



Report of Environmental Impact Review and Reasons for Decision

EIR 0607-001

Gahcho Kué Diamond Mine Project

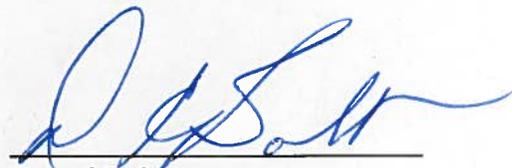
July 19, 2013

Panel decision

To make its decision in this environmental impact review, the Gahcho Kué Panel (Panel) has relied upon all the evidence and information on the public record. After considering the evidence, the Panel has made its decision according to subsection 134 (2) of the *Mackenzie Valley Resource Management Act*.

The Panel has found that the Gahcho Kué Diamond Project proposed by De Beers Canada Inc. is likely to cause significant adverse impacts to the environment, in particular to barren ground caribou. The Panel has set out measures in this Report which in the Panel's opinion will, if adopted, ensure that these impacts are no longer significant. The Panel has also recommended follow-up programs to ensure the adaptive management of this Project.

The Panel therefore recommends, under subsection 134 (2), that the Project be approved subject to implementation of the mitigation measures, follow-up programs and commitments described in this Report.



Darryl Bohnet

July 19, 2013

Chairperson, Gahcho Kué Panel

Mackenzie Valley Environmental Impact Review Board

Executive summary

The Gahcho Kué Panel (Panel) conducted an environmental impact review (EIR) of the Gahcho Kué Diamond Mine Project (Project), a proposed open pit diamond mine at Kennady Lake, located approximately 280 km northeast of Yellowknife. The developer of the proposed Project is De Beers Canada Inc. (De Beers). This report describes the process, evidence, conclusions and decisions of the environmental impact review.

Proposed development

De Beers proposes to construct, operate and close an open pit diamond mine to recover diamonds from three ore bodies known as 5034, Tuzo and Hearne, which are located beneath Kennady Lake. The 5034 and Tuzo ore bodies will be mined to approximately 300 m and the Hearne ore body to 205 m.

During construction, Kennady Lake will be isolated from surrounding water bodies by building a series of dykes and berms. In order to access the ore bodies, portions of Kennady Lake will be dewatered by discharging water through the natural outlet of Kennady Lake and to a pipeline to a nearby lake. During mine operations, part of Kennady Lake will be used as a water management pond to manage the groundwater that is pumped from the open pits, recycled water from the processing plant and site runoff. Water from the water management pond that meets discharge criteria will be discharged to a nearby lake.

The three open pits will be mined sequentially, beginning with 5034, then Hearne and finally Tuzo. Initially, waste mine rock and process kimberlite that remains after the diamonds are removed will be placed in constructed waste management facilities located adjacent to Kennady Lake. Fine processed kimberlite that remains after the diamonds are removed will be deposited in a containment facility located in a portion of the drained lake. When mining of 5034 is complete, at about year 4, waste rock and the fine processed kimberlite from Hearne and Tuzo will be used to completely backfill the 5034 pit. The Hearne pit will be partially backfilled with waste from the Tuzo pit. The Tuzo pit will not be backfilled.

At the end of mine life, water from the water management pond that does not meet discharge criteria will be deposited in the mined out Tuzo pit. At closure, Kennady Lake will be refilled with water. When the water quality in the refilled lake is acceptable, the lake will be reconnected to the surrounding watersheds, and most of the natural drainage to Kennady Lake and the downstream flow from Kennady Lake will be restored.

The Gahcho Kué mine site will be accessed during the winter by a 120 km winter access road that will be constructed annually between km 271 of the existing Tibbitt to Contwoyto

Winter Road and Kennady Lake. The site will also be accessed by air for mine staff, re-supply and emergency transport.

Major facilities to be constructed at the Project site will include a processing plant, accommodation complex, maintenance workshop, warehouse, administration office, storage area for oil, fuel and glycol, explosives storage and production facility, sewage treatment, site roads and an airstrip.

Construction of the Project will take two years and the mine will operate for 11 years. After mining is finished, refilling Kennady Lake with water will take between eight and 16 years. It is expected to take 60-75 years after the lake is refilled for a self-sustaining ecosystem with a fish population similar to pre-mining conditions to be re-established in Kennady Lake.

De Beers predicts that the total contribution to gross domestic product during construction and operations of the Project will be \$3.9 billion of which more than 80% will flow to the Northwest Territories.

Environmental Impact Review Process

The Panel considered all the information on the public record. The Panel's review of the Project included written information requests from the parties with responses from the developer, technical sessions with face to face discussion of key issues and the submission of technical reports. The Panel held public hearings in Dettah, Lutsel K'e and Yellowknife. The Panel heard from aboriginal organizations, community members, elders, government organizations and members of the public. This environmental impact review includes consideration of the capacity of renewable resources that are likely to be significantly affected by the development to meet existing and future needs and an assessment of the need for follow-up programs.

Water quality

Impacts to water quality will occur during mine construction, operation and closure. These impacts will be managed, primarily by using the water management pond during operations, and at closure by disposing of poor quality water into the mined out Tuzo pit. It is predicted that the water with poor quality in the mined-out pits will not mix with the good quality water above it because the water with poor quality is heavier.

When Kennady Lake is refilled, the release of phosphorus from the processed ore and waste rock disposal facilities could change nutrient levels in the lake, which could result in changes to the amounts and types of aquatic life and fish. During the EIR, De Beers modified project design in order to dispose of more waste ore in the mined out pits. This will reduce the amount of waste ore disposed of above ground and the amount of

phosphorus that is released into Kennady Lake. This design modification also reduces the Project's terrestrial footprint.

De Beers has committed to preventing changes to water quality in nearby lakes or downstream that could adversely affect its use as drinking water, by fish or the suitability of the fish from these waterbodies for consumption during operations, closure and post-closure. This commitment includes Kennady Lake for the post-closure period. Monitoring in the refilled Kennady Lake is required to ensure water quality is good enough for this lake to be connected with the surrounding watershed. The Panel is of the view that all of the design features and mitigations described by the developer are necessary to prevent significant adverse effects. The Panel does not anticipate significant impacts to water quality provided the Project is constructed, operated and closed in the manner described by De Beers and that the commitments it has made are followed.

Fish and aquatic life

Fish and fish habitat will be lost in the majority of Kennady Lake during mine construction and operations. However, aquatic life in downstream lakes with similar fish assemblages will not be disturbed. After mine closure, Kennady Lake will be refilled and it is predicted that aquatic life, including fish, will repopulate the lake during a recovery period. De Beers has committed to fish out Kennady Lake before dewatering, mitigate downstream impacts to fish, proposed a fish habitat compensation plan in consultation with communities and made commitments to monitor fish and fish habitat in the refilled Kennady Lake post-closure.

The Panel does not anticipate significant impacts to fish and aquatic life provided the Project is constructed, operated and closed in the manner described by De Beers and that the commitments De Beers has made are followed. The Panel proposes that a follow-up program is required to ensure that fish populations similar to those found in the affected lakes prior to mining operations are re-established in Kennady Lake.

Caribou

The Panel heard from many parties that the current low numbers of the Bathurst caribou herd and the resulting harvest restrictions are a serious concern to Aboriginal organizations, communities and individuals because the ability to hunt caribou is important to the economic, cultural, and social well-being of Aboriginal and other people of the Mackenzie Valley. The primary concerns of the parties are the potential cumulative effects from development and natural factors affecting caribou and caribou habitat. Further, the parties are concerned that there is no effective management of cumulative effects throughout the herd's entire range, with the exception of harvest restrictions.

Impacts of the Project on caribou and caribou habitat include: decreases in habitat quantity and quality, habitat fragmentation, and sensory effects (such as noise, lights, dust

deposition) at the mine site and along the access roads that can result in changes to caribou population size and distribution. The Panel concluded that the impacts to caribou and caribou habitat are likely to be significant because any negative adverse impact that contributes to on-going harvest restrictions is significant.

The Panel recommends measures to reduce the impacts of the mine site and the winter access road on caribou and caribou habitat. These measures will also minimize the Project's contribution to cumulative effects. The Panel also recommends a measure for governments to establish and implement a cumulative effects monitoring and management framework so that cumulative effects on caribou can be managed effectively and mitigated. In addition, the Panel proposes a follow-up program to ensure that the monitoring and mitigation plans proposed as part of the Project are effective and to test the effectiveness of the measures in this Report.

Other wildlife and species at risk

The developer has prepared a conceptual wildlife and wildlife habitat protection plan and a wildlife effects monitoring program. These programs and plans will include monitoring, mitigation and adaptive management commitments made by the developer to reduce impacts to wildlife including species at risk such as grizzly bears and wolverine. The Government of the Northwest Territories (GNWT) and De Beers will be signing a memorandum of understanding which will guide the completion and implementation of these plans and programs and De Beers has committed to on-going consultation with Aboriginal groups in the development of both.

The Panel does not anticipate significant impacts to species at risk or wildlife other than caribou, provided the Project is constructed, operated and closed in the manner described by De Beers and that the commitments De Beers has made are followed. The Panel proposes that a follow-up program is necessary for other wildlife to address both project specific and cumulative impacts of the Project on wildlife. The wildlife and wildlife habitat protection plan and wildlife effects monitoring program can be designed to meet the requirements of a follow-up program.

Biophysical components

De Beers commits to the preparation and implementation of an air quality effects monitoring and mitigation plan and an incineration management plan which contain ways to mitigate impacts from the Project on air quality. The developer has made commitments to address uncertainties in how construction of dykes and waste management facilities may change permafrost conditions which could influence the stability of these structures.

A conceptual closure and reclamation plan has been prepared by De Beers. A more detailed plan will be completed during the licensing phase of the Project. The goal of the developer's closure and reclamation plan is to return Kennady Lake to a self-sustaining

ecosystem as quickly as possible and to minimize lasting environmental impacts. The Panel does not anticipate significant adverse impacts to the environment after mine closure provided the Project is closed in the manner described by De Beers and that the commitments De Beers has made are followed.

Cultural environment and incorporation of traditional knowledge

De Beers commits to supporting community cultural programming and the use of aboriginal language in order to mitigate impacts to cultural values. Commitments were made by the developer to incorporate traditional knowledge into all phases of the Project including permitting and mine construction, operations and closure. During the EIR, the developer funded Aboriginal organizations to conduct traditional knowledge studies.

Social and economic

De Beers made considerable efforts to engage communities and aboriginal organizations during the course of this EIR by visiting communities and conducting workshops. De Beers commits to continue engaging communities throughout the Project timeline.

There will be positive impacts to the NWT economy from the Project because it will extend mining activity at a time when other area diamond mines move towards closure. The developer has made commitments related to promoting education, training, employment and business development. Mitigations to minimize adverse social impacts are also identified. The GNWT and De Beers propose to implement a socio-economic agreement as a follow-up program that monitors and tests socio-economic predictions, evaluates successes, identifies gaps and uses adaptive management to maximize benefits for all residents of the NWT. The Panel anticipates minimal adverse impacts and real benefits to the residents of the NWT from the Project, provided the developer implements its commitments.

Monitoring, adaptive management and follow-up

De Beers presented various draft monitoring and management plans during the course of this Environmental Impact Review. De Beers states that these plans will verify impact predictions, and determine the effectiveness of environmental design features and mitigations. De Beers also states that monitoring will be used to identify unanticipated effects and implement adaptive management.

In the Panel's view, these monitoring plans must contain sufficient detail to demonstrate that adaptive management will be effective if impacts are worse than predicted, environmental design features or mitigations do not work as anticipated, or if there are unanticipated adverse impacts.

The Panel acknowledges that once the monitoring and management plans proposed are fully developed, some of these can act as follow-up programs. In particular, the Panel identified that follow-up programs are required for impacts to water, fish, caribou, other wildlife and species at risk, and socio-economic ecosystem components. This Report outlines the requirements for those follow-up programs.

Ni Hadi Yati

Ni Hadi Yati is a joint proposal from several Aboriginal organizations and De Beers that was presented at the Public hearing during the final stages of this EIR. Ni Hadi Yati proposes to provide a forum for Aboriginal groups to increase their technical capacity to assist in the development and implementation of environmental monitoring and management plans for the Project. Participating Aboriginal organizations and De Beers have agreed to negotiate a contract to initiate Ni Hadi Yati.

The Panel supports Ni Hadi Yati because it was developed in the spirit of collaboration and could facilitate the incorporation of Traditional Knowledge into the monitoring and management and facilitate transparency and accountability throughout the life of the Project.

Panel's conclusions and recommendations

The Panel finds that while the Project has the potential to cause significant adverse impacts to the environment that the measures and follow-up programs the Panel has recommended will ensure that no significant adverse impacts will result from the Project. The Panel requires measures and a follow-up program to reduce potential adverse impacts to barren ground caribou so that the impacts are no longer significant. Although significant adverse impacts were not identified for water, fish, species at risk and wildlife other than caribou, aquatic life and socio-economic impact, follow-up programs are also required for these valued components because of uncertainty in the predicted impacts.

The Panel concludes that the Project should proceed to the regulatory phase for permits and licenses, subject to the measures and follow-up programs set out in this Report and that the developer implements commitments made during this environmental impact review.

List of Abbreviations

AANDC	Aboriginal Affairs and Northern Development Canada
AEMP	Aquatic Effects Management Program
AQEMMP	Air Quality Effects Monitoring and Management Plan
DFO	Department of Fisheries and Oceans Canada
EC	Environment Canada
EIR	Environmental Impact Review
EIS	Environmental Impact Statement
ENR	Department of Environment and Natural Resources, GNWT
GNWT	Government of the Northwest Territories
IMP	Incineration Management Plan
MVEIRB	Mackenzie Valley Environmental Impact Review Board
MVRMA	<i>Mackenzie Valley Resource Management Act (the Act)</i>
NRCan	Natural Resources Canada
NWT	Northwest Territories
PKC	Processed Kimberlite Containment
PR	Public Registry
SSWQOs	Site Specific Water Quality Objectives
TC	Transport Canada
WEMP	Wildlife effects monitoring program
WLWB	Wek'èezhì Land and Water Board
WWHPP	Wildlife and Wildlife Habitat Protection Plan
ZOI	Zone of Influence

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1 Introduction

This is the Gahcho Kué Panel's (Panel)'s *Report of Environmental Impact Review and Reasons for Decision* (REIR) for the proposed De Beers Gahcho Kué Project (the Project). Consistent with sections 121 and 134 of the *Mackenzie Valley Resources Management Act* (MVRMA or the *Act*), the purpose of this report is to:

- review the relevant evidence on which the decision is based;
- document the process of the environmental impact review;
- summarize and report on comments about the development received from the public;
- set out the Panel's analysis, conclusions and recommendation on whether the proposed development should be approved with or without mitigative or remedial measures or a follow-up program, or rejected; and
- satisfy statutory reporting requirements.

This Report includes thirteen sections and four appendices, set out as follows:

- **Section 1** provides information on the requirements of the *Act*, the environmental setting and a brief description of traditional uses in the Project area.
- **Section 2** describes the Panel's review process for this Project and provides information about procedural history, phases of the review, the parties and the hearings conducted by the Panel;
- **Section 3** addresses the analytical framework adopted by the Panel for its decision-making and report including decisions on significance of effects, scope of development and assessment and the treatment of the developer's commitments;
- **Section 4** reports on specific decisions required of the Panel by the *Act* and other applicable statutes;
- **Sections 5 to 11** describe the Panel's analysis of the proposed Project's effects on key lines of inquiry and subjects of note;
- **Section 12** summarizes monitoring, adaptive management, and required follow-up programs for the Project
- **Section 13** addresses oversight and the proposed Ni Hadi Yati initiative;
- **Appendix A** summarizes the Panel's recommended measures, suggestions and follow-up programs;
- **Appendix B** is the public registry index;
- **Appendix C** contains the developer's commitments; and
- **Appendix D** consists of Panel member biographies.

