou by people that value the animals as part of their culture and livelihood*" (Gahcho Kué EIS, p. 7-20).

DeBeers acknowledged that "there is a moderate degree of uncertainty associated with these predictions, which is primarily related to the duration of impacts and the variability inherent to long-term predictions in ecological systems." With respect to expected duration of potential effects from the proposed Gahcho Kué Project, DeBeers stated the following:

- The duration of incremental and cumulative impacts from the Project on caribou populations and distribution, and traditional and non-traditional use of caribou for the majority of pathways is anticipated to be reversible over the long term (27 to 32 years [approximately two caribou life spans]).
- The duration of impacts associated with the Winter Access Road is expected to be reversible within the medium term (five years after initial closure).
- Direct disturbance to habitats within the development footprint are expected to be irreversible within the temporal boundary of the assessment. (Gahcho Kué EIS, p. 7-20)

Based on the temporal boundaries for the development phases of the project that include construction (2 years), operations (11 years), and closure (8 years), the predicted duration of effects from the Project can be expected to occur for a 20 to 25 year time frame (ibid, p. 7-20).

Tłı̨chǫ Government Perspective

Barren-ground caribou are a cultural keystone species; they are essential to Tłı̨chǫ language, culture and way of life and their continued existence and availability for harvesting is of critical importance to the Tłı̨chǫ Government and the Tłı̨chǫ people.

The uncertainty and predicted duration of effects of the Gahcho Kué mine is a key concern to the Tłı̨chǫ Government, because the project proposal comes at a time when abundance of Bathurst caribou herd is at an historic low. The Bathurst caribou herd declined from over 450,000 in 1986 to approximately 126,000 in 2006. A further precipitous decline to approximately 32,000 in 2009, resulted in a harvest closure to residents and non-residents, and a voluntary harvest restriction agreed to by the Tłı̨chǫ Government and the Yellowknives Dene First Nation (YKDFN). The harvest restrictions to 150 Bathurst caribou for the Tłı̨chǫ and 150 for the YKDFN have led to challenges and sacrifices for those aboriginal communities. Thus, the Gahcho Kué Project proposal is occurring at a time in which there is a heightened concern over the rapid decline and current small population size of the Bathurst herd, and a serious focus of governments and aboriginal communities on conservation and recovery of the herd. With a predicted duration of effects of 20+ years for this one proposed mine, any incremental and cumulative impact to Bathurst caribou may be socially unacceptable to Tłı̨chǫ people. What this means is that concern about the Bathurst herd may already be at a threshold of social and cultural significance even without the added uncertainty of how the Gahcho Kué Project may impact caribou.

In developing a perspective and co-management strategy for addressing the decline of the Bathurst caribou herd with Tłı̨chǫ communities, the Government of the Northwest Territories (GNWT), the Wekweezi Renewable Resources Board (WRRB), and other aboriginal authorities, the Tłı̨chǫ Government has adopted a precautionary approach, which has placed high priority on long-term sustainable use and conservation of caribou. This has meant making difficult decisions on behalf of Tłı̨chǫ communities and adopting conservative and precautionary caribou harvest restrictions. Having made these difficult and costly decisions in favour of precaution in the management of Bathurst caribou, the Tłı̨chǫ Government considers large-scale industrial development proposals that may have significant negative impacts on recovery of the caribou herd as unacceptable. The Tłı̨chǫ Government urges the Review Panel to also adopt a precautionary approach to the identification, characterization, and management of potential impacts on this most vital of resources.

Although DeBeers has provided an extensive evaluation of the potential incremental and cumulative impacts of the Gahcho Kué Project on the environment and wildlife – and specifically caribou – the Tłı̨chǫ Government views the environmental review and application

process as an initial, albeit important preliminary exercise. The Tłı̨chǫ Government perspective is that the real work and the important work of mitigation, monitoring and managing impacts to environment and wildlife starts after a development proposal is approved and then occurs throughout and beyond the operational life of the project. Based on the depth and quality of the formal EIS compared to the current version of the Wildlife Monitoring Plan, the Tłı̨chǫ Government is generally concerned that DeBeers may not have a similar perspective. The Tłı̨chǫ Government is also concerned that DeBeers' proposal to establish an Adaptive Management Advisory Committee will have limited ability to provide independent oversight.

Consequently, if the Project is approved, the Tłı̨chǫ Government wishes, in the context of the public hearings, to discuss two key measures to ensure that the important work of mitigation, monitoring and managing impacts is done in a responsible, transparent and publically accountable manner throughout the life of the Project1.

TG RECOMMENDATION 5 (REPEATED): The proponent and respective Parties should collaboratively develop an agreement that creates an independent oversight body. The oversight body will review environmental monitoring and management proposals as well as activities and reports from the proponent and the regulators, and develop appropriate recommendations or submissions for follow-up action.

TG RECOMMENDATION 11: The proponent should develop an enforceable Wildlife Monitoring Plan to be undertaken principally by De Beers, and under purview of the independent oversight body. This WMP must be collaboratively designed by the proponent and respective Parties, with a reporting requirement similar to that of the Wek'èezhíi Aquatic Effects Monitoring Program, and an agreed upon review and approval system.

Summary of key findings of DeBeers Canada Gahcho Kué Project EIR

The following summary of key findings and impacts to caribou is paraphrased from DeBeers' public presentation at an MVEIRB technical session on 30 Nov 2011.

Direct Changes to Habitat Type

- At the seasonal-range scale, cumulative direct disturbances of terrestrial habitat will be low (<2%) relative to a reference condition
- Cumulative direct disturbance on area of each habitat type will be <1% per seasonal home range (Ahiak and Bathurst)

[1] The Tłı̨chǫ Government is open to working with the Panel, the Proponent and other Parties to assist with the development and implementation of the recommended measures outlined below.

Changes to Habitat Quality

- The combined changes from dust deposition, noise and other sensory disturbances is predicted to be within 15 km from the Project footprint (i.e., the ZOI)
- The magnitude of cumulative declines in preferred habitat (from direct and indirect effects) across seasonal ranges is predicted to be low (ranging from 3-7% for Bathurst)
- Largest decrease in preferred habitat in autumn/rut range
    - Incremental decrease from "2010 Baseline to Application" was 1.4%
    - Cumulative decrease from "Reference to Future" was 7.2%.
    - Most losses occurred prior to 2006.

Energy Modelling

- The magnitude of the cumulative decrease in fecundity (calf production) from the Project and other developments is predicted to be low (<3.1%)

Population Viability Analysis (PVA) Tests and Summary

- Incremental changes from the Project did not statistically influence the persistence of the Bathurst herd
- Cumulative changes from the Project and other developments were statistically significant (moderate in magnitude)
- Population persistence most sensitive to changes in adult cow survival and harvest rate
- EIS models overestimated effects of human development (results were biased but biased in the 'right' direction)
- Sensitivity tests using natural range of inputs showed that assessment conclusions do not change (influence of potentially inaccurate inputs, e.g., carrying capacity, & calf survival, on the predictability of the assessment is minor)
- Precision of the assessment was maintained, in part, by executing 1000 simulations over a 30-year period per model
- The approach provides confident and ecologically relevant impact predictions

Effects of Winter Access Road

- Impact of winter road on wildlife was considered minor for the following reasons:
    - Access from winter roads is limited to 8-12 weeks per year
    - Harvest for residents and non-residents is regulated
    - De Beers staff will be prohibited from hunting while on site
    - Limited hunting beyond kilometre 100 on T-C road (D. Panayi, pers. comm.), and junction with Winter Access Road for Project occurs further north at kilometre 271

- No evidence of harvest along Snap Lake Winter Access Road and Winter Access Road for Gahcho Kué Project (kilometre 271) is 43 km further than winter road to Snap Lake
- For caribou, winter access road extends outside core winter range
- The existing core winter range 2006 to 2010 is west/northwest of the Project
- The existing core winter range 2006 to 2010 is smaller than the previous range 1996 to 2005

KLOI Caribou – Summary

- Landscape will remain 'intact' and well below 40% habitat loss threshold where fragmentation effects occur for wildlife (Reviewed in Swift and Hannon 2010)
- The impacts from the Project should be reversible (except for the residual footprint, for example, the mine rock piles).
- The Project and other developments should not have a significant adverse effect on the persistence of caribou populations.
- Confidence based on consistently low effect sizes from analyses, and the 'conservatisms' that were considered in models.

The commitments made on caribou are drawn together and summarized in Appendix A.

Gaps in methods or approach

The EIS and subsequent technical work on developing a caribou and wildlife monitoring program by DeBeers for the Gahcho Kué Project suggests that regulatory compliance is the primary concern in its approach to seek approval for the project, and appears less concerned with seeking and maintaining public confidence and support from Aboriginal governments and communities. There is significant public concern about the caribou populations that the Tłı̨chǫ Government is constantly managing. Any new pressures will trigger an increase of this concern.