1.1 Requirements of the *Mackenzie Valley Resource Management Act*

The Gahcho Kué Panel was established by the Mackenzie Valley Environmental Impact Review Board in order to conduct an environmental impact review of the Gahcho Kué

Project. The Panel's authority is based on Part 5 of the *Mackenzie Valley Resource Management Act*. The Panel is required by law to make decisions in relation to its determination of the environmental impacts of the proposed development. More specifically, the Panel is responsible for conducting an environmental impact review that considers the proposed development's impacts on the biophysical, socio-economic and cultural environments, in accordance with sections 114 and 115 of the *Act*. These sections of the *Act* also require the Panel to ensure that the concerns of Aboriginal people and the public with respect to the Project are taken into account. Section 115.1 of the *Act* requires that the Panel consider both traditional knowledge and scientific information provided in the course of the review. The Panel is an independent body and conducted this environmental impact review based on its *Rules of Procedure* and *Environmental Impact Assessment Guidelines* specific to this proceeding.

As described in subsection 134(2) of the *Act*, the Panel must prepare a Report containing a summary of comments received from the public, an account of the Panel's analysis, the conclusions of the Panel and its recommendation. The REIR will be conveyed to the federal Minister setting out the Panel's recommendation as to whether this proposal for development should be approved, with or without mitigative or remedial measures or follow-up programs, or rejected.

After considering the Panel's Report, the federal Minister may:

- adopt the recommendation of the Review Panel or refer it back to the Panel for further consideration, or
- after consulting the Review Panel, adopt the recommendation with modifications or reject it.¹

If the federal and responsible Ministers accept the Panel's Report of Environmental Impact Review, section 136 of the MVRMA specifies that:

"The federal Minister and responsible ministers shall carry out a decision made under Section 135 to the extent of their respective authorities. A first nation, local government, regulatory authority or department or agency of the federal or territorial government affected by a decision under that section shall act in conformity with the decision to the extent of their respective authorities."

Section 117 of the *Act* specifies specific requirements, such as the determination of the scope of development and factors that need to be considered. These are discussed in section 3.1 of this Report. Subsection 117(3) of the *Act* requires additional

¹ Section 135

statutory decisions for an environmental impact review and these are addressed in Section 4 of this Report.

1.2 Environmental setting

The Gahcho Kué Project site is situated at Kennady Lake, approximately 140 km north of Łutselk'e, 280 km northeast of Yellowknife, and 80 km southeast of De Beers' Snap Lake Mine (Figure 1)². The Kennady Lake watershed lies in the headwaters of the Lockhart River system which flows into Great Slave Lake (Figure 2). The evidence submitted in the review indicates that Kennady Lake is oligotrophic and has low biological productivity (PR#80 p.8-75³).

The Gahcho Kué site is in the Mackay Upland Eco-region and the Taiga Shield Ecozone (PR#184 p.1-5). Due to the Project's location within this transitional area between boreal forest and tundra (PR#80 p.11.7-8), wildlife from both habitat types may occur within the regional study area. Traditional knowledge and the developer report that caribou, muskox, moose, barren ground grizzly bear and wolverine are present in the regional study area. Caribou were observed during aerial surveys in the regional study area. Muskox and moose were also observed during surveys for caribou (PR#80 p.11.11 -12). Barren ground grizzly bear and wolverine were also confirmed to occur within the regional study area (PR#80 p.11.12-21).

In 1970, there was a permanent land withdrawal made for a large area south of the Project site for a proposed national park (PR#80 Figure 12.7-4). In 2007, an area adjacent to the Project site was included in the land withdrawal as part of the study area for the proposed East Arm National Park (Thaidene Nene). This study area boundary is about 5 km from the Project footprint. The developer used the 2007 boundary in its analysis of impacts from the Project on the proposed park (PR#80 p.12-269).

1.3 Traditional use of the Gahcho Kué region

The Gahcho Kué site and surrounding area represent a region of cultural, social, spiritual and ecological importance to Aboriginal people and others (PR# 80 p.12-91 -965). This is also an area where Aboriginal and treaty rights have been established or are asserted,

² The Panel has used maps and figures developed by DeBeers Canada in this REIR solely for illustrative purposes. Their use should not be implied to indicate the Panel's acceptance of the evidence on which they are based.

³ Note: This report references page numbers using the page number format in the document being referenced. For some documents the page number format includes a chapter number. For documents with no page number, the sequential page number from the beginning of the document is used (i.e. the page number of the PDF).

based on both historical land use and occupancy and historical and modern agreements with the Crown.

The project site is located in Mòwhì Gogha Dèñìht'ìèè, a region established by the Tlicho Agreement in 2005. It is within the area covered by Treaty 11 which was signed in 1921. This is also part of the region where rights are asserted by the Akaitcho Dene First Nations and the Northwest Territories (NWT) Métis Nation. Both of these organizations are currently negotiating land claims with Canada.

The project area is also part of the Łutselk'e Denesôhne's cultural landscape (as shown in Figure 12.3-5 in PR#80). The proposed Thaidene Nene National Park is part of a broader initiative by Łutselk'e Dene First Nation for the protection of their traditional territory (PR#397 p.39-40). The spiritually and culturally important Lady of the Falls site is located on the Lockhart River within the proposed national park, approximately 71 km in a direct line from the Gahcho Kué Project site.

The developer and each of these parties to this proceeding agree that the Project is in a traditional harvesting and land use area (PR#80 p.12-26; PR#271; PR#372; PR#374; PR#415; and PR# 418 and 420;). Traditional knowledge about the region in which the Project is proposed was shared with the Panel in submissions made by the Tlicho Government, Yellowknives Dene First Nation, Northwest Territories Métis Nation, North Slave Métis Alliance, Deninu Kué First Nation and the Lutselk'e First Nation. These submissions indicate a long history of travel through and use of the Kennady Lake region for harvesting and other traditional pursuits. The evidence before the Panel indicates that some people use the area today.

The people of Łutselk'e make annual pilgrimages to the Lady of the Falls site on the Lockhart River (PR#394 p.65).

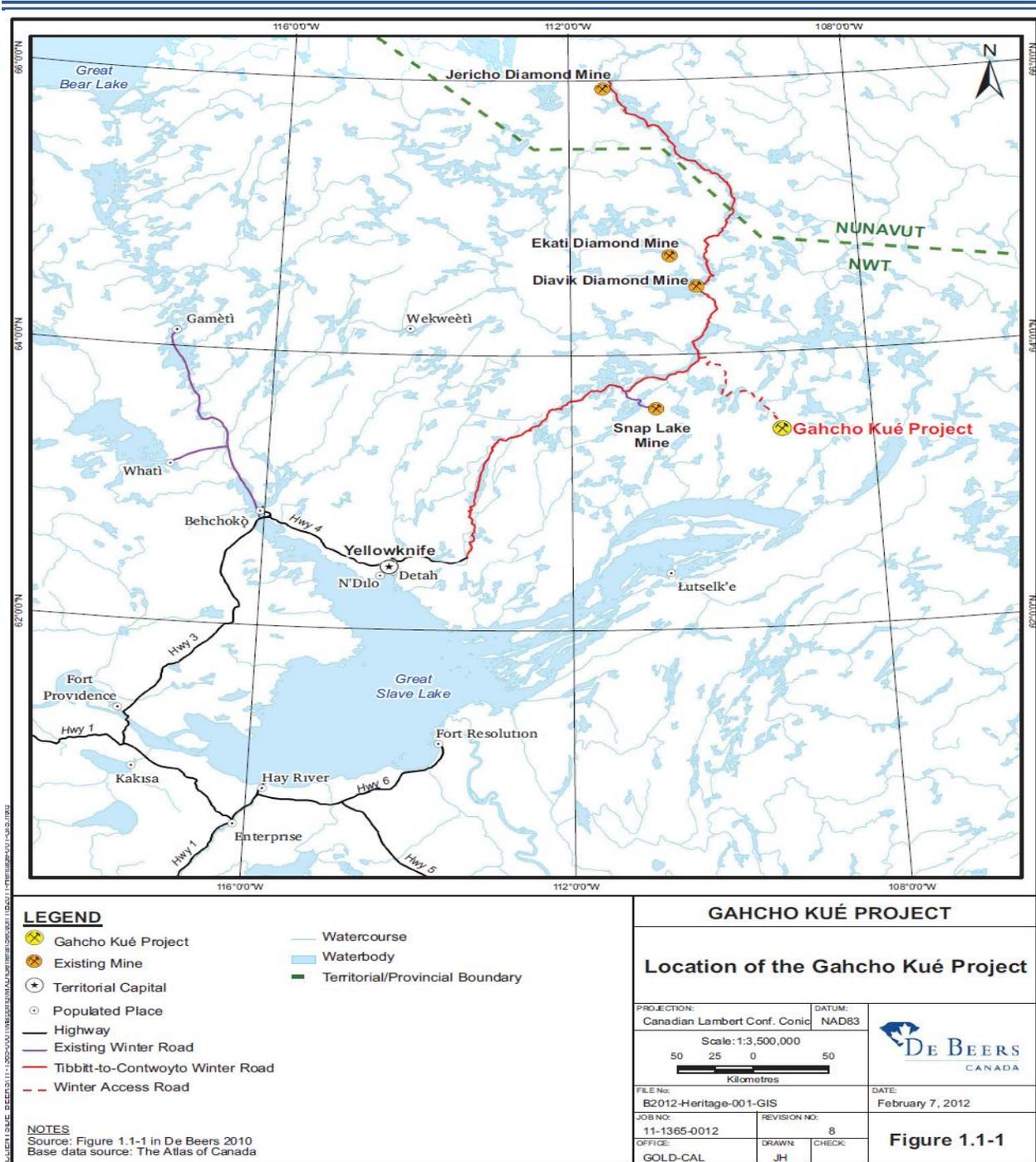


Figure 1: Regional location of the proposed Gahcho Kué Project (PR#184 p.1-2)

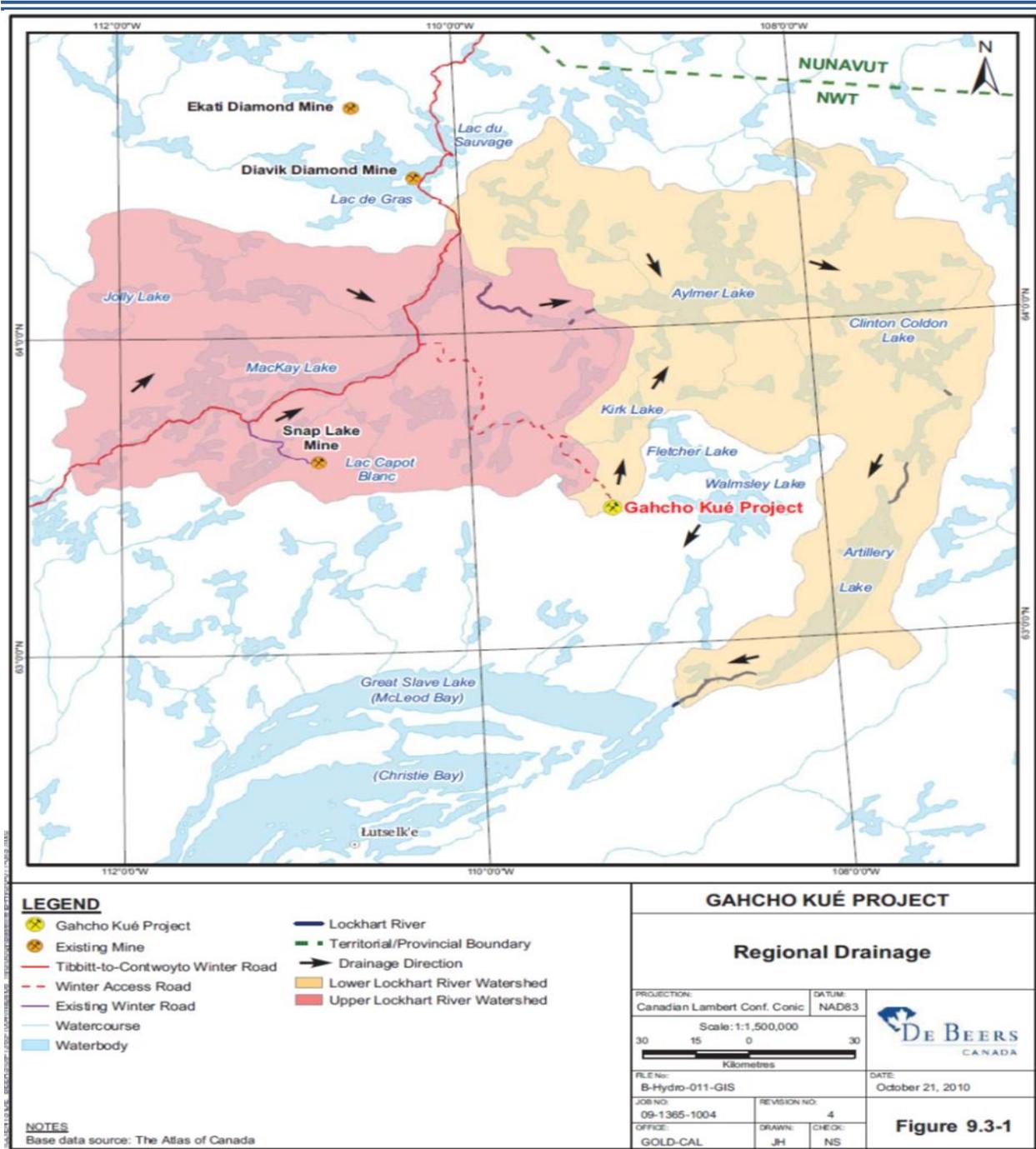


Figure 2: Regional drainage in the Upper and Lower Lockhart River Watersheds (PR#80 p. 9-25).

2 Environmental impact review process

This section describes the Panel's environmental impact review process for this Project. It provides information about the procedural history, the parties to this assessment and the steps the Panel took to satisfy the legal requirements set out by the *MVRMA* and to make a decision in this proceeding.

2.1 Procedural history

On November 24, 2005, DeBeers Canada Inc. (the developer) applied to the Mackenzie Valley Land and Water Board for a type A Land Use Permit (MV2005C0032) and a type A Water License (MV2005L20015) for the Gahcho Kué development. On December 22, 2005, Environment Canada referred the Gahcho Kué Project to the Review Board for environmental assessment because, in its opinion, the proposed development might have significant adverse impacts on the environment.

The Review Board initiated an environmental assessment (EA) and notified DeBeers Canada Inc. that the EA had commenced on January 4, 2006. Following scoping workshops in Yellowknife, Dettah, Lutsel K'e, Fort Resolution, and Behchoko, and a scoping hearing in Yellowknife during March and April of 2006, the Review Board determined that the proposed development was likely to be a cause of significant public concern.

The Review Board ordered an environmental impact review of the proposed Gahcho Kué Project pursuant to *MVRMA* section 128(1)(c) on June 12, 2006. On June 28, 2006 the Review Board issued its *Reasons for Decision and Report of Environmental Assessment for the DeBeers Gahcho Kué Diamond Mine, Kennady Lake, NT*. On July 28, 2006, the developer applied for judicial review of the Review Board's order that an environmental impact review be conducted. During the course of the litigation the Review Board refrained from any further action that would have advanced the environmental impact review process.

The Supreme Court of the Northwest Territories heard the judicial review application on November 21, 2006 and rendered its decision on April 2, 2007 upholding the Review Board's order (PR#7 p.18). The Review Board then notified De Beers Canada Inc., interested parties and the public of the continuation of the environmental impact review on April 24, 2007 (PR#9 p.1).

2.2 Parties to the environmental impact review

At the same time as the notice of continuation of the environmental impact review, representatives of government departments and other interested groups were asked to identify their interests and to notify the Panel of their intent to participate in the proceeding as a registered party. According to the Panel's *Rules of Procedure*, the developer is a registered party. In addition to the developer, fifteen organizations were granted status as registered parties and participated in the proceeding. They are:

- Aboriginal Affairs and Northern Development Canada
- Akaitcho Interim Measures Agreement Implementation Office
- Dene Nation
- Deninu Kué First Nation
- Environment Canada
- Fisheries and Oceans Canada
- Government of the Northwest Territories
- Lutsel K'e First Nation
- Natural Resources Canada
- North Slave Metis Alliance
- NWT Metis Nation
- Parks Canada
- Tlicho Government
- Transport Canada
- Yellowknives Dene First Nation

The parties to the environmental impact review had the opportunity to participate throughout the process. Although some of the parties did not actively participate in all the stages, all had access to the information exchanges between the developer and the parties, which can be found on the public registry. The public registry index is in Appendix B.