For example in the current version of the Wildlife Monitoring Plant, DeBeers states that the "overall reason why we should monitor wildlife is to follow-up on the concerns that communities, government and other regulators (i.e., MVLWB) have with respect to how the Project will influence the ecosystem (Wildlife Monitoring Plant – Oct 2012, p. 1-6)." DeBeers further emphasizes that its monitoring goals are to i) test effects predictions (and/or associated assumptions), ii) test effectiveness of environmental design features and mitigation, and iii) meet and fulfill regulatory requirements.

Gaps in proposed mitigation measures and/or monitoring

The Tłı̨chǫ Government identifies three broad gaps in this section, including the monitoring of roads, monitoring the distribution of caribou and estimating a zone of influence, and treatment of cumulative effects.

Monitoring roads – effects on hunting access and caribou

In its EIS, DeBeers concluded that the potential impact to caribou of the Gahcho Kué winter access road would be minor because the road is further from Yellowknife than hunters have gone in the past and also that the area of the winter access road is not within core winter range of the Bathurst caribou herd (based on satellite telemetry of caribou cows from 2006-2010). DeBeers' conclusion is based on an underlying assumption that previous patterns of hunting access by people and winter range use by caribou will be similar in the future.

In a response to an information request from Tłı̨chǫ Government (TG_45; 6 Apr 2012), DeBeers acknowledged the potential effect of winter roads on caribou and suggested that data from GPS collars would provide an effective way of studying the effect and that 'existing collar data should be examined to estimate the number of collared animals and frequency of collar locations for producing sufficient data for analyzing the response of caribou to winter roads.' Although satellite and/or GPS collars can provide a useful approach to study the effect at a regional scale, it is also important to address the issue through site-specific monitoring.

In a recent response (GNWT 2-1; 7 Sep 2012) to a GNWT-ENR information request and the Conceptual Caribou Monitoring Program v2 (p. 21), De Beers described the following options for monitoring public use of the Winter Access Road as a means of addressing the potential for increased harvesting:

> Regular and frequent inspections of the road undertaken by De Beers Protective Services personnel. Inspections would be completed by driving the length of the winter access road between the Project site and MacKay Lake (i.e., km 271 of the Tibbitt-to-Contwoyto Winter Road). All observations of non-Project vehicles or evidence of wildlife harvest would be recorded and provided in annual reports. This information will be provided immediately to ENR if a concern is identified. A standardized reporting form would be developed in consultation with ENR.
>
> Station an ENR or community monitor at a rest stop along the road. Check in by non-Project road users would be voluntary. Observations of non-Project vehicles would be recorded and provided in annual reports, and immediately to ENR in the event a concern is noted. A standardized reporting form would be developed in consultation with ENR.

ENR may choose to establish an access monitoring station through the Tibbitt-to-Contwoyto Winter Road Joint Venture.

Implementing one of more of those options should provide a means of monitoring public use and winter hunting access, but none of the proposed options will address the question of whether vehicular traffic (including industrial vehicles) on the winter road and properties of the road itself may affect behavior and/or impede movement by caribou. Table 1 in the Conceptual Caribou Monitoring Program (v2, p. 15) indicates that the Wildlife Monitoring Program will be used to determine the amount and type of public use of the Winter Access Road to address the issue of increased hunting access. However, the current version of the WMP does not address the potential barrier effects of the Winter Access Road and associated vehicular traffic on caribou movements.

In addition to the physical properties of the Winter Access Road (i.e., snow banks and berms), timing, volume and noise of vehicular traffic are key variables in understanding the potential barrier effects of roads to caribou. Although DeBeers has noted that the winter range of the Bathurst herd since 2006 has generally been further north and northwest of the Winter Access Road and encounter rates of satellite collared cows has been variable (GKP 4; 4 Apr 2012), a specific monitoring plan should be developed for the winter haul season that would detect caribou in the vicinity of the Winter Access Road. If sufficient numbers of caribou are detected, a predesigned monitoring program should be implemented to systematically observe and define the response of caribou to the road and associated vehicle traffic. Thus, vehicular traffic on the Winter Access Road (especially industrial vehicles transporting materials and equipment to and from the Gahcho Kué Mine), should be a key baseline variable that is monitored during the winter road season for the duration of the project life (note Figure TG 42-1 in DeBeers response to TG IRs 6 Apr 2012 illustrates projected truck volume). The monitoring design and methodology for caribou behavior and vehicle traffic should be piloted and applied on the Tibbett to Contwoyto winter road corridor and would provide a useful baseline for comparison.

Monitoring distribution of caribou and estimating a zone of influence (ZOI)

A zone of influence (ZOI) is defined as an area of reduced caribou occupancy, relative to an industrial feature, i.e., footprint. 'The combination of direct (physical footprint) and indirect (noise, dust, and other sensory disturbances) effects can create a zone of influence around a mine site' that can change i) the occurrence and spatial distribution of caribou relative to an industrial footprint, as well as ii) behaviour and activity patterns of caribou due to disturbance and heightened awareness when they spend time within the ZOI. Monitoring studies at the Ekati and Diavik diamond mines showed that caribou were more likely to occur further from the mine than closer to it. As noted by DeBeers (Gahcho Kué EIS, p. 7-18), "the ZOI varies in size among mines and between years, but appears to range from about 10 km to 30 km from a mine

site. The ZOI appears to be larger for mines with a large footprint and higher levels of activity, and smaller for smaller mines.

DeBeers used an average distance of 15 km to predict the ZOI for caribou to the proposed Gahcho Kué Project. The size of the ZOI was an important assumption used in the EIS to estimate the maximum spatial extent of an indirect effect of the Project on habitat quality and availability; it was also used to estimate the likelihood and energetic consequences for adult female caribou occurring within a ZOI, which was based on encounter rates estimated from satellite telemetry data and expressed as a change in fall pregnancy rates. Thus the ZOI was a key assumption used by DeBeers to estimate incremental and cumulative effects of the Project to Bathurst caribou.

The current version of the WMP (October 2012) outlines a layout of aerial survey transects centered on the Project, which will be used to improve accuracy and precision of ZOI estimates. However, it is unclear how the design will specifically increase accuracy and precision, and why the Proponent selected a distance of 19 km as the maximum distance from a centrally located transect that intersects the

Project footprint, when it was noted in the EIS that the range of a ZOI may vary from about 10 – 30 km. Also, given recent analyses by Boulanger et al. 2012[2], the monitoring design should also include measurement of applicable co-variables to better address the question of possible mechanisms.

Monitoring behavior and activity of caribou within a ZOI

In conjunction with an assessment of the extent of the ZOI, the relative change in behavior and activity budgets of caribou within the ZOI was a key assumption in the energetics model used in DeBeer's EIS; it was assumed that caribou activity within the ZOI would be influenced by disturbance and those animals would therefore have reduced opportunities to feed which would translate in to lower body weights in fall and reduced pregnancy rates. However, it was also recognized that natural variability in environmental conditions, such as level of insect harassment in summer could also have a large effect on feeding behavior, body condition and consequently fall pregnancy rates (Gahcho Kué EIS, Figure 7.5-4, p. 7-116).

In the draft WMP (October 2012), DeBeers outlines its rationale for developing a monitoring protocol to measure changes in caribou behavior that occur within the ZOI. With respect to caribou behavior, the WMP states that 'the objective is largely related to testing the assumption of the energetic model used in the EIS. For example, it could be tested that 55% of

[2] Boulanger, J. K.G. Poole, A. Gunn and J. Wierzchowski. 2012. Estimating the zone of influence of industrial developments on wildlife: a migratory caribou Rangifer tarandus groenlandicus and diamond mine case study. Wildlife Biology. 18: 164-179.

caribou groups show a behavioural response to sensory disturbances and that when disturbed, groups run away from the source for 15 minutes' (Gahcho Kué WMP, Oct 2012, p. 5-12).

Unfortunately, the draft WMP does not describe a specific approach or methodology, but rather highlights the challenges of collecting sufficient observational data in the field.

> *Due to the variability introduced by natural factors, a large amount of data is required before conclusions can be made. In a number of years, there have been too few caribou in the study area (or for too short a duration) for sufficient data to be collected* (Gahcho Kué WMP, Oct 2012, p. 5-12).

The draft WMP suggests further that previous monitoring of caribou behavior at mines indicates that the mine-related effects may be small relative to other factors.

> *However, based on the results of monitoring at existing mines, behaviour changes are minor, making them difficult to detect and attribute to energetic effects, vary from year to year, and appear to be largely driven by factors other than the mine (Marshall 2009)* (Gahcho Kué WMP, Oct 2012, p. 5-12).

Consequently, the WMP is ambiguous and lacks detail with respect to how caribou behavior will be monitored, and what specific sampling designs have or have not worked. Although the proponent acknowledges the importance of the question and associated assumptions used in the EIS, there is much more work to be done to refine specific questions and develop robust hierarchical sampling/monitoring designs for caribou that enter the ZOI, which will provide reliable behavioral information. It is also important to note that paired monitoring of appropriate environmental co-variables, such as weather conditions and a site-specific insect harassment index, will be a key component to a caribou behavior monitoring program. Paired and/or nested monitoring designs will be important to answer specific questions and explain relative effects attributable to mine activity and disturbance, versus variability in natural environmental factors. As outlined in DeBeers Round 2 Information Request (YKDFN 2.1) discussion and collaboration are required to confirm a suitable monitoring approach.