2.3 Environmental impact review phases

After the Review Panel was appointed, it conducted the environmental impact review in three phases: a scoping phase, an analytical phase, and a decision phase (**Figure 3**). Each phase of the environmental impact review process was comprised of specific tasks which are described below.

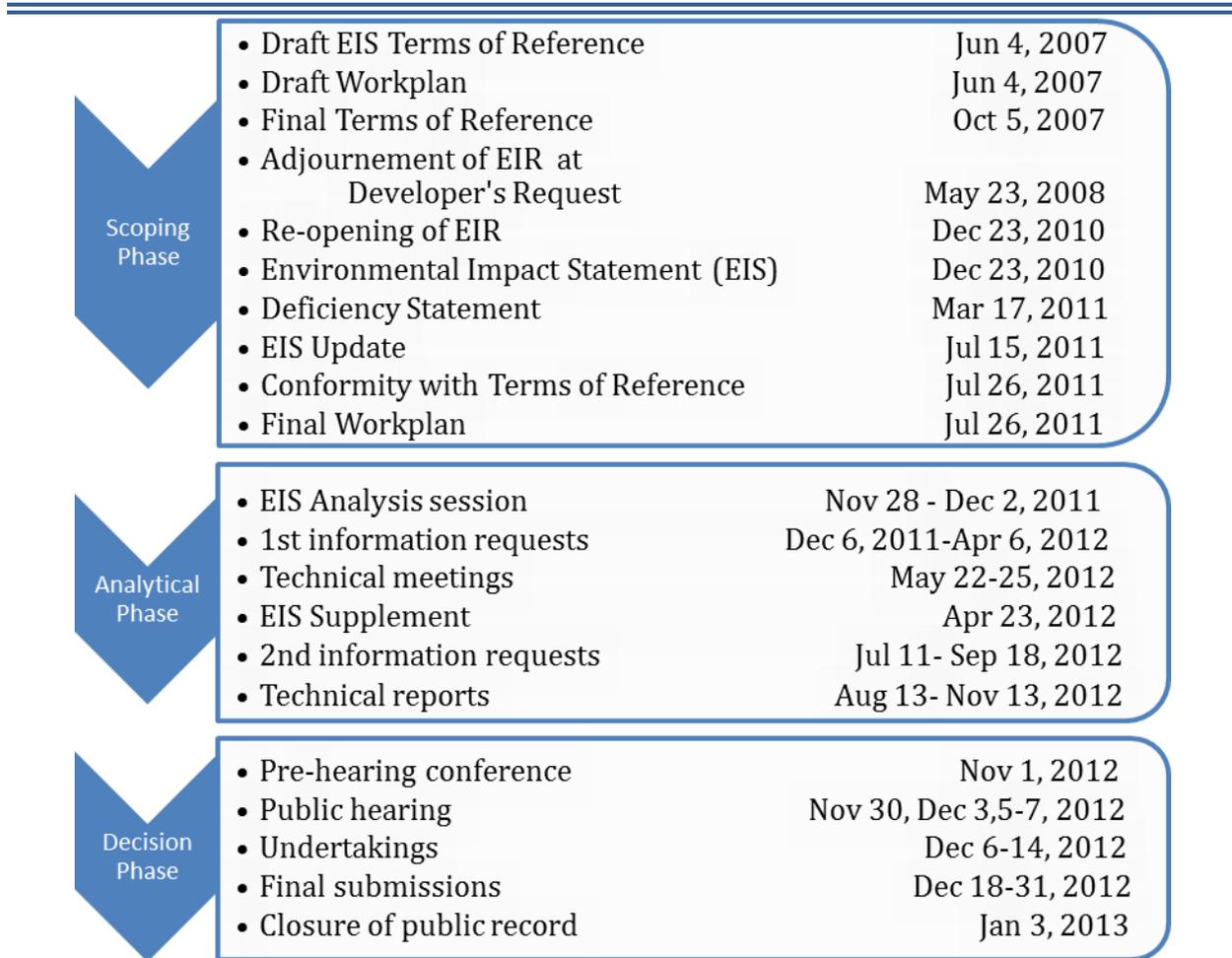


Figure 3: Key dates of the Gahcho Kué environmental impact review process

2.3.1 Scoping phase

The scoping phase involves developing the terms of reference for the environmental impact statement (EIS), ensuring compliance with those terms and developing a work plan for the EIS. The Terms of Reference (ToR) outlined the parties' roles and responsibilities while the Work Plan established milestones and identified the Panel's timelines and expectations for the completion of the environmental impact review. The developer is responsible for producing information sufficient to meet its burden of proof and to address the Panel's and the parties' questions and concerns in order assist the Panel to evaluate the potential impacts that the proposed Project might have on the environment.

On June 4, 2007, the Panel issued draft Terms of Reference for the EIS and a draft work plan. The Panel issued the final terms of reference (PR#48) on October 5, 2007.

On May 9, 2008 De Beers temporarily deferred the filing of the EIS (PR#59 pg.1). The Panel adjourned the Gahcho Kué environmental impact review on May 26, 2010 due to De Beers' ongoing delay of its EIS submission. De Beers submitted the EIS on December 23, 2010 more than 3 years after the Panel had issued its final terms of reference.

The Panel reviewed the EIS in accordance with the terms of reference and issued a deficiency statement to De Beers on March 17, 2011. The Panel determined that five main items needed to be better addressed before the review could proceed to the analytical phase, while other minor deficiencies could be dealt with in later stages of the assessment (PR#84). De Beers submitted responses to the Panel's EIS deficiency statement on May 3 and July 15, 2011 (PR#88, 89, 105, 106). After considering the deficiency statement responses, which included updates to the EIS, the Panel found De Beers' EIS in conformity with the terms of reference on July 26, 2011 (PR#110).

2.3.2 Analytical phase

The analytical phase involved analysis and technical review of the developer's submissions. In order to facilitate review of the EIS, the Panel held EIS analysis sessions attended by Panel staff, the developer, and the parties from November 28, 2011 to December 2, 2011. Following these meetings, the Panel asked the parties to prepare and submit information requests to De Beers by January 18, 2012. De Beers responded to the information requests between March 16, 2012 and April 6, 2012.

During the analysis session and the first round of information requests, the parties discussed the EIS (PR#80), including the updated EIS sections that resulted from the conformity review (PR#106). On April 23, 2012 De Beers submitted an EIS supplement which included additional revisions to Sections 8, 9 and 10 of the EIS (PR#184).

The Panel held technical sessions from May 22 to 25, 2012.

On June 13, 2012 the Panel advised the parties that a second round of focused information requests would be held. De Beers responded to these information requests from August 9, 2012 to September 14, 2012. The parties responded to information requests directed to them from September 13 to 17, 2012.

From October 2 to 4, 2012, De Beers submitted information to Transport Canada to complete a navigable waters assessment in response to their second round information requests. Also on October 4, 2012 De Beers submitted their draft fish-out plan.

The parties submitted technical reports from October 22 to 25, 2012. De Beers responded to technical reports from November 8 to 13, 2012. De Beers also submitted a draft No-Net-Loss Plan on November 13, 2012. Throughout October and November De Beers submitted a number of monitoring and management plans including an Incinerator Management Plan, Air Quality and Emission Monitoring and Management Plan and Wildlife Monitoring Plan.

2.3.3 Decision phase

The decision phase includes public and community hearings, final submissions from the parties, followed by closure of the public record, Panel deliberations and the release of the REIR. The parties submitted public hearing presentations from November 20 to 22, 2012. The Panel conducted the Environmental Impact Review hearings from November 30, 2012 to December 7, 2012. Community hearings were held in Dettah on November 30, 2012 and in Lutsel K'e on December 3, 2012. Public hearings were conducted in Yellowknife on December 5, 6 and 7, 2012. Transcripts of the public and community hearings are available on the public record (PR#393, 394, 396, 402, 403).

Radio, posters, newspapers and webpage announcements were used to notify the public prior to the hearings. The hearings allowed the public an opportunity to listen to and participate in a discussion of the issues related to the proposed development. The hearings also provided an opportunity for the community members to bring important concerns directly to the Panel's attention.

De Beers and several other parties made presentations to the Panel. All parties had the opportunity to question both the developer and the other parties involved. The parties set out their views about the direct and indirect impacts of the proposed development and presented impact predictions and mitigation recommendations to the Panel.

The Panel received final written submissions from the parties on December 18 to 21, 2012 and De Beers' closing argument on December 31, 2012. During final party submissions Lutsel K'e Dene First Nation submitted their traditional knowledge report on December 24, 2012 and asked that the Panel keep the report under confidential cover. The Panel granted this request. Deninu Kué First Nation also submitted their Ethno-history report submission on December 21, 2012 with their closing statements. North Slave Metis Alliance submitted their interim traditional knowledge report to the Panel on December 21, 2012 along with their closing statements.

The Panel closed the public record on January 3, 2013.

3 Analytical framework for this environmental impact review

3.1 Statutory requirements

The *Act* sets out a number of specific requirements which must be addressed by the Panel in addition to those mentioned in section 1.1 above. They include:

- determining the scope of development as set out in subsection 117(1);
- specific factors that must be considered as described in subsection 117 (2); and
- additional factors in subsection 117(3).

The Panel notes that the scope of the development was addressed briefly in the Review Board's Report of Environmental Assessment in June, 2006. As indicated earlier, however, the purpose of that report was to convey the Board's decision to refer the Project to environmental impact review on the basis of significant public concern. Consequently, in the Panel's view, the scope of development set out in that report is not sufficient as a foundation for the impact assessment required in this proceeding. Moreover, as will be indicated below, important changes were made to the original scope of development made by De Beers during the environmental impact review process and it is essential to describe them in this report.

The Panel must also address the requirements of subsections 117(2) and (3) and 134(2) of the *Act*. The specific findings of the Panel in response to the requirements of subsection 117(3) are addressed in section 4 below. They include consideration of:

- the purpose of the development;
- alternative means, if any, of carrying out the development that are technically and economically feasible, and the impact on the environment of such alternative means;
- the need for any follow-up program and the requirements of such a program; and
- the capacity of any renewable resources that are likely to be significantly affected by the development to meet existing and future needs.

Section 4 of this Report also addresses the Panel's reporting responsibility under section 79 of the federal *Species at Risk Act*.⁴

The broader requirements of subsections 117(2) and 134(2) are all addressed in the analysis conducted in Sections 5 through 12 of this report. In those sections, the Panel reviews the evidence on the record, including all submissions from the public and the parties and makes its determinations about environmental impacts, including cumulative

⁴ S.C. 2002, c.29.

impacts and the need for mitigative or remedial measures and follow-up programs. Finally, the general framework of criteria used by the Panel to determine significance is set out in section 3.5 below.

3.2 Scope of development

The following description of the proposed development is summarized from the information provided in De Beers' Environmental Impact Statement (EIS) submitted December 2010 (PR#80), updates to the EIS (PR#106) and the 2012 EIS supplement submitted in April 2012 (PR#184) and other relevant documents submitted by De Beers.

De Beers' proposal is to dewater portions of Kennedy Lake sequentially in order to access the 5034, Hearne and Tuzo kimberlite pipes. A fourth kimberlite pipe, Telsa, will not be mined due to its small size and low grade. The 5034 and Tuzo pits are expected to be about 300 m deep, while the Hearne pit will likely be 205 m deep (PR#80 p.16). Prior to dewatering of Kennedy Lake, a fish salvage or "fish-out" will be conducted (PR#311 p.2). De Beers has committed to developing a fish compensation plan that meets DFO's No-Net-Loss policy (PR#80 p.10-58; PR#249).

The vertical kimberlite pipes located beneath Kennedy Lake are most amenable to open pit mining as opposed to underground mining (PR#184 p.1-5). The Gahcho Kué Project will consist of construction, operation and closure phases. The construction phase is when the infrastructure is built, the lake is isolated from the upstream and downstream watersheds and areas within the lake are de-watered. During operations, the ore is mined and processed. The closure phase is when the infrastructure is decommissioned and Kennedy Lake will be refilled. This is estimated to take eight to 16 years. De Beers defines "post-closure" as the period when Kennedy Lake receives only natural drainage and releases water to Area 8 (PR#80 p.3-46).

Table 1 outlines De Beers' proposed timeline. Notably, mining of pits follows an overlapping sequence.

Table 1: Overview of proposed project timeline and general activities (PR#184 p.3-8)

Year	Project Phase	General Activities
-2	Construction	Building site infrastructure Initial lake dewatering and fish-out
-1	Construction	Building site infrastructure Pre-stripping of 5034
1 to 3	Operations	Mining – 5034
4	Operations	Mining – 5034/Hearne
5	Operations	Mining – 5034/Hearne/Tuzo
6 and 7	Operations	Mining – Hearne/Tuzo
8 to 11	Operations	Mining – Tuzo
12 and 13	Closure and reclamation	Interim closure – remove non-essential buildings/site infrastructure Beginning of lake refilling (about 8 to 16 years total) and monitoring
14 to 19	Closure and reclamation	Continued lake refilling (about 6 to 14 years remaining) and monitoring
20+	Post-closure	Site monitoring to meet regulatory requirements

3.2.1.1 Infrastructure

Major facilities to be constructed on site include: dykes and berms to allow for the dewatering of Kennady Lake, a processing plant, accommodation complex, maintenance workshop, warehouse, administration office, storage for oil, fuel and glycol, facilities for production and storage of explosives, sewage treatment, site roads and an airstrip. Power will be generated by diesel-powered electric generator units and the main fuel storage facility will consist of eight 500,000 litre prefabricated tanks and two 18 million liter steel tanks.

The accommodation complex will be capable of housing 432 construction workers on a double occupancy basis during mine construction and 216 workers on a single occupancy basis during mine operations. (PR#184 p1-13) De Beers estimates there will be 690 full-time equivalent positions created during the 2 years of mine construction, and 372 full-time equivalent positions during the operations phase of the mine. (PR#396 p. 39)

3.2.1.2 Site access and winter road

The Project site will be accessed seasonally over land during the winter by a 120 km winter access road that will be constructed from Kennady Lake to the north end of MacKay Lake and will intersect the Tibbitt-to-Contwoyto winter road at kilometer 271. The winter access road will follow the route for the winter road currently used to access the existing

exploration camp at Kennady Lake. The winter road will be in operation from late January or early February through March and, under favourable conditions, into early April. (PR#184 p.1-14)

A permanent airstrip will be constructed and the mine site will be accessible by air for mine staff, supplies and emergency transport. Before the permanent airstrip is established, aircraft will land on an ice airstrip on Kennady Lake.

3.2.1.3 Beneficial project design modifications during the EIR

Initially, De Beers proposed that the processed kimberlite⁵ (PK) would be deposited in fine PK containment facilities located along the northwest margin of Kennady Lake and in the dewatered northern portion of Kennady Lake while coarse PK would be stored in a pile on the west margin of the lake (PR #80 p.3-38). In later years fine PK would be placed in the mined-out Hearne pit and the coarse PK would be used for reclamation of the fine PK facility and co-disposed with mine rock in the 5034 pit (PR #80 p.3-38).

During the environmental impact review, issues were identified with the potential release of phosphorus associated with the long-term storage of processed kimberlite. Phosphorus is a concern because it is a nutrient, and changes in nutrient levels can change the types and amount of aquatic life, and, depending on levels, can be detrimental to sustaining aquatic life. De Beers modified the project design to mitigate these concerns (PR#184 p.2-7). A reduction in phosphorus concentration in the lake would facilitate the return to oligotrophic conditions while still ensuring sufficient overwintering habitat for aquatic life (PR#217 p.33). In these design modifications, De Beers plans to dispose fine PK in the 5034 pit in addition to disposal in the Hearne pit, thereby reducing the size of the fine PK containment facility by 83 ha. Figure 5 shows the revised project footprint, the area numbering system within Kennady Lake and the numbering system for surrounding lakes. In the revised plan, the fine PK containment facility no longer covers lakes A1 and A2, as originally proposed (PR#217 p.24).

The project modifications are described in the EIS supplement submitted in April 2012 (PR#184) (PR#184 p.2-2). The updated plan consists of dewatering Areas 2 to 7 and not displacing water from Area 1 (see Figure 4). Table 2 summarizes the key Project modifications since the original December 2010 EIS was filed. The Panel has accepted De Beers' rationale for the Project modifications. The Panel's conclusions about the impacts of the Gahcho Kué Project and the determination under section 134 of the *Mackenzie Valley Resource Management Act* are based on the inclusion of these design changes in the scope of development.

⁵ Processed kimberlite is the rock material that remains after all economically and technically recoverable diamonds have been removed.

In addition to the EIS Supplement, De Beers also submitted updates to the draft fish habitat compensation plan on June 29, 2012. Due to the updated footprint of the Project related to the mitigation associated with the fine processed kimberlite containment facility, De Beers recalculated the areas of fish habitat loss (PR#249 p.1). On November 13, 2012 De Beers submitted an updated fish habitat compensation plan (No-Net-Loss). De Beers notes that these changes reflect information shared during site visits and workshops with Aboriginal groups and government regulators. In contrast to the 2010 EIS, De Beers no longer proposes the raised D-E-N lake option as the primary source of fish habitat compensation (see Figure 4). In addition, De Beers is committed to pursuing offsite options for fish habitat compensation. (PR#360 p.1) De Beers also submitted a draft fish-out plan on October 4, 2012 though De Beers considers it a work in progress (PR#311 p.1).

Table 2: Key beneficial modifications to the proposed development

Original EIS component	Alternative chosen component	Benefits of chosen alternative in relation to the likelihood of significance of adverse impacts
Fine PKC Facility covering Lakes A1 and A2	Reduction of Fine PKC Facility footprint by 83 ha (PR#217 p 24) Fine PK not stored in Area 1 Only includes Area 2	<ul style="list-style-type: none"> • No displacement of water from Area 1 • Reduced phosphorus concentrations in Kennady Lake • Kennady lake anticipated to return to oligotrophic conditions with sufficient overwintering habitat • Reduces the Gahcho Kué Project footprint (PR#217 p 33)
No backfilling of 5034	Fine PK moved from Area 1 and deposited into 5034 and Hearne pits	<ul style="list-style-type: none"> • Disturbed habitat area reduced • Reduces size of fine PK facility and long-term geochemical loadings from the facility
West mine rock pile	West mine rock pile height increased by 24 m but base area remains the same	<ul style="list-style-type: none"> • Accommodates mine rock and possibly fine PK after closure of Fine PK facility • Disturbed habitat area reduced during closure
Construction of Dyke C to isolate Lakes A1 and A2 in Area 1 from Lake A3 (PR#184 p. 2-8)	A watershed diverted during operations Watershed runoff from Area 1 will be diverted to Area 8 (PR#184 p 2-11)	<ul style="list-style-type: none"> • Lake A3 no longer permanently diverted to N watershed • Dyke C (permanent saddle dam) no longer required • Disturbed habitat area reduced

Original EIS component	Alternative chosen component	Benefits of chosen alternative in relation to the likelihood of significance of adverse impacts
<p>Fish habitat compensation lake in the D-E-N watershed</p> <p>At closure newly developed habitat area (D-E-N lakes) would be reconnected to the refilled Kennady Lake through Lake D1 at closure</p>	<p>Habitat enhancement structures will be constructed in Kennady Lake</p> <p>Off-site mitigation for fish habitat compensation, e.g. culvert rehabilitation to remove barriers to migratory fish</p>	<ul style="list-style-type: none"> • Maximize high quality habitat in the 2m to 4 m depth range • Finger reefs available for use by fish immediately after refilling is complete • Expected increase in fish production • Removal of migratory barrier to fish off-site

3.2.1.4 Construction and operations

During construction, dykes and berms will be built around Kennady Lake to isolate the lake from the upstream and downstream watersheds and to isolate different areas within the lake from each other (Figure 4). The “fish-out” will be conducted in Areas 2 and 7 of Kennady Lake as well in Lake D1 (PR#311 p.2). Areas 3 and 5 will only be partially dewatered and used as the water management pond (PR#184 p.1-12). Dewatering of the lake will be staged and coincides with operations. Mining of the open pits is sequenced as described in Table 1.

The construction and operation period is expected to last eight to eleven years as described in Table 1. Pre-stripping of the 5034 pit will occur in Year -1 of operations. The Hearne pit will be pre-stripped during mining operations at the 5034 pit. Mining of the Hearne pit is scheduled for Year 4 of operations. Incorporated into the project from the EIS supplement is the deposition of fine PK and mine rock into the 5034 and Hearne pits (PR#217 p 24). The Tuzo pit will be pre-stripped during operations at Hearne pit. Mining of kimberlite at Tuzo pit is scheduled to commence in Year 5 (PR#184 p 1-6). The Tuzo pit, which is the last pit to be mined, will not be backfilled with material (PR#184 p3-108). Pit closure and complete backfilling of 5034 pit and partial backfilling of Hearne pit will occur progressively as each pit is mined out (PR#184 p.1-6, 3-108). During operations, groundwater flowing into the open pits will be pumped to the water management pond (Areas 3 and 5) where a portion of it will be recycled to the process plant, used for dust suppression, or pumped to Lake N11 when water quality meets discharge requirements (PR# p.1-12).

Ore processing at the project site includes crushing, screening and concentration. This is followed by x-ray and grease diamond recovery, de-gritting, fine thickening and the disposal of rejects.

Coarse processed kimberlite will be placed in the on-land coarse PK pile, mine rock will be placed in the west and south mine rock piles and used for reclamation purposes, such as covering the coarse PK pile (Figure 4). Fine processed kimberlite will be fed to a thickener to remove excess water for recycling and then pumped by pipeline to the fine PK containment facility. In later years of the project the fine PK will be placed in the 5034 and Hearne pits. (PR#184 p.3-31)

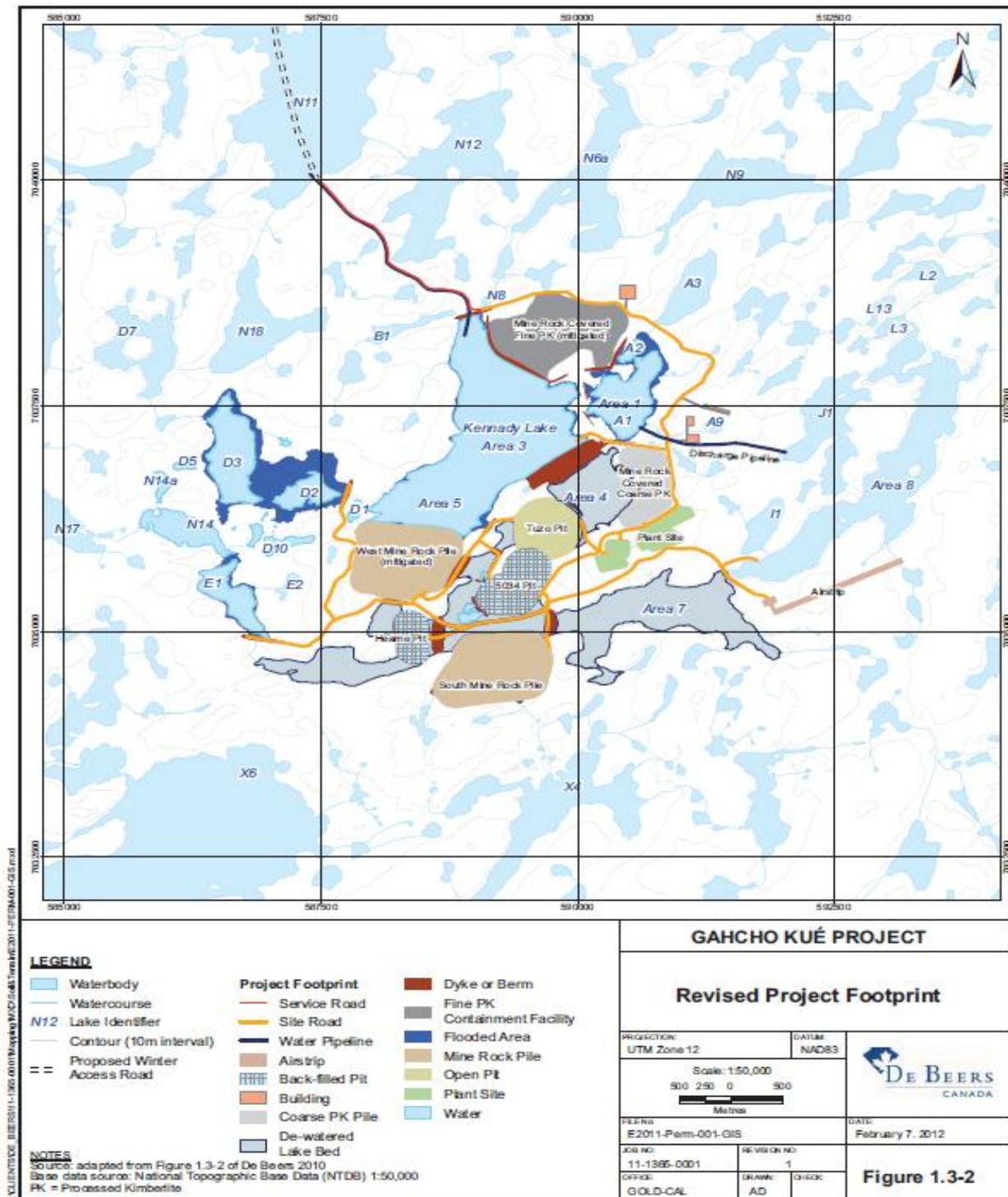


Figure 4: Map of the revised project footprint (PR#184 p.1-8)

3.2.1.5 Closure and post-closure

De Beers states that their reclamation goal is to minimize the lasting environmental impacts of operations and allow disturbed areas to return to productive fish and wildlife habitat as quickly as possible (PR#80 p 10-58). The closure phase at Gahcho Kué consists of removing all potentially hazardous materials from the site, constructing additional fish compensations structures near Kennady Lake and the refilling of and monitoring of lake conditions over time. Refilling of Kennady Lake will be accomplished using runoff supplemented by water from Lake N11 (Figure 4). Once appropriate water quality has been achieved, reclaimed portions of Kennady Lake will be re-connected to the downstream watershed (Area 8) via breaching and/or partial removal of Dyke A (the Dyke between Areas 7 and 8 as shown in Figure 4; PR#217 p.19).

The project site will be decommissioned after mining has concluded (PR# 184 1-15). Progressive reclamation of disturbed areas during operations will be conducted as soon as possible and practical (PR#80 p 10-62). However, closure and reclamation will extend years after mine closure. De Beers will use proven technology that is available at the time of reclamation, in accordance with the legal requirements, to facilitate reclamation (PR#80 p.10-59). The Gahcho Kué closure and reclamation schedule is outlined in Table 3

The final decommissioning and reclamation of each facility will occur when each is no longer needed. For example, in later years of the project, fine PK will be backfilled in the mined out 5034 and Hearne pits (PR#184 p 3-10). Therefore the fine PK containment facilities will be decommissioned before the completion of mining and processing operations. Both the fine PKC facility and coarse PK pile will be capped with mine rock and graded. Areas 5 and 6 will also undergo final grading. (PR#184 p 3-10)

Infrastructure, buildings and equipment will be taken off site or disposed on site within 2 years of the completion of processing operations. The infrastructure required for site monitoring and fish habitat reclamation will be the exception (PR#184 p 3-10).

De Beers states that refilling and monitoring of Kennady Lake and the project site will continue until all regulatory conditions are met (PR# 184 1-15). De Beers anticipates that it will take 8 to 16 years to refill Kennady Lake to the original lake level (PR#184 p 3-11). De Beers also anticipates that Kennady Lake, once refilled, will return to oligotrophic conditions. Due to an increase in nutrients, it is anticipated that Kennady Lake will be more productive than baseline conditions (PR#217 p 32). Figure 5 shows the proposed project footprint post-closure.

Table 3: Key activities and milestones in the conceptual closure and reclamation schedule (PR#184 3-105)

Activity / Milestone	Year
Begin progressive reclamation of fine PKC facility area 2 (mitigated)	3
Begin progressive reclamation of south mine rock pile	5
Begin progressive reclamation of west mine rock pile (mitigated)	7
Begin progressive reclamation of the 5034 pit	5
Begin progressive reclamation of the Hearne pit	7
Begin progressive reclamation of coarse PK pile	6
Finish mining in the Tuzo Pit	11
Breach Dykes B, E, F, G, J, K, and N	11
Decommission explosives storage and manufacturing facilities	11
Complete construction of fish enhancements structures	11
Start to decommission processing plant and service shop	12
Complete decommissioning of processing plant and maintenance complex	12
Decommission main power plant	12
Remove main fuel storage tanks	12
Remove permanent accommodation complex	13
Achieve interim closure status	13
Reclaim site roads not required for reclamation monitoring	13
Breach Dyke A	19+
Complete the refilling of Kennady Lake	19+
Final demobilization from site	19+
Monitor post-closure conditions in Kennady Lake	20+

Note: assumes mining operations begin in year 1 and end in year 11.

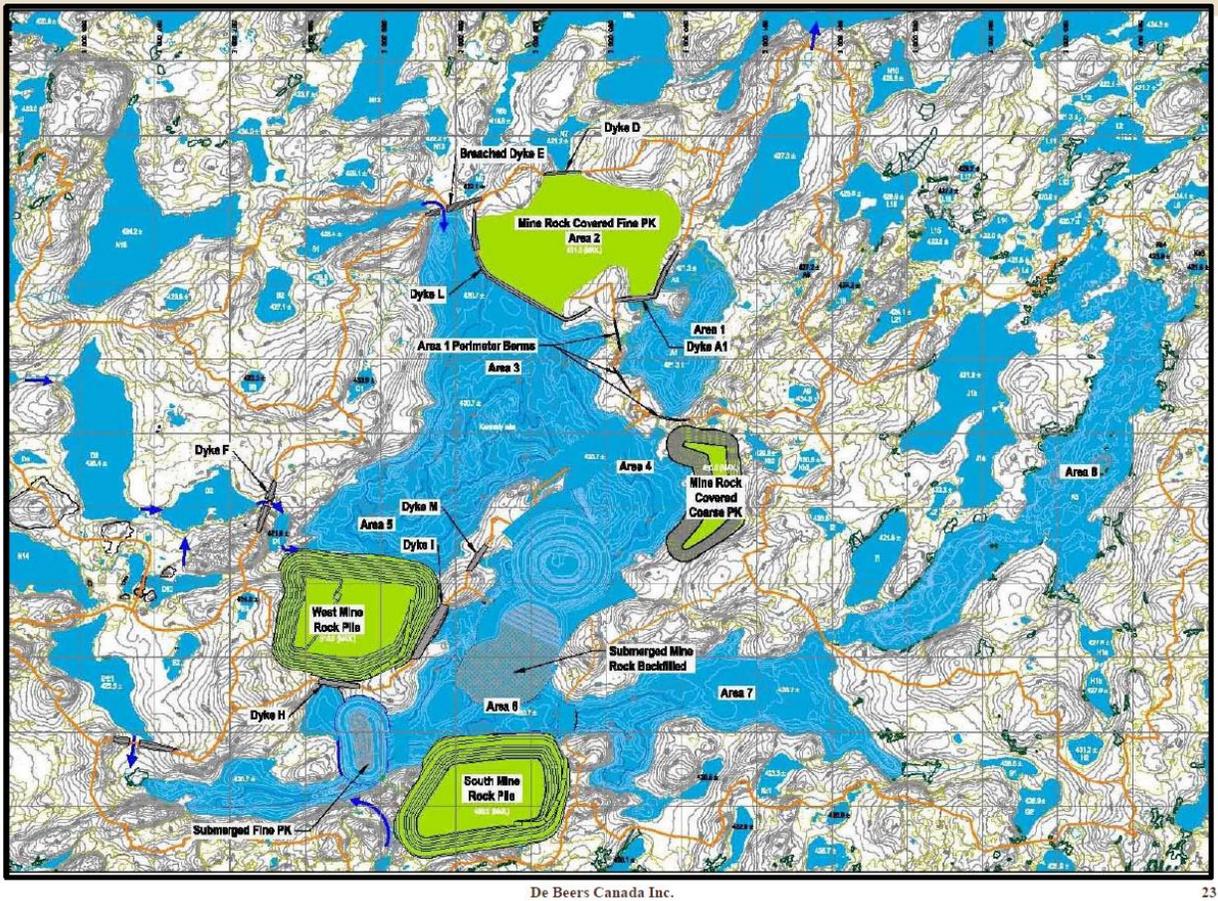


Figure 5: Map of the project footprint post closure (PR#184 p 10-60)

3.3 Final scope of development

The Panel identified the scope of development to include those components required for:

- the mining of the Tuzo and 5034 pits to approximately 300 m deep and Hearne pit to approximately 205 m;
- the processing of the kimberlite from those pits to extract the diamonds; and
- the management of water and all waste streams including waste water, processed kimberlite and mine rock, and reclamation of the site as described in the EIS (PR#80), the EIS Supplement (PR#184) as well as other documents submitted by the developer as part of the EIR (see Appendix B).