Cumulative effects

In its EIS, DeBeers concluded that "the weight of evidence from the analysis of the primary pathways predicts that the incremental impacts from the Project and cumulative impacts from the Project and other developments will not have a significant negative influence on the resilience and persistence of caribou populations (Section 7.8). Most of the incremental and cumulative impacts were predicted to be negligible to low in magnitude and reversible" (Gahcho Kué EIS, p. 13-17). DeBeers also concluded that "... cumulative impacts from development also are not predicted to have a significant adverse affect on continued

opportunities for use of caribou by people that value the animals as part of their culture and livelihood" (Gahcho Kué EIS, p. 13-18).

It is important to recognize that the value of a CEA is not to predict the future, but rather to explore implications of plausible scenarios based on explicit statements of assumptions. The implications are viewed through the lens of social acceptability and technical soundness based on internal consistency of logic to inform decision-making. As outlined in the overview, the Tłı̨chǫ Government is seriously concerned about the current state of the Bathurst caribou herd, which suggests a precautionary approach when considering current management goals for herd recovery and restrictions to aboriginal hunting of caribou, versus additional impacts imposed by the cumulative effects of industrial development. From this perspective, the Tłı̨chǫ Government does not agree with DeBeers' conclusion that cumulative effects from development will not have a significant adverse effect on aboriginal people and their continued opportunities to hunt caribou, because the current reality and experience is that opportunities to hunt Bathurst caribou are restricted.

However, TG also recognizes the value of the proponent's cumulative effects assessment because it has provided a means for a broader review of land use activity across the range of the Bathurst herd (see information requests TG 44 and YKDFN 3.37 – 3.39) and has generally improved approaches and methods for CEA. If the Project is approved, the Tłı̨chǫ Government suggests that review and oversight of the Gahcho Kué project can provide a meaningful way to further advance CEA approaches and monitoring and recommends to the Panel that it capitalize on the opportunity.

Thus, in addition to a mandatory schedule for annual review and reporting, a comprehensive analysis and discussion of all data from the Gahcho Kué monitoring program should be conducted every five years (as outlined by the proponent in the Caribou Conceptual Monitoring Plan v2 - Aug 2012; p. 25). The 5-year evaluation should include a comprehensive site-specific assessment of effects mitigation and monitoring, as well as an updated cumulative assessment of all industrial activities and developments on the range of the Bathurst herd.[3]

The cumulative effects update and summary should be done collaboratively to advance the 'state-of-the-art' in assessment methodologies, test and update critical assumptions, contribute to a regional cumulative effects monitoring approach, and incorporate a review of range-wide industrial development activities relative to recovery and health of the Bathurst herd. This 5-year review and assessment should be conducted so that it specifically contributes to and is consistent with the ongoing caribou management efforts including (but not limited to) the

[3] As cumulative effects monitoring and management are primarily the responsibility of Aboriginal Affairs and Northern Development Canada (AANDC) and the GNWT, the Panel should develop a suitable measure, which could meaningfully advance CEA and monitoring through the Gahcho Kué Project.

GNWT-ENR barren-ground caribou management strategy, AANDCs Cumulative Impact Monitoring Program (CIMP) and the initiative to develop a comprehensive management proposal for the Bathurst caribou herd as outlined in section 12.11 of the Tłı̨chǫ Agreement.

Recommendations

TG RECOMMENDATION 12: DeBeers should develop and implement a monitoring program to address the issue of whether the Winter Access Road and associated vehicular traffic affects behavior and/or impedes movement by caribou. Some key considerations are: i) develop a method for detecting a predefined threshold density for caribou in the vicinity of the Winter Access Road, which would trigger a sampling methodology; ii) design the caribou sampling methodology to systematically record behavior of individuals and groups of caribou and their reactions to winter roads and vehicles; iii) pilot the monitoring and sampling program along the Tibbett to Contwoyto winter road corridor to identify and address potential problems in methodology, and establish a comparative baseline; and iv) implement an automated vehicle monitoring system to document volume, timing and characteristics of winter road traffic.

TG RECOMMENDATION 13: The ZOI represented a critical assumption in the proponent's EIS; the proponent should develop and conduct specific monitoring studies to define and estimate the ZOI for the Gahcho Kué mine through its development phases from construction to closure.