The development does not include the Telsa pipe, kimberlite deposits in the Tuzo, 5034, and Hearne at depths deeper than those identified in the project description or other potential kimberlite deposits in the area. The scope of development includes the construction of the access road from the Tibbitt to Contwoyto winter road at kilometer 271 to the project site. The main components of the scope of development are summarized in

Table 4. The scope of the development also includes all commitments made by De Beers throughout the EIR process.

Table 4: Final scope of development

Phase	Components/Activities
Construction	Construction of core infrastructure including accommodations complex, office complex, power plant, fuel storage tanks, sewage treatment plant, roads and airstrip
	Major concrete works and erection of maintenance and emulsion buildings
	Initial stripping of 5034 pit for construction materials
	Building minor diversion structures and site roads
	Construction of dyke A to separate Area 7 from Area 8 and initial dewatering of Kennady Lake
Mining Operations	Removal of waste rock, kimberlite and mine water from the open pits, including the use of explosives
	Storage of mine rock in south mine rock pile, the west mine rock pile (max height 94 m) and the 5034 pit
	Storage of a portion of the coarse PK on land north of the plant site in the on-land coarse PK pile with the remainder placed in the west mine rock pile and used for reclamation of the fine PKC facility
	Fine PK stored in fine PK facility (mitigated) as well as in the 5034 and Hearne pits
	Isolation of Area 1 from the fine PK facility (mitigated) by construction of permanent saddle dam (Dyke A1) between Areas 1 and 2
	Processing of ore to extract diamonds
	Storage and handling of processed kimberlite
	Storage and handling of waste rock
	Removal of diamonds from mine site
	Water Management
Diverting water away from controlled area and flooding lakes D2, D3, E1 and A1	
Construction of various dykes and berms to remove water from controlled area	
Water pipeline to Lake N11 in the N watershed	
Water pipeline from Lake A1 to Lake J1b in the J watershed allowing water to flow to Area 8 of the Kennady Lake watershed	
Use of Areas 3 and 5 as a water management pond	
Handling of water from water management pond and open pits	
Surface water management	
Removal of water from Kennady Lake for use at the mine site, both by mining personnel and for mining operations, including dust control	
Contingent water treatment and sewage disposal	
Transport and Surface Structures	Use of the current Tibbitt-Contwoyto winter road
	Construction of an access road from Tibbitt-Contwoyto winter road km 271 to project site
	Construction/upgrading of airstrip and air transport activities
	Solid waste management and containment areas
	Surface structures, including power plant, sewage and water treatment plants, camp facilities, roads, and ore processing plant
Closure and Reclamation	Begin progressive reclamation of Fine PKC Facility, South Mine Rock Pile, West Mine Rock Pile during operations
	Begin progressive reclamation of 5034 pit, Hearne pit and Coarse PK Pile during operations
	Breach Dykes B, E, F, G, J, K and N
	Decommission explosives facilities, process plant, maintenance complex, service shop and power plant
	Remove fuel storage tanks, reclaim roads not required for reclamation monitoring and achieve

Phase	Components/Activities
	interim closure status (in year 2 after closure)
	Breach Dyke A and complete refilling of Kennady Lake (year 8-16 after closure)
	Monitor post-closure conditions in Kennady Lake to meet regulatory requirements

3.4 Developer commitments

This Report of EIR is based on the scope of development for the Project as defined above in this document, including the commitments tables prepared by De Beers in its original EIS (PR#80 Appendix 1.VII), the table submitted as an undertaking after the public hearings (PR#406; and Table C1 in Appendix C), and all other commitments made throughout the EIR process (Table C2 in Appendix C). These commitments made by the developer were instrumental in the Panel’s section 134 (2) findings and are binding. Any significant changes to the plans and commitments set out by the developer could undermine the conclusions drawn by the Panel about impact significance.

Despite the importance of the developer’s commitment to the Panel’s decision, the Panel anticipates that refinement of better methods, best practices and new approaches to mining which further minimize the environmental effects of Gahcho Kué may emerge during the development and operation of the Project. The Panel expects that such improvements should be applied to the Gahcho Kué development even if they are not now included in or supersede commitments made by De Beers in this proceeding. Strict adherence to commitments made in the course of this proceeding should not constrain the developer’s or the regulators’ discretion to apply better solutions to avoid environmental impacts should better solutions become available in the future.

3.5 Decisions on significance

Section 117(2)(b) of the *Mackenzie Valley Resource Management Act* requires the Panel, during the environment impact review, to decide, based on the evidence, whether or not in its opinion the proposed development will likely have a significant adverse impact on the environment. The Panel considered all the evidence and submissions on the public record to arrive at its decision.

During the course of this environmental impact review, the Panel asked the registered parties to assist by providing their own views of the predicted impacts and the significance of such impacts, including justification. The Panel considered the following characteristics of all environmental impacts identified:

- magnitude
- nature of the impact
- geographic extent
- reversibility of the impact

-
-
- timing
 - duration
 - frequency
 - probability of occurrence
 - predictive confidence level

Sections 6 to 13 of this report describe the Panel's analysis and the reasons for its decisions on the significance of adverse impacts that are likely to result from the proposed development.

3.6 Scope of assessment

The scope of the environmental impact review (scope of review) is determined by the Panel to identify those matters which will be examined as part of the impact analysis of the Project on the environment. The scope of review includes all of the development's potential impacts on valued components of the biophysical and the human environment (e.g. wildlife species or social values) and addresses public concern arising from the development, by itself and in combination with other past, present and reasonably foreseeable future developments. This analysis also addresses the factors listed under subsection 117(2) of the *Mackenzie Valley Resource Management Act*. After considering the information available on the public record, the Panel made its decision on the scope of the review and prepared a Terms of Reference to guide the developer's preparation of an Environmental Impact Statement. As the review progressed, the Panel focussed its attention on those matters set out in its scope of review which had, in the Panel's opinion, not yet been resolved or where uncertainty or concerns remained based on the evidence provided by the parties or the public.

3.6.1 Valued components

The Panel identified the following potentially affected valued components for the Terms of Reference (PR#48), which form the basis for the scope of the EIR:

Key lines of inquiry

- caribou;
- water quality and fish in Kennady Lake;
- downstream water effects;
- long term biophysical effects, closure and reclamation;
- family and community cohesion;
- social disparity within and between communities; and
- long term social, cultural and economic effects.

Subjects of note (biophysical)

- impacts on Great Slave Lake;
- air quality;
- carnivore mortality;
- species at risk and birds;
- permafrost, groundwater and hydrogeology;
- waste rock and processed kimberlite storage;
- climate change impacts;
- alternative energy sources;
- other ungulates;
- waste management and wildlife;
- traffic and road issues; and
- vegetation.

Subjects of note (socioeconomic)

- employment, training and economic development;
- impacts on tourism potential and wilderness character;
- demand on infrastructure;
- culture, heritage and archaeology;
- Aboriginal rights and community engagement; and
- proposed national park.

3.6.2 Temporal scope of assessment

The Panel assessed valued components over the temporal scope of the Gahcho Kué Project as shown in Table 1 and includes the following:

- construction of new mine facilities – 2 years;
- mine operations – 11 years;
- closure activities – 6 years; and
- post-closure monitoring – 20 years plus.

3.7 Traditional Knowledge

The Panel recognizes the important role that Aboriginal cultures, values and traditional knowledge must be accorded in its decision making. In accordance with the requirements of section 115.1 of the *Mackenzie Valley Resource Management Act*, the Panel considered all traditional knowledge that the parties shared during the environmental impact review.

Relevant traditional knowledge made available to the Panel in relation to the analysis of the potential impacts of the Project has been given equal weight to western scientific information.

Written Traditional Knowledge submissions were submitted by the following parties during the course of this EIR:

- Tlicho Knowledge for De Beers Canada Proposed Gahcho Kué Diamond Project – August 2012 (PR#271)
- YKDFN Traditional Knowledge and Traditional Land Use Study Progress Report – November 2012 (PR#372)
- NWT Metis Nation Tradition Knowledge Study – November 2012 (PR#374)
- North Slave Metis Alliance Traditional Knowledge And Land Use Interim Report – December 2012 (PR#415)
- Deninu Kué First Nation Ethno-history Report – December 2012 (PR#418, 420)
- Lutsel K'e Dene First Nation Traditional Knowledge Report - December 2012 (PR#422)

Aboriginal organizations presented traditional knowledge information in their presentations at the Public hearings. The Panel also heard traditional knowledge directly from members of Aboriginal communities during hearings in Dettah, Lutsel K'e and Yellowknife.

4 Statutory decisions required of the panel

4.1 Purpose of the development

Section 117(3)(a) of the *MVRMA* requires the developer to describe the purpose of the development.⁶ De Beers describes the need for the Project, or project rationale, in Section 1.2 of its EIS. De Beers notes that the Project is being proposed at a time when two other open pit diamond mines are exhausting the resource that can be extracted by open pit mining. The developer suggests that reduced production will result at those mines because of the transition to underground mining. This means that output from Gahcho Kué will be a valuable contributor to the North American diamond industry. De Beers notes that the Project will benefit the NWT workforce by offering continued employment for people in the NWT with skill sets applicable to open pit mining. (PR#80 p. 1-16)

The Panel accepts this description of the purpose for the Project and finds that De Beers has satisfied the requirements of paragraph 117(3)(a) of the *MVRMA*.

⁶ *MVRMA* 117(3)(a)

4.2 Alternative means analysis

One of the statutory requirements in an environmental impact review is the requirement for the project developer to consider “alternative means, if any, of carrying out the development that are technically and economically feasible, and the impact on the environment of such alternative means”.⁷ De Beers submitted an analysis of project alternatives in Section 2 of its EIS to fulfill this requirement. The alternatives to the development examined included changes such as:

- change in the timing of the project to a later date;
- cancellation of the project; and
- full accounting of potential opportunity costs in consideration of possible effects on ecotourism, outfitting activities and traditional harvesting

Details on alternative means of carrying out the project were considered under the following headings:

- mining methods;
- water management;
- management of mine rock and processed kimberlite;
- employee work schedule; and
- transportation of workers and material (PR#80 Section 2).

In March of 2012, DFO requested that De Beers submit a more detailed alternatives analysis including a discussion of the potential impacts to fish and fish habitat of the various alternatives. During the Technical Sessions held in May 2012, De Beers committed to submitting a detailed alternatives analysis document to the Panel by mid-June (PR#216). De Beers submitted its *Detailed Alternatives Analysis Report* on June 18, 2012 (PR#240).

The June 2012 Detailed Alternatives Analysis assessed the available alternatives using the following broad criteria:

- technical feasibility;
- economic viability; and
- environmental considerations.

These criteria were subdivided by the developer so that alternatives with favourable economics along with reasonable long-term technical and environmental risks could be selected. For example, the alternatives considered for mining methods included open pit or underground mining, varying extraction rates and the sequencing of mining. Mine waste

⁷ MVRMA 117(3)(b)

management alternatives focussed on options for placing as much waste (mine rock, coarse PK fine PK) in mined-out pits as possible (PR#240 p18).

The June 2012 report also describes detailed alternatives for mine waste and water management with advantages and disadvantages set out for each as well as a description of the selected alternative. Impacts to fish and fish habitat from the various alternatives during Kennady Lake dewatering and refilling at mine closure were given particular focus in the alternatives analysis report.

The preferred alternative selected by the developer is in the current project description. De Beers states that by using the preferred alternative, a fully functioning ecosystem will develop in Kennady Lake after mining is complete and the lake would be reconnected with the surrounding watershed. (PR#240 pp14-70) The Panel accepts this conclusion and has completed its review on the basis of the current project description as set out in section 3 above. The Panel finds that De Beers has satisfied the requirements of paragraph 117(3)(b) of the *MVRMA*.

4.3 Need for follow-up

Subsection 117 (3) (c) of the *MVRMA* states that an environmental impact review of a proposal for a development shall also include a consideration of the need for any follow-up program and the requirements of such a program.

The *Mackenzie Valley Resource Management Act* defines “follow-up program” as a program for evaluating:

- The soundness of an environmental assessment or environmental impact review of a proposal for a development; and
- The effectiveness of the mitigative or remedial measures imposed as conditions of approval of the proposal.⁸

The first statement means that follow-up programs should test and evaluate the impact predictions and the environmental design features and mitigation included as part of the Project. In its EIS, De Beers proposes that monitoring programs will be implemented upon approval of the Project (PR#80 p.6-28). Section 12 of this report provides a summary of the developer’s proposed approach to monitoring and follow-up, the parties’ submissions and recommendations and the general requirements and rationale for follow-up identified by the Panel.

⁸ *Mackenzie Valley Resource Management Act*, Section 111.(1)

In Sections 5 to 11 of this report the Panel identifies the key valued components that could be impacted by the Project and whether the valued component requires a follow-up program as a condition of Project approval. Sections 5 to 11 address any component-specific requirements for follow-up while Section 12 provides a summary. The Panel has therefore fulfilled the requirements of paragraph 117 (3)(c).

4.4 Impacts on capacity of renewable resources

Subsection 117 (3) (d) of the *Act* requires that the Panel consider the capacity of any renewable resources that are likely to be significantly affected by the development to meet existing and future needs. The Panel identified caribou as a renewable resource that could be significantly affected by the development.

Communities in the NWT rely heavily on harvesting wildlife for food and as a way of practicing cultural and traditional activities on the land. The primary species harvested in the regional study area of the Project is barren ground caribou. The Panel considers the capacity of caribou herds to meet existing and future needs in more detail in Section 7. That section discusses impacts to caribou, caribou habitat and the related effects on people. In the view of the Panel, the capacity of caribou herds to meet existing and future needs is dependent on the implementation of a mitigation measure for caribou and its associated follow-up program which are also presented in Section 7.

The Panel has therefore satisfied the requirements of paragraph 117(3)(d) of the *MVRMA*.

4.5 Section 79 of the *Species at Risk Act*

The *Species at Risk Act*⁹ creates responsibilities for the Panel in addition to those set out in the *Mackenzie Valley Resource Management Act*. Specifically, if the project is likely to affect a listed wildlife species or its critical habitat, the Panel must identify the adverse effects of the project on the species and its critical habitat. If the project is carried out, the Panel must ensure that measures are taken to avoid or lessen those effects and to monitor the species.

Accordingly, the Panel identified Project impacts on species at risk and ensured that mitigation is in place to reduce and monitor those impacts. These impacts and mitigation measures are described in Section 9 of this Report. In the opinion of the Panel, this satisfies the requirements of Section 79 of the *Species at Risk Act*.

⁹ S.C. 2002, c.29, ss. 79(2).