TG RECOMMENDATION 14: The effect of mine activities on caribou behavior and activity within the ZOI was a key assumption in the proponent's EIS and conclusion on the predicted impacts and energetic consequences to caribou. The proponent should design and implement robust monitoring designs to estimate impacts to behavior and activity of caribou that enter the ZOI. Paired monitoring of appropriate environmental co-variables, such as a site-specific insect harassment index are important design component, which will allow overall effects on caribou behavior to be attributed to mine activity and disturbance, versus variability in natural environmental factors.

TG RECOMMENDATION 15: A comprehensive analysis and discussion of all data from the monitoring program should be conducted every five years. The 5-year evaluation should include a comprehensive site-specific assessment of effects mitigation and monitoring, as well as an updated cumulative assessment of all industrial activities and developments on the range of the Bathurst herd. The cumulative effects update and summary should be done collaboratively to advance the 'state-of-the-art' in assessment methodologies, test and update critical assumptions, contribute to a regional cumulative effects monitoring approach, and incorporate a review of range-wide industrial development activities relative to recovery and health of the Bathurst herd. This regular review and assessment should be conducted so that it specifically contributes to and is consistent with the ongoing caribou management efforts including (but

not limited to) the GNWT-ENR barren-ground caribou management strategy, Aboriginal Affairs and Northern Development Canada's (AANDC) NWT Cumulative Impact Monitoring Program (CIMP) and the initiative to develop a comprehensive management proposal for the Bathurst caribou herd as outlined in section 12.11 of the Tłı̨chǫ Agreement.

Summary of recommendations

TG RECOMMENDATION 1: The proponent will consider, in setting the SSWQOs, the traditional use of the Aboriginal people of the region and the levels will be set suitably to protect these traditional uses.

TG RECOMMENDATION 2: The proponent will consider, in deriving the SSWQOs:

- Expected receiving environment water quality based on the effluent quality;
- Existing background concentrations;
- Canadian Council of Ministers of the Environment guidelines for the protection of freshwater aquatic life;
- Health Canada drinking water quality guidelines; and
- Review of available toxicity literature and/or developing new toxicological information, conducting of ecological risk assessments, and other investigations

TG RECOMMENDATION 3: The proponent should consider options other than flooding of adjacent lakes, and should consider options such as off-site compensation.

TG RECOMMENDATION 4: The proponent should work more closely with Aboriginal authorities in planning of sessions that will engage with traditional knowledge holders.

TG RECOMMENDATION 5: The proponent and respective Parties should collaboratively develop an agreement that creates an independent oversight body. The oversight body will review environmental monitoring and management proposals as well as activities and reports from the proponent and the regulators, and develop appropriate recommendations or submissions for follow-up action.

TG RECOMMENDATION 6: The Tłı̨chǫ Government asks the Panel to require the commissioning of an independent economic analysis that evaluates a series of likely scenarios to determine what options would provide maximum benefits for the residents of the Mackenzie Valley. If this analysis is in agreement with De Beers perspective, then permitting could begin, however if it is in conflict, then additional mitigations must be considered.

TG RECOMMENDATION 7: The proponent will work with the Tłı̨chǫ Government to provide adaptive support to social wellness programming, in partnership with the Tłı̨chǫ Community Services Agency regarding health, education and social services.

TG RECOMMENDATION 8: The proponent will ensure there is sufficient space on site for contractors to pursue and maintain training programs.

TG RECOMMENDATION 9: The proponent will fund and support on-the-land counselling programs, and prioritize them over dependence upon standard EFAP programs delivered through services in Yellowknife or through telephone-based counselling, and provide country foods at the mine.

TG RECOMMENDATION 10: The proponent will work together with the aboriginal authorities to develop a closure plan based on each component with guidance from the Tłı̨chǫ Government.

TG RECOMMENDATION 11: The proponent should develop an enforceable Wildlife Monitoring Plan to be undertaken principally by De Beers, and under purview of the independent oversight body. This WMP must be collaboratively designed by the proponent and respective Parties, with a reporting requirement similar to that of the Wek'èezhií Aquatic Effects Monitoring Program, and an agreed upon review and approval system.

TG RECOMMENDATION 12: DeBeers should develop and implement a monitoring program to address the issue of whether the Winter Access Road and associated vehicular traffic affects behavior and/or impedes movement by caribou. Some key considerations are: i) develop a method for detecting a predefined threshold density for caribou in the vicinity of the Winter Access Road, which would trigger a sampling methodology; ii) design the caribou sampling methodology to systematically record behavior of individuals and groups of caribou and their reactions to winter roads and vehicles; iii) pilot the monitoring and sampling program along the Tibbett to Contwoyto winter road corridor to identify and address potential problems in methodology, and establish a comparative baseline; and iv) implement an automated vehicle monitoring system to document volume, timing and characteristics of winter road traffic.