5 Impacts to water

The issues of water quality and water quality objectives were central themes in the EIR, because the majority of Kennady Lake will be dewatered and a portion of Kennady Lake (an existing water body) will be used as a water management pond for groundwater, process water and runoff. At the end of mine life, Kennady Lake, including the water management pond, will be reconnected with the surrounding water bodies once the required post closure water quality objectives are met. During the EIR, the parties identified many concerns related to water and reclamation and closure. There were concerns about the effects of the processed kimberlite on water quality over the long term because it will be stored adjacent to the refilled Kennady Lake. Other concerns addressed the effects of poor water quality at depth in the mined out pits and whether it would remain isolated from the refilled Kennady Lake above it. There were also concerns about water quality and quantity effects downstream associated with the dewatering of Kennady Lake, and then refilling it approximately a decade later, and what effects those changes might have on fish populations and the ability of resource users to harvest fish. As a result, these concerns led the Panel to identify three key lines of inquiry related to water. As described in the Terms of Reference, De Beers was required to prepare an EIS that included a comprehensive and detailed analysis of the three key lines of inquiry:

- water quality and fish in Kennady Lake;
- downstream water effects; and
- long term biophysical effects and closure issues (PR#48 p. 22).

This section of the Report discusses the evidence and concerns on potential impacts to water quality and the aquatic environment in Kennady Lake and the receiving environment, both upstream and downstream of the Gahcho Kué Project. The Panel considered changes to water quality in Kennady Lake, the immediate upstream watershed and downstream waters resulting from the construction, operations, closure and post-closure phases of the mine. The developer's position is presented, followed by evidence and concerns submitted by the parties. Each subsection concludes with the Panel's analysis and opinion on the likelihood of significant adverse impacts followed by suggestions.

5.1 Water quality and water quality objectives

The quality of water subject to discharge must meet specific water quality objectives. The water quality objectives during mine operations may be different from the objectives at closure and post-closure. The water that must be managed in the water management pond includes groundwater that flows into the pits, waste water from the ore processing, and site runoff. Groundwater becomes increasingly saline with depth, thus the groundwater that needs to be managed is different in quality compared to surface water.

Water quality objectives are normally necessary to set standards for the protection of water from the impacts of mining developments. During the construction and operations phases, De Beers will control the Kennady Lake watershed, except for Area 8, so that water affected by the Project is contained and only released when it meets regulatory requirements (PR#80 p.1-24). Water quality objectives are also needed at the end of mine life to determine when Kennady Lake, including the water management pond, can be reconnected with the surrounding water bodies. The conditions within the management pond during operation are key to having the pond (Kennady Lake) reconnected at the end of mine life (PR#141 p.1). Several parties have suggested that during operations, methods should be identified and developed to reduce the period of time required for recovery of the water management pond.

The term “water quality objective” is defined by the Canadian Council for Ministers of the Environment (CCME) as “a numerical concentration or narrative statement that has been established to support and protect the designated uses of water at a specified site.”¹⁰ In the EIR, water quality objectives for the receiving environment are compared to the predicted impacts to water quality. If project-related water quality changes in the receiving environment are predicted to be lower than or at water quality objectives, then it is likely that the project will have no significant effect with respect to water quality impacts. If predicted changes are higher than some or all of the water quality objectives, then further information gathering and risk assessments may be necessary to determine significance.

As explained above, water quality objectives can be either numeric or narrative. The CCME has defined numeric water quality objectives for Canadian waters for different uses including the protection of aquatic life and drinking water. Drinking water standards are set out in Health Canada’s *Guidelines for Canadian Drinking Water Quality 1996*. The CCME guideline values for aquatic life are derived from an extensive amount of existing toxicity data performed on laboratory strains of various aquatic organisms (e.g., benthic invertebrates, fish, aquatic plants etc.) and intended to be protective of the most sensitive species, in the most sensitive life stage, over an indefinite period of exposure.

Guideline values are considered generic and useful for all water bodies; however, the CCME also defines methods for modifying water quality objectives to reflect site-specific considerations including baseline concentrations, toxicity modifying factors and resident species of aquatic organisms. These site-specific water quality objectives (SSWQOs) are used in the regulatory phase to assess and/or calculate effluent discharge limits (i.e., effluent quality criteria or EQC) for a project as per the Mackenzie Valley Land and Water Board’s Water and Effluent Quality Management Policy.

¹⁰ CCME (1999), Canadian Environmental Quality Guidelines, Guidelines and Standards Division, Winnipeg, MB

As discussed below, both numeric and narrative water quality objectives have been proposed by the developer and the parties during this EIR. They are intended to protect identified current and future water uses in water bodies downstream from Kennady Lake during all project phases, and in Kennady Lake after mine closure.

Site specific water quality objectives

Site specific water quality objectives apply to water quality parameters (such as pH, hardness, phosphorous levels) or the concentration of a chemical in a receiving water body. During the regulatory approvals phase, the Mackenzie Valley Land and Water Board will use SSWQOs to calculate effluent quality criteria in a water license. Effluent quality criteria are end-of-pipe discharge limits. When making a determination on water quality objectives, the Panel considers the acceptability of SSWQOs to decide on the significance of impacts to water. In other words, the Panel may determine whether or not there will be significant adverse effects on the aquatic environment assuming that the SSWQOs are met at a specific point downstream based on the evidence provided during the EIR.

The Panel will not provide a recommendation on effluent quality criteria. It is the responsibility of the Mackenzie Valley Land and Water Board to determine the effluent quality criteria in order to meet the narrative or quantitative SSWQO's. Further discussion of some of the specific technical matters related to methodologies or application is more appropriate at the water licensing stage, when more detailed information is available.

5.1.1 Developers' submission

DeBeers defined the project phases as follows:

- initial dewatering - Kennady Lake is drawn down and water is discharged to Lake N11 and Area 8 (Years -2 to -1);
- operational – water is diverted from mine pits and lake areas to the water management pond; water is discharged from the water management pond to Lake N11, as necessary (Years 1 to 11);
- closure – water is transferred from the water management pond to the Tuzo Pit and Kennady Lake is refilled from natural drainage and water pumped from Lake N11 (years 12-20); and
- post-closure – Kennady Lake receives only natural drainage and releases water to Area 8 (year 21 onward) (PR# 80 p.3-46).

Although De Beers defines the closure phase as the 8-year period between years 12 and 20, they note it will take between 8 and 16 years in total to refill the lake (PR#80 p.3-6).

DeBeers predicts that during construction, which includes initial dewatering, and operational phases, concentrations of total dissolved solids (TDS) in Kennady Lake (primarily areas 3 and 5, the water management pond) will increase. This increase would

be due to the management of saline groundwater inflows from the mining pits, natural runoff, and process water cycling. Total dissolved solids will decrease during closure when the water with high TDS is siphoned to the Tuzo pit and the lake is refilled with low TDS surface waters from surrounding watersheds (PR#184, p.8-32). Post-closure, TDS is expected to reach a steady state well below the Health Canada Drinking Water Guidelines. Similar trends are expected for major ions, with the exception of fluoride which is expected to increase during operations, decrease during closure and then increase slightly into the long term (post closure) with a steady state concentration just above the CCME Chronic Aquatic Health Guideline (PR# 184, p.8-33).

Concentrations of nutrients (ammonia, nitrate, phosphorus) are also expected to increase during construction and operations, decrease during closure and eventually reach a steady state at some point in the future (PR#184, p.8-35). The increase in phosphorus will result in Kennady Lake (areas 3 and 5) changing from oligotrophic (low productivity) to mesotrophic (moderate productivity) during the operational phase. Based on the original project design, De Beers predicted that Kennady Lake would remain mesotrophic into post closure due to inputs of phosphorus associated with the long term storage of processed kimberlite and waste rock adjacent to the Lake. During this EIR, De Beers made changes to the project design (disposal of more processed kimberlite in the mined pits) which would reduce the amount of phosphorus being released into the lake post-closure, thus allowing the lake to return to oligotrophic conditions post-closure (PR#184 p.8-37).

The predictions of water quality (and ultimately trophic status after closure) incorporate the model predictions of the stability of the water in the mined out pits (PR#184 p.8-49). The models suggest the strength of the stratification in the Hearne pit will weaken with time; however, the upward flux, which was included in water quality predictions, will contribute a relatively small amount of water and mass to the surface layer and therefore have a small effect on the water quality of Kennady Lake in the post-closure phase (PR#184 p. 8-49).

Although the refilled Kennady Lake is expected to remain oligotrophic there will be increased nutrient levels, and therefore the biomass of plankton and benthic invertebrates is expected to be higher compared to baseline levels (PR# 184 p.8-79). De Beers states that this may result in increased growth and production of small bodied forage fish (e.g. lake chub, slimy sculpin, ninespine stickleback), increased survival of larvae and increased growth and production of large-bodied fish species (PR# 184 p.8-79). De Beers expects the fish species assemblage to be similar to pre-development conditions including the re-establishment of large-bodied fish populations such as northern pike, Arctic grayling, burbot, round whitefish, lake trout, and possibly longnose sucker, although the relative abundances of the large-bodied fish species may change from baseline conditions (PR#184 p.8-80).

Concentrations of trace metals are expected to change in Kennady Lake due to potential loading sources such as rock and processed kimberlite drainage, groundwater, and pit wall

exposure (PR#184 p.8-38). Of the 23 modeled trace metals, 11 are predicted to increase in concentration during the operations phase and then steadily decline through post-closure. The other 12 metals will also increase during operations, but are projected to decrease during closure and reach a steady-state soon after closure that continues through post-closure (PR#184 p.8-38). While concentrations of metals during operations are predicted to increase above CCME guidelines, at post closure only copper and cadmium are predicted to be higher than CCME guidelines. However, these two metals have also been measured above guideline concentrations in baseline conditions (PR#184 p.8-38).

For Area 8, following the construction of Dyke A, the concentrations of many of the water quality parameters are projected to increase slightly above background concentrations due to evapo-concentration and lower inflows. Following closure, concentrations of all modeled constituents are projected to increase, reaching a peak concentration within 5 years of the reconnection of Area 8 with Kennady Lake (PR#184 p.8-41).

As a result of the Project, water quality is predicted to change in waterbodies downstream of Kennady Lake through the Interlakes (L and M watersheds) to Lake 410 as well as in the N watershed from Lake N11 through to Lake 410 (Figure 1; PR#184 p.9-5). Changes to water quality were predicted to have negligible effects on aquatic health in Lake N11 and Lake 410 and water quality in the Interlakes was predicted to be similar to that in Area 8, although parameter concentrations would gradually decline with distance downstream due to dilution (PR#184, p.9-9).

De Beers proposed final water quality objectives for the Project in a technical memorandum submitted to the Panel on September 14, 2012 (PR#292). The document provides both narrative objectives for water quality that describe overall water management goals as well as numerical water quality objectives that provide a basis for determining whether the overall goals will be met. Narrative statements that describe water management goals for Lake N11 and downstream waters during all project phases including construction (which includes initial dewatering) operations, closure and post-closure are described by the developer in the technical memorandum along with narrative statements for Kennady Lake during the post-closure phase.

The narrative statements proposed by De Beers are as follows:

for Kennady Lake:

- water quality changes as a result of Project activities will not significantly affect the suitability of Kennady Lake post-closure to support viable aquatic ecosystems;
- water quality changes as a result of Project activities will not significantly affect the return of populations of lake trout, northern pike and arctic grayling in Kennady Lake post-closure; and
- water quality changes as a result of Project activities will not negatively affect traditional and non-traditional uses of Kennady Lake post-closure.

For Lake N11 and downstream waters during all project phases,

- water quality changes as a result of Project activities will not significantly affect the suitability of Lake N11 and downstream waterbodies to support viable aquatic ecosystems;
- water quality changes as a result of Project activities will not significantly affect populations of lake trout, northern pike and arctic grayling in Lake N11 and downstream waters; and
- water quality changes as a result of Project activities will not negatively affect traditional and non-traditional uses of Kennady Lake post-closure (PR#292 p. 4; PR#184 p. 8-81, 9-69 and 10-15).

With respect to numerical water quality objectives, the developer has identified twelve substances (or parameters) of potential concern to water quality after closure once Kennady Lake has been refilled. In addition, 9 substances of potential concern are identified for Lake N11. De Beers proposes a 200 m initial dilution zone, or mixing zone in Lake N11 and water quality objectives would be met at the edge of that dilution zone. CCME guidance documents were used by the developer in developing interim water quality objectives for Kennady Lake and Lake N11 (PR#292).

De Beers states that the Aquatic Effects Monitoring Program (AEMP) water quality objectives can be re-evaluated as more data becomes available through monitoring during the operations phase of the mine. Adaptive management as part of the AEMP would then be used to re-evaluate water quality objectives (PR#292 p. 17). In its closing argument, De Beers states that they will consider revisions to the SSWQO narrative statements during the preparation of the AEMP which will consider traditional uses including drinking the water and catching and eating fish. De Beers does not support the narrative statement proposed by AANDC that references benthos and plankton or also their approach of applying pre-development hardness values. De Beers contends that the specifics on establishing baseline values in determining water quality objectives can be done during water licensing which includes AEMP development. In De Beers' view, narrative statements for site specific water quality objectives can be refined during the water licensing phase (PR#424 p.25).

De Beers' Summary of Commitments table, submitted to the Panel on December 14, 2012 summarizes commitments made during the EIR process and states that De Beers is:

“committed to not allowing changes to water quality that could adversely affect the drinkability of the water, the fish communities (lake trout, northern pike, Arctic grayling), or the ability to eat the fish in Lake N11 and Area 8 during operations, closure and post-closure and in Kennady Lake in post-closure”
(PR#406 p.8).

5.1.2 Parties submissions and recommendations

In its Technical Report, AANDC describes water quality objectives as the standard for water quality to be achieved at the edge of a mixing zone or assessment boundary downstream of a project. AANDC believes that this standard for water should be determined during the environmental impact review phase. A number of national and NWT specific policy documents provide guidance on determining water quality objectives, including documents produced by CCME and the Mackenzie Valley Land and Water Board's Effluent Quality Management Policy. (PR#325 p. 5-11)

In its Technical Report, AANDC provides recommendations and its rationale for water quality objectives. AANDC reviewed the developer's narrative statements that describe overall goals for water quality objectives and is of the opinion that the statements need greater detail in order to identify the specific level of protection the statements are intended to achieve. In its Closing Argument, AANDC revises and provides clarity on the narrative statements. They are slightly modified from those in its Technical Report in response to questions during the hearing. The revised narrative statements refer separately to levels of protection for Lake N11 and downstream waters during all project phases along with statements specifically for Kennady Lake during post-closure only. AANDC recommends that the narrative statements be placed as measures in the Report of EIR.

"Narrative statements could include for Lake N11 at the edge of the initial dilution zone and lakes downstream of Kennady Lake at all stages of the project (construction, operation, closure and post-closure):

- water quality changes due to mining activities will not significantly affect benthic macro-invertebrate and plankton abundance, taxonomic richness or diversity
- water quality changes due to mining activities will not significantly alter fish abundance and diversity and fish consumption at current levels
- water quality changes due to mining activities will not negatively affect areas utilized as traditional drinking water sources
- water quality changes due to mining activities will not significantly affect mammals or waterfowl using the area as drinking water , food source or habitat, or the current ability for people to harvest these animals

Narrative statements could include for Kennady Lake, at post-closure:

- prior to re-connection with the surrounding watershed, water and sediment quality in Kennady Lake is capable of supporting a viable and self-sustaining ecosystem that is compatible with the regional watershed and maintains traditional use of the area

- post-closure water quality in Kennady Lake, prior to re-connection with the surrounding watershed, is capable of supporting a benthic macro-invertebrate and plankton community with an abundance, taxonomic richness and diversity comparable to pre-mining conditions
- post-closure water quality in Kennady Lake, prior to re-connection with the surrounding watershed, is capable of supporting fish abundance and diversity and fish consumption comparable to pre-mining conditions. The level of contaminants within fish tissues and organs should not increase or accumulate to levels deemed harmful to fish health during the post-closure period (e.g. 50-70 years)
- post-closure water quality in Kennady Lake , prior to re-connection with the surrounding watershed, will not negatively affect areas utilized as traditional drinking water sources
- post-closure water quality in Kennady Lake, prior to re-connection with the surrounding watershed, is capable of supporting mammals and waterfowl using the area as a drinking water source, food source or habitat, and the current ability for people to harvest these animals at levels comparable to pre-mining conditions” (PR#412 p. 2-3).

During the December 6, 2012 public hearing in Yellowknife, AANDC stated that if these narrative statements were met through numerical water quality objectives, then significant adverse impacts are not likely to occur (PR#402 p. 87).

The primary differences between the narrative statements proposed by AANDC from the narrative statements and the commitment proposed by De Beers and described above section are the statements that reference benthos and plankton as well as the approach recommended by AANDC in applying pre-development hardness values.

Other parties, including Environment Canada and Tlicho Government also provided recommendations to the Panel to ensure that protective water quality objectives for the Project are set and to minimize the release of contaminants from the from the Project to the aquatic ecosystem. In its Technical Report, the Tlicho Government suggests that when setting SSWQOs, the developer should consider the traditional use of Aboriginal people in the region and objectives for water should be set so that the traditional uses can be protected (PR#332 p. 6). In its response to the Tlicho Government’s Technical Report, De Beers commits to considering this approach. Tlicho Government also recommends that De Beers derive its SSWQOs using CCME guidelines and other standard methods, which De Beers has agreed to consider as SSWQOs are further developed during the water licensing phase (PR#342 p. 3).

Submissions to this EIR have identified the importance of water to the parties. Specific traditional uses of water in the area have been identified such as drinking water, fishing, as a travel route and for cultural values. Aboriginal parties also expressed their holistic view of water as follows: “All of the lakes and rivers within the Gahcho Kué watershed are

considered to be a single body of water”¹¹. Parties, including YKDFN, LKDFN and the NSMA described their concerns with the impact of the project on water in written submissions and during the public hearings.

5.1.3 Panel’s analysis and recommendations

The Panel notes that the developer’s impact assessment concluded that these changes to water quality will not result in significant adverse effects. The Panel is aware that these changes are based on modeled predictions which assume the effective implementation of Project design features and mitigations. The parties questioned the methodology and input parameters for some of the water quality modeling and identified modeling uncertainty. De Beers also acknowledges the uncertainty in modeled predictions: “The model results [for water quality] are projections that are suitable for the assessment of effects; however, the model does not account for natural variability, and therefore, model results should not be viewed as predictions or forecasts of future conditions” (PR#106 p.8-307).

The Panel considered these facts in its deliberation.

De Beers states that “Changes to Kennady Lake and the downstream receiving environment as a result of the proposed Gahcho Kué Project are considered to represent an acceptable level of change as long as the aquatic ecosystem in the reconnected Kennady Lake and downstream receiving environment retains functionality similar to baseline conditions” (PR#290 p.8). De Beers has “committed to not allowing changes to water quality that could adversely affect the drinkability of the water, the fish communities (lake trout, northern pike, Arctic grayling), or the ability to eat the fish in Lake N11 and Area 8 during operations, closure and post-closure and in Kennady Lake in post-closure” (PR#406 p.8).

The Panel recognizes that the Project, as proposed, will result in the removal of Kennady Lake and its aquatic life (except for Area 8) from the ecosystem and watershed during the construction, operations and closure phases and that Kennady Lake is not predicted to return to a productive ecosystem until 30-70 years after Kennady Lake is reconnected with the surrounding watershed. The Panel is of the view that the removal of Kennady Lake during this time frame is not a significant adverse impact, because of the small size of the lake, and affected aquatic area, and the large number of other available lakes and aquatic habitats in the region.

The Panel notes that the Project as described will result in the removal of Kennady Lake and its aquatic life from the aquatic ecosystem and watershed (except for Area 8) during the construction, operations and closure phases. Once mining is completed and Kennady Lake is reconnected to surrounding waters, De Beers predicts that some fish species will

¹¹ Traditional Knowledge of Gahcho Kue Nene by Lutsel K’e Dene First Nation Nov. 2012 p.24

return within 5 years, and that a return to a productive ecosystem with steady state conditions will occur in Kennady Lake within 65 years after closure (PR#217 p32). The Panel is of the opinion that the project as described, including the commitments described in this Report is not expected to result in significant adverse impacts related to water provided areas downstream of Kennady Lake are protected. However, the project will likely experience unexpected events as well as accidents and malfunctions during construction, operations and closure. Adequate monitoring, contingency planning and adaptive management will be required to ensure that adverse impacts to water will not be significant. Therefore, the Panel has determined that a follow-up program for water quality is required. This program is described further in Section 5.4.

The Panel is of the view water quality downstream throughout all project phases and within Kennady Lake at post-closure needs to be protected but does not require a return to baseline conditions. Based on the evidence and information provided, the Panel is in agreement with the developer that “Changes to Kennady Lake and the downstream receiving environment as a result of the proposed Gahcho Kué Project are considered to represent an acceptable level of change as long as the aquatic ecosystem in the reconnected Kennady Lake and downstream receiving environment retains functionality similar to baseline conditions” (PR#290 p.8).

The Panel is of the view that the differences of opinions between the parties and the developer regarding specific water quality objectives can be dealt with in the water licensing phase. As stated in Section 8.1 of the MVLWB Policy, when the MVLWB is setting water quality objectives, it must consider the “measures and suggestions, including predictions and limits of acceptable change, listed in Reports of Environmental Assessment or Environmental Impact Review”. The Panel considers De Beers’ commitment “to not allow changes to water quality that could adversely affect the drinkability of the water, the fish communities (lake trout, northern pike, Arctic grayling), or the ability to eat the fish in Lake N11 and Area 8 during operations, closure and post-closure and in Kennady Lake in post-closure” as key in its findings. In the opinion of the Panel, if the Project is constructed, operated and closed as described by De Beers and the commitments it has made are followed, there will be no significant adverse impacts to water quality.

Based on the information presented by the parties and the developer, the Panel is of opinion that the CCME Guidelines for Protection of Aquatic Life are adequate to protect aquatic life, and will protect traditional uses including drinking water. An exception is for the aspect of traditional use related to the edibility of fish, which is more aesthetic or sensory in nature and a narrative statement is more appropriate. Several parties have expressed a preference for narrative objectives rather than numeric objectives. The Panel agrees and suggests narrative objectives as described below. However, the Panel acknowledges that values in the Guidelines for the Protection of Aquatic Life may also be acceptable.

The Panel provides the following suggestion which outlines the Panel's assessment of acceptable change expressed as narrative water quality objectives:

Suggestion #1

(a) Traditional water uses in Lake N11 (outside of the initial dilution zone) and in all waters downstream of Kennady Lake should not be affected by Gahcho Kué mining activities throughout construction, operation and reclamation of the mine. Post-closure conditions in all waters in the region, including the refilled Kennady Lake, shall support all traditional water uses. Traditional water uses include:

- drinking the water
- harvesting and consuming fish

This means that:

(b) Throughout all project stages (construction, operations, closure and post-closure) the Gahcho Kué Project should be designed and managed by De Beers so that the following water quality objectives in Lake N11 or any waters downstream of Kennady Lake are met:

- water quality changes due to Project activities will not substantially alter the suitability of waterbodies to support viable aquatic ecosystems; and
- water quality changes due to Project activities will not substantially alter fish health, abundance or diversity or impact the ability of traditional users to harvest or consume fish.

(c) De Beers should monitor conditions, including water and sediment quality, during the refilling of Kennady Lake to ensure that conditions are suitable to support aquatic life before re-connecting the lake to the rest of the watershed.

5.2 Impacts of dewatering Kennady Lake and flooding adjacent lakes

5.2.1 Developer's submission

In Section 3.9 of the 2012 EIS Supplemental Information Submission, De Beers describes water management at the mine site from initial dewatering of Areas 2 to 7 through operations to refilling of Kennady Lake. The section describes updates to water management based on supplemental mitigation and updates to project design. Dewatering of Kennady Lake involves constructing perimeter and internal water retention dykes in order to isolate and draw down water in various portions of the lake so that the ore bodies under the lake can be accessed and mined (PR#184 p. 3-48 – 3-49).

Impacts to the small upstream lakes and aquatic life in the D and E watersheds during dewatering of Kennady Lake include:

- release of sediment during dyke construction may change water quality and impact fish and fish habitat
- increase in water levels may lead to erosion and affect fish and fish habitat
- release or generation of nutrients, mercury and other substances from flooded sediments and vegetation may change water quality and affect aquatic health and fish

De Beers predicts temporary changes in surface water and sediment quality as a result of water level increase in these small lakes. However, preparation of the flooded areas where necessary and monitoring will limit long-term nutrient and metal releases to these lakes as well as mercury methylation. The developer anticipates only minor changes in water and sediment quality and predicts that residual effects on fish will be negligible. (Pr#80 p. 8-219-225)

De Beers estimates in its 2012 EIS Supplement that more than half of the water in Kennady Lake can be pumped out and discharged into downstream waters without treatment. During the first phase of dewatering, water will be pumped via pipelines to Area 8 (the natural outlet for Kennady Lake) and Lake N11 in the N watershed north of Kennady Lake. Due to predicted high sediment loads in water during drawdown, dewatering of areas 6 and 7 will include treatment of the water to reduce total suspended solids using in-line flocculation. Water discharged from Kennady Lake during dewatering will be sampled and monitored for total suspended solids and other parameters, and any water that does not meet discharge standards will be stored in controlled areas of Kennady Lake until it meets discharge criteria. (PR#184 p. 3-57-60)

5.2.2 Parties' submissions and recommendations

In its technical report, Environment Canada describes the potential formation of methyl mercury following shoreline inundation during the flooding of lakes D2, D3 and E1 as a

result of dewatering of Kennady Lake. Environment Canada believes that monitoring of the flooded lakes, including water, sediment and fish will be important to validate predictions made by De Beers regarding mercury concentrations. To address this potentially adverse impact EC recommends that De Beers identify specific management response actions in the event that mercury concentrations approach predicted levels in water, sediment or fish. (PR#333 p. 17-19)

In its response to EC's Technical Report, De Beers commits to this recommendation from Environment Canada and repeats it in its Summary of Commitments. Specifically, De Beers commits to:

“monitoring of mercury concentrations in edible fish tissue in the raised D-E-N lakes prior to and following raising the lake and during operations using non-invasive techniques, to determine whether there is a potential issue. Specific management response actions to any upward trend of mercury concentrations following water level increases would be determined, if and when necessary, through engagement with regulatory agencies, including Environment Canada, and Aboriginal communities” (PR#348 p.5, #406 p. 8).

NRCan provided three recommendations for ensuring the stability of the dykes that are used to isolate Kennady Lake and create the water management pond, and in particular for the dykes that will remain at closure (PR#328). NRCan states that these recommendations provide guidance on factors that should be considered in the detailed/final design for the Project or subsequent monitoring and follow up plans to ensure that possible environmental impacts are minimized (PR# 408 p.2). De Beers agreed to these recommendations which are described in more detail in Section 9.2.2 of this Report.

Transport Canada advised that an exemption under Section 23 of the *Navigable Waters Protection Act* is required in order for De Beers to dewater and place tailings in Kennady Lake. Transport Canada is satisfied that the developer has acknowledged this requirement and that De Beers plans to file the appropriate application to Transport Canada during the regulatory phase (PR#411 p. 1).

The parties' view on the impacts to fish and aquatic life from dewatering Kennady Lake and downstream flows are described in Section 5.

5.2.3 Panel analysis and recommendations

The Panel observes that De Beers has committed to monitor and mitigate increasing trends in mercury concentrations in fish in the areas flooded as a result of construction and operation of the Project. Panel acknowledges that once mercury levels in fish rise above guidelines for human consumption, the only mitigation is harvest restrictions. Therefore, preventative actions to reduce increasing mercury concentrations (such as removing

vegetation before flooding as suggested by the developer) and appropriate monitoring and effective adaptive management are necessary.

The Panel is of the view that the design and maintenance of the dykes are a key engineering component of the Project, and ensuring the integrity of the dykes, especially those that will remain after closure, is necessary so that there no significant adverse impacts. Therefore, De Beers should implement the geotechnical investigations, analysis, and development and implementation of monitoring as proposed by NRCan in recommendations 1, 2 and 3 of their technical report (PR#328). De Beers has already committed to these recommendations, and those commitments are considered to be part of the scope of development for the Gahcho Kué Project.

In the Panel's view the dewatering of Kennady Lake and flooding of adjacent lakes is not likely to have significant adverse impacts on water and the environment provided the Project is constructed, operated and closed as described by the developer and its commitments are followed.

5.3 Impacts of the mine on water quality at closure

5.3.1 Developer's submissions

At the end of mining, Kennady Lake will be refilled and reconnected to the surrounding watersheds. De Beers predicts that it will take a long time for Kennady Lake to recover and form a sustainable ecosystem with a self-sustaining fish population. Northern pike are expected to be re-established 50-60 years following the complete refilling of Kennady Lake and lake trout will require 60-75 years to re-establish a stable self-sustaining population after the lake is refilled. (PR#80 p. 8-513) De Beers has proposed a range of time (60-75 years) as the period required before a self-sustaining population of aquatic life is expected to return to the lake. The reason for this range of time is due to the unknown span of time it will take for the lake to refill (8-16 years) and uncertainties in the re-population rate of the lake by various trophic levels including fish species.

At the end of mine operations, the water management pond (Areas 3 and 5) will contain poor water quality that will not be suitable for discharge into the surrounding watershed. De Beers proposes to transfer this poor quality water to the Tuzo pit and the water management pond will then be reconnected with the surrounding watershed. Refilling of Kennady Lake will be supplemented through active pumping of water from Lake N11.

De Beers predicts that the poor water stored in the Tuzo and Hearne pits will stratify or form a chemocline and will not mix with the acceptable water above, resulting in limited impacts on water quality above the chemocline.

In its summary of commitments, De Beers provides a list of reclamation activities that will occur during the closure phase. Reclamation activities from this list specific to water include:

- removal or breaching of dykes and refilling Kennady Lake
- evaluate opportunities to restore Area 7 earlier in the mine plan
- breaching Dyke A that separates Kennady Lake from the downstream will only occur once the water quality is at an acceptable quality as defined in the water license discharge criteria
- restoration of navigation
- reclamation plans will be developed iteratively during the Project in consultation with regulators and aboriginal authorities
- traditional knowledge will be considered in reclamation and closure plans (PR#406 p. 14)

5.3.2 Parties submissions and recommendations

Environment Canada provided specific recommendations in its technical report on tracking water quality changes prior to and during closure when Kennady Lake will be reconnected to surrounding surface waters. Environment Canada notes that one of the developer's modelling assumptions predicts water quality on a mixed whole-lake basis and assumes that poor quality wastewater will remain isolated at the bottom of Tuzo pit in permanent stratification. Freshwater overlying the poor quality water in Tuzo and Hearne pits is assumed by the developer to be fully mixed with the rest of Kennady Lake. (PR#333 p. 15)

Environment Canada is concerned that using whole-lake averages could mask pockets of poorer water quality where areas of unacceptable chronic toxicity to aquatic life could occur. In order to be protective of aquatic life in Kennady Lake once reconnection with surrounding surface water occurs, Environment Canada believes that water quality objectives should be met in areas of maximum poor water quality in the lake. Environment Canada's specific recommendation states that:

"Monitoring to track water quality changes in Kennady Lake during closure should include measurement of deeper areas and water column profiles, as well as the waters overlying the mine pits. Assessment of lake water quality (suitability for reconnection) should be based on individual maxima rather than whole lake mixed averages" (PR#333 p. 15).

In its response to EC's technical report, De Beers commits to monitoring the basins of Kennady Lake including the mine pits at closure and an assessment of water quality in each of the key basins (ie. areas 3, 5, 6 and 7) will be considered in the evaluation of suitability of the refilled Kennady Lake to be reconnected to downstream waters (PR#348 p. 3). This commitment is not found in De Beers' summary of commitments submission, nor is there any reference to monitoring the stability of the chemocline.