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TG RECOMMENDATION 15: A comprehensive analysis and discussion of all data from the monitoring program should be conducted every five years. The 5-year evaluation should include

a comprehensive site-specific assessment of effects mitigation and monitoring, as well as an updated cumulative assessment of all industrial activities and developments on the range of the Bathurst herd. The cumulative effects update and summary should be done collaboratively to advance the 'state-of-the-art' in assessment methodologies, test and update critical assumptions, contribute to a regional cumulative effects monitoring approach, and incorporate a review of range-wide industrial development activities relative to recovery and health of the Bathurst herd. This regular review and assessment should be conducted so that it specifically contributes to and is consistent with the ongoing caribou management efforts including (but not limited to) the GNWT-ENR barren-ground caribou management strategy, Aboriginal Affairs and Northern Development Canada's (AANDC) NWT Cumulative Impact Monitoring Program (CIMP) and the initiative to develop a comprehensive management proposal for the Bathurst caribou herd as outlined in section 12.11 of the Tłı̨chǫ Agreement.

TG RECOMMENDATION 16: The Tłı̨chǫ Government requests a table that includes a summary of the commitments made by De Beers Canada in the proposed Gahcho Kué project.

Appendix A: Caribou commitments made by De Beers Canada Gahcho Kué Project

> *"Mitigation refers to policies and procedures implemented to control, reduce, eliminate or avoid adverse environmental impacts (WLWB 2010). ... In the context of wildlife monitoring, the goals of mitigation include keeping people safe, keeping wildlife safe, and limiting Project-related effects to wildlife and the environment." (DeBeers Canada Gahcho Kué Project. 2012. Wildlife Monitoring Plan, Oct 2012).*

The following policies, practices, and procedures are specifically related to caribou protection.

- All incidents involving interactions, deterrents or injury of caribou will be documented and evaluated.
- All sightings of caribou will be reported to environmental staff on-site.
- Drivers will be notified when caribou are present at site.
- If caribou are crossing Project roads, traffic will stop and wait for them to cross (i.e., caribou have the right-of-way).
- Road closures will occur during periods of high caribou presence.
- Caribou will only be herded away from roads or the airstrip and other potential hazards in specific circumstances, such as when there are incoming flights, safety concerns or emergencies.
- Blasting will be temporarily suspended if caribou are within the danger zone, i.e., the exclusion area for workers around the blast site.
- Dewatering pipelines will have areas designed for caribou crossing as recommended by TK.
- Use of deflections to guide caribou away from the airstrip towards the north end of Area 8 of Kennady Lake as recommended by TK.
- Low profile roads will be used so that they do not act as a barrier to movement for wildlife and facilitate movements of caribou

The following environmental design features and mitigation are expected to limit the risk from vehicle and aircraft collisions with caribou.

- Personnel arriving at or leaving the site will be transported by bus, which will reduce the amount of traffic between the airstrip and the accommodation complex.
- Levels of private traffic using the Winter Access Road will be monitored.
- All wildlife have the "right-of-way".
- The site will be designed to limit blind spots where possible to reduce the risk of accidental wildlife-human encounters.
- Speed limits will be established and enforced.

- Drivers will be warned when wildlife are moving through an area using signage and radio.
- Safe, effective methods will be used to remove caribou from the airstrip before aircraft land or takeoff.
- Drivers will be warned when wildlife are moving through an area using signage and radio.
- Safe, effective methods will be used to remove caribou from the airstrip before aircraft land or takeoff.
- Ramps to facilitate the access and egress of caribou from the mine rock piles will be constructed during closure.
- Ploughing snowbanks on winter roads to allow for wildlife crossing . Winter road snow berms will be removed so that they do not act as a barrier to movement for wildlife.
- Use of electric fencing, flagging or inukshuks around airstrips or other hazardous mine structures to prevent injuries or mortality to wildlife.

Mitigation proposed to reduce direct habitat loss includes the following.

- Keep mine footprint as compact as possible.
- Promote natural re-vegetation and practice progressive reclamation of disturbed areas where practical as the mine develops.
- Remediate and close the site when mining operations are complete.
- Backfilling the mined-out pits with processed kimberlite and mine rock will decrease the on-land Project footprint.
- At closure, the entire site area will be stabilized and contoured to blend with the surrounding landscape.
- Maintain downstream flows within baseline levels.