In its technical report AANDC describes its position on mine site closure in the Northwest Territories generally as well as specific to this Project and provides recommendations to the Panel with rationale. These recommendations include:

- monitoring and adaptive management of water quality during refilling of Kennady Lake so that it can eventually support a viable self-sustaining ecosystem compatible with the regional watershed and traditional use;
- monitoring and identifying potential mechanisms through which full lake mixing could occur and to implement measures to enhance chemocline stability;
- identifying and developing methods to reduce the period of time for recovery of the water management pond to occur; and
- ensuring that the closure goals and objectives are developed in consultation with Aboriginal groups, interested parties and regulators are met prior to and following the connection of the water management pond with the downstream environment (PR#325 p.19).

These recommendations are consistent with AANDC's Mine Site Reclamation Policy which states that:

"Following mine closure, mining companies or their future owners should continue to be responsible for the site, including the remediation of any additional environmental complications which develop."

"The total financial security for the final reclamation required at any time during the life of the mine should be equal to the total outstanding reclamation liability for land and water combined"

"The required standard of reclamation should be based on the 1994 Whitehorse Mining Initiative definition: "returning mine sites and affected areas to viable and, wherever practicable, self-sustaining ecosystems that are compatible with a healthy environment and with human activities" (PR#325 p. 17)

AANDC states in its technical report that it is not the typical practice for waste rock and processed kimberlite piles to be in direct contact with a water body, as is proposed for Kennady Lake at closure. AANDC contends that the final water quality of the refilled Kennady Lake may be different from predicted values depending on how accurate the assumptions are. As a result of these uncertainties, AANDC is unsure whether the water quality in the refilled Kennady Lake will be able to support a viable and self-sustaining ecosystem compatible with surrounding watershed and maintain traditional uses. (PR#325 p. 17)

AANDC concurs with EC, that the successful establishment of the chemocline or stratification layer in the pits is critical prior to allowing reconnection of Kennady

Lake with fresh water. The chemocline in the pits must be stable in perpetuity and therefore a key element of the closure planning should be to identify potential mechanisms through which full mixing could occur and any mitigation that could serve to enhance the stability of the chemocline should be implemented as early as possible during the operations and early closure and post-closure phases. If there is uncertainty in the long-term stability of the chemocline, AANDC believes that contingency options to ensure acceptable post-closure water quality should be implemented. These include water treatment or other adaptive management methods. (PR#325 p. 18)

De Beers agrees in principle to AANDC's recommendations for monitoring water quality during closure, identifying mechanisms and mitigations for whole lake mixing and to reduce the period of time for the WMP to recover through the closure planning process (PR# 347 p.6), but makes no commitments regarding the latter two in the Summary of Commitments (PR#406). DeBeers states that they will develop closure and reclamation objectives for the Project that are consistent with various guidelines (PR#347 p.7) but does not make any commitment that these objectives will be met prior to the reconnection of the water management pond with downstream waters.

In its technical report, LKDFN recommend that a measure be put in place to ensure that the developer is responsible for water quality at closure and beyond and that a maximum security bond be put in place to ease uncertainty (PR#326 p. 8). During the hearings, NSMA expressed concern with the lack of water treatment contingency in the event that water quality during project phases is worse than predicted by the developer. The NSMA closing submission recommends that the developer should construct an operable water treatment plant to treat water if rising contaminants are unable to be mitigated through discharge timing, water segregation or increased water storage capacity (PR#414 p. 2).

5.3.3 Panel analysis and recommendations

The Panel notes that De Beers commits to monitoring the basins of Kennady Lake, including the mine pits, during the closure phase when refilling of Kennady Lake occurs (PR#348 p. 3). De Beers also commits to monitoring the water quality during the mine operations to verify the water quality modelling projections presented in the 2012 EIS supplement and to continue to develop contingency plans for the operational and closure stages of the Project such that they can be implemented as needed (PR#348 p. 4). The Panel suggests that these commitments should be incorporated into the Aquatic Effects Monitoring Program which will be required during the regulatory phase for the water licence.

The Panel agrees that there are uncertainties with the developer's preliminary modeling and predictions that the refilled Kennady Lake will be suitable to support viable aquatic ecosystems and the return of lake trout, northern pike and arctic grayling. The Panel acknowledges that while closure scenarios cannot be predicted with complete accuracy,

work can be done throughout operations to test and refine predictions and respond if necessary to unanticipated trends.

The Panel has provided Suggestion #1 described earlier in this Report, that Kennady Lake must support traditional uses and a viable aquatic ecosystem post-closure. In order for healthy and self-sustaining aquatic life to re-establish and remain in Kennady Lake over the long-term, the sequestered poor water quality at the bottom of the Tuzo pit must remain below the stratification level or chemocline.

In the Panel's view the Project is not likely to have significant adverse impacts on water quality at post-closure provided the Project is constructed, operated and closed as described by the developer and its commitments are followed and enforced by regulators.

The Panel provides the following suggestions to support closure planning and improve predictions on pit lake stratification at closure.

Suggestion #2

During operations, part of closure planning should include the identification of potential mechanisms through which full lake mixing could occur (e.g. weathering, pit wall slumping) and use the results of ongoing investigations and studies to implement measures such that chemocline stability will be enhanced. Once mining is complete, the information gathered should be used to improve the likelihood that successful pit lake stratification can be achieved over the long-term.

Suggestion #3

During operations, closure planning should identify and develop methods to reduce the period of time required for recovery of the refilled Kennady Lake.

5.4 Aquatic Effects Monitoring Program as a follow-up program

5.4.1 Developer's submission

De Beers submitted an EIS supplement in April of 2012 (PR#184). The submission describes the supplemental mitigation of the fine processed kimberlite containment (PKC) facility and assesses the supplemental mitigation on the aquatic environment (PR#184 p. 1-1). In the 2012 EIS supplement, the PKC facility footprint is reduced in order to reduce long-term phosphorous loading from the facility into the aquatic environment. From years 5 to 7 of mine operations, 1.5 Mt of fine PK solids will be deposited in the mined-out 5034

pit instead of the PKC facility. After year 7 of mine operations, fine PK will be backfilled into the mined-out Hearne pit

In May 2012, De Beer's submitted a conceptual Aquatic Effects Monitoring Program (AEMP) framework document including overall monitoring objectives for aquatic effects monitoring as part of the environmental monitoring and management framework (PR#204 p. 19-32). De Beers notes in this framework that a detailed AEMP will be developed during water licensing. De Beers states in the framework document and again in the summary of commitments that they will consider using the following guidelines in the development of the AEMP and related response framework:

- *Guidelines for Designing and Implementing Aquatic Effects Monitoring Programs for Development Projects in the Northwest Territories* (AANDC, 2009); and
- *Guidelines for Adaptive Management – a Response Framework for Aquatic Effects Monitoring* (WLWB 2011) (PR#204 p. 19, PR#406 p. 7).

De Beers submitted a summary of commitments to the Panel on December 14, 2012 as an undertaking after the public hearings. In this document, De Beers commits to preparing an Aquatic Effects Monitoring Program as part of its water license (PR#406 p. 7). Specific commitments in the summary of commitments relate to monitoring and address many of the recommendations made by the parties in their technical reports.

5.4.2 Parties' submissions and recommendations

In its technical report, AANDC recommends that De Beers be required to follow the 2009 AEMP Guidelines rather than simply to "consider" them as stated by the developer. AANDC's reasons for this is that the Guidelines provide a solid basis for identifying and monitoring project related effects and that they provide for the incorporation of traditional knowledge. In addition, the Guidelines provide a mechanism to include adaptive management, through a response framework, with specific linkages to monitoring results and action levels. The steps for designing and implementing a framework for water monitoring are described in AANDC's technical report. (PR#325 p. 12-15)

Environment Canada submitted recommendations on monitoring and adaptive management in its technical report. The purpose of the monitoring and follow-up is to address the developer's modeling uncertainties, compare monitoring observations to impacts predictions and detect any unforeseen or unanticipated effects. A key purpose of monitoring is thus to inform adaptive management. EC recommends that De Beers use experience gained during operating the mine to test the validity of the modeled water quality predictions and predicted impacts to water and aquatic life (PR#333 p. 13-14). In its response to the recommendations in the EC technical report and in its summary of commitments, De Beers commits to EC Recommendation 3.1 with respect to monitoring and adaptive management and Recommendation 3.2 regarding evaluating water quality objectives (PR#348 p. 2, PR#406 p.9).

In its closing statement, NSMA recommends that the developer include the traditional knowledge of the North Slave Metis in the development of the Aquatic Effects Management Plan (PR#414 p. 3)

In its technical report, LKDFN recommended that a measure be put in place in the Report of EIR to ensure that the developer is responsible for water quality at closure and beyond. LKDFN are unconvinced that water quality will be acceptable at closure and recommend the maximum security amount to ease uncertainty (PR#326 p. 8). De Beers responded to this by stating that:

“Water quality will be monitored throughout the mine life and compared to benchmarks to identify future risk and proactively deal with potential issues during mine operations and closure before Kennady Lake is fully restored. During closure, the rate of refilling of Kennady Lake will be determined by supplemental pumping of water from Lake N11 and by water flowing into Kennady Lake after the removal of dykes E, F and G. The following measures can be applied to identify the risk and deal with the potential water quality issues:

- if a specific water quality issue is identified during mine operation, the overall water and mine waste management plans will be modified to mitigate the issue;
- if a risk is identified during mine closure, the closure and refilling plan will be adjusted accordingly. For example, breaching of Dykes E, F, and G can be delayed and refilling pumping from Lake N11 may be adjusted to allow a longer closure period to deal with the potential water quality issue before the water level in the controlled basin is raised to its original lake elevation of 420.7 metre (m);
- identify the key sources of the poor quality water and develop specific plans to improve the water quality.

In an unlikely case that the water quality cannot meet discharge criteria after the water level in the controlled area continues to rise towards the original lake elevation of 420.7 metres above sea level (m), the following measures can be applied:

- delay or constrict the flow rate after breaching of Dykes E, F, and G.
- reduce the refilling pumping from Lake N11 to allow a longer closure period.
- isolate the poor quality water from the area where the water quality can meet discharge criteria.
- Raise the containment dykes to store the poor quality water until the water quality meets discharge criteria.
- Treat the poor quality water zone.” (PR#344 p. 3-4)

In its response to Environment Canada's Technical Report, recommendation 3.3 to actively minimize levels of contaminants in the system and to develop a treatment contingency plan which identifies feasible treatment methods for the operational and closure stages, De Beers states that water management contingencies include:

- using expanded storage capacity in the system;
- discharging at different times of the year when the water quality allowed;
- separating the water sources and sequestering poor water in isolated areas;
- maximizing the use of poor quality water in the process plant where the water will ultimately be directed to one of the mined out pits later during mine operations;
- removing suspended solids with a combination of flocculants and a settling pond;
- increasing the storage capacity of the water management system; and
- reducing the lake refilling time and/or installing a water treatment plant to deal with specific water quality issues (PR#348 p. 4).

De Beers further states that it “will be monitoring the water quality during the mine operations to verify the water quality modeling projections presented in the 2012 EIS supplement (De Beers 2012d), and commits to continue to develop contingency plans for the operational and closure stages of the Project such that they can be implemented as needed” (PR#348 p 4). This commitment is included in the list of developer commitments compiled by the Panel and found in Appendix C2 of this Report. While the specific water management contingencies described above in response to EC and LKDFN recommendations are not included in the developer's summary of commitments table (PR#406 and Appendix C1), in its closing argument, De Beers lists available contingencies to deal with water that does not meet discharge criteria when release of water is planned during initial dewatering (PR#423 p. 33-34). EC reiterates its recommendation that the developer prepare a water treatment contingency plan that identifies feasible treatment methods for the operational and closure phases of the Project (PR#421 p.2).

At the community hearing in Lutsel K'e, the Panel heard the following views from community members:

- draining a lake is a significant impact, attempting to control water behind numerous dykes is a significant impact and any slight impact on the Lockhart River is a significant impact (PR#394 p. 122);
- people do not want any impact to the spiritually and culturally important site, Lady of the Falls, located on the Lockhart River (PR#394 p. 158);
- there are concerns with spills at the Snap Lake mine (PR#394 p. 160);
- the Lutsel K'e Dene First Nation and membership oppose the Gahcho Kué project until the Snap Lake mine is improved and until trust is built in order to work together and improve from here on (PR#394 p.160-161).

In its closing statement, LKDFN restates concerns with contaminants in the water downstream from the De Beers' Snap Lake Mine and that De Beers needs to improve water

management at that mine site. LKDFN notes that the Gahcho Kué Project is 4 km from the proposed Thaidene Nene protected area, which is intended to protect the quality and quantity of water within its boundaries. (PR#410 p. 7)

LKDFN are concerned that water from the mine site will eventually flow over the Lady of the Falls on the Lockhart River. This is a spiritual site of great importance to the Dene people, who believe that if people protect the land and water, then the Lady of the Falls will protect the people. The Lutsel K'e Dene are not willing to have any kind of impact to this spiritual site. While De Beers has stated water quality and quantity will not be impacted that far downstream from the Project, LKDFN state that alternative linkages of water flow through Fletcher and Walmsley Lake have not been properly investigated. If this connection were to exist as suggested by Traditional Knowledge, the distance that water would travel between the mine and the Lockhart River would be reduced. (PR#410 p. 7)

During the public hearings in Yellowknife, the developer described its efforts to address concerns from LKDFN who advise that there may be a connection between Kennady Lake and the Hoarfrost River. De Beers state that they did assess the possibility of a connection, including an investigation with the Water Survey of Canada, but did not find one. De Beers advises that since the concern remains outstanding, they commit to further work with the Water Survey of Canada to conduct hydrological monitoring of downstream waterbodies including perceived connections to Fletcher and Walmsley Lakes and the Hoarfrost River (PR#396 p. 54-55, PR#406 p. 8 and Appendix C-vii).

5.4.3 Panel analysis and recommendations

The Panel views the Aquatic Effects Management Program as a key component in the water management framework which specifies how monitoring and responding to changes or unpredicted outcomes will be dealt with during the operational and closure phases of the Project. The AEMP will be further developed during the regulatory phase and will be incorporated into the water license. The Panel anticipates that an AEMP completed in accordance with a water license will be comprehensive enough to address the concerns expressed by the parties.

The Panel is aware of the AANDC guidelines for designing and implementing an AEMP and agrees that the developer should comply with the guidance set out in this document. The rationale for this is that the AANDC Guidelines are comprehensive and incorporate both Traditional Knowledge and adaptive management into AEMP development. The Panel expects that the Mackenzie Valley Land and Water Board will ensure that a comprehensive and appropriate AEMP framework will be developed.

Kennady Lake is near the headwater boundary between two watersheds. Field work by De Beers indicates that the surface water flow path from Kennady Lake is north to the Lake 410 watershed to Kirk Lake. During the hearings and in written submissions, the Panel

heard that Traditional Knowledge from elders of the LKDFN suggests alternate surface water flow and potential groundwater flow paths that could connect with the Hoarfrost River or a shorter route to the Lockhart River.

The Panel expects that an AEMP will include monitoring locations to determine whether surface water flow direction predictions of the developer are correct for the duration of the Project. The specific monitoring locations should be determined during the water licensing phase in consultation with the LKDFN. This monitoring should be designed to address the concerns of Lutsel K'e residents about the impacts to water quality on the Lockhart River and verify the predictions by the developer that any potential changes will not be measurable.

Water management contingency planning is important due to the uncertainties with De Beers' modelling predictions. The Panel is mindful that water quality predictions cannot not be completely accurate and that operational adjustments for water management may be necessary to respond to unanticipated effects of mine development at Kennedy Lake, including the water management pond and downstream waters. The project will likely experience unexpected events that were not predicted as well as accidents and malfunctions during construction, operations and closure. Adequate monitoring, contingency planning and adaptive management will be required to ensure that adverse impacts to water will not be significant.

The Panel is of the opinion that if the Project does not operate as proposed and predictions and assumptions turn out to be inaccurate and are not managed properly, there could be adverse environmental impacts. For example, if the chemocline in the pits does not stabilize and the poor quality water disposed into the bottom of the pits mixes with the water above it, there could be adverse impacts to water quality in Kennedy Lake and potentially downstream.

Therefore, the Panel