The following mitigation is proposed to reduce indirect habitat effects to wildlife populations.

- Regular application of water (or alternative dust suppression products) to roads, airstrip, and laydown areas to limit fugitive dust emissions.
- Enforcing speed limits should assist in reducing production of dust.
- Enclose processes that create dust (such as rock crushing), where feasible.
- Maintain a minimum flying altitude of 300 metres (m) above ground level (except during takeoff and landing) for cargo and passenger aircraft outside of the Project site.
- Helicopters will fly above 300 m whenever possible.
- The amount of noise from the mine site will be limited with the use of appropriate exhaust mufflers (i.e., fit diesel generator units with high-performance engine exhaust silencers).

- Limit as many equipment noise sources as possible by locating them inside buildings.
- Establish site rules for recreational walking on and off-site.
- Recreational use of all vehicles will be prohibited.
- Manage all water seepage and effluent from the site to control release of nutrients and contaminants to the environment.
- Environmental sensitivity training for personnel.

Specific mitigation proposed to reduce direct Project-related wildlife mortality includes the following:

- Report all relevant observations of wildlife (particularly caribou, fox, wolverine, and bear) to environmental technicians on-site.
- Communicate presence and location of wildlife on-site through radio.
- Complete land clearing for all facilities outside of the breeding season for migratory birds (15 May to 15 September).
- Prevent upland breeding birds and raptors from nesting on mine infrastructure and man-made structures. If nest is found and eggs are present, then the nest will be monitored and efforts will be made to avoid the area.
- Skirt all buildings to limit opportunities for animals to find suitable shelter.
- Isolate or remove any physical or chemical hazards to wildlife.
- Report to the Department of Environment and Natural Resources (ENR) any raptor nesting activity observed on Project infrastructure or within 1.5 kilometres (km) of the Project.
- Prohibit firearms of any type, bows, and crossbows at the Project
- Prohibit hunting, trapping, harvesting, and fishing by employees and contractors and enforce this prohibition
- Blasting will be temporarily suspended if caribou are within the danger zone.
- Many site buildings will be connected by corridors, reducing the need for staff to go outdoors.
- All wildlife will have the right-of-way on roads.
- Speed limits will be established and enforced.
- Drivers will be warned with signage and radio when caribou are moving through an area.
- At closure, the entire site area will be re-contoured to reduce hazards to wildlife.
- Problem wildlife will only be destroyed as a last resort, and with the approval of ENR.
- Contact ENR to receive additional direction regarding new issues that arise.
- Isolate or remove any physical or chemical hazards to wildlife.

The following are mitigation policies and procedures to decrease the risks to wildlife from ingestion of toxic substances or encounters with toxic spills during all phases of activity on the Project site.

- Adhere to and regularly update the Emergency Response and Contingency Plan.
- Follow the procedures outlined in the Hazardous Material Management Plan.
- Designate and train a spill response team consisting of on-site personnel.
- Provide spill containment supplies at fuel transfer and storage areas.
- Immediately isolate, clean and report any spills.
- Keep spill response equipment readily available and maintained.
- Maintain vehicles and equipment.
- Store fuel in double-walled containers or single-walled containers in lined containment areas.

The following policies and practices are included in the Waste Management Plan to reduce the numbers of scavenging wildlife (such as carnivores and birds) attracted to the Project, and limit human-wildlife interactions.

- Education and enforcement of proper waste management practices to all workers and visitors to the site.
- Waste management awareness and incentive programs will be implemented.
- Waste will be monitored and the sources of misdirected waste will be identified and managed.
- Training will be provided to on-site personnel about wildlife awareness and safety including the dangers of improper food waste disposal and feeding wildlife.
- Providing designated indoor areas for lunch and coffee breaks for staff working outdoors.
- Separation of food waste and non-food waste through the use of designated garbage cans.
- Food waste and other attractants will be incinerated frequently and regularly to reduce holding time and odours.
- Waste facilities and incinerators will be fenced or enclosed.
- Food waste and non-toxic combustible waste will be burned in oil-fired incinerators, according to the Waste Incineration Guidelines (Environment Canada 2010, internet site).
- Hazardous material will be shipped out for recycling or disposal at an appropriate facility.
- The landfill will be inspected and covered frequently.

- Waste products that cannot be incinerated or landfilled will be collected, sorted, and placed in designated areas within the Waste Management Area until they can be shipped off-site.
- Ongoing monitoring and review of the efficiency of the waste management program and improvement through adaptive management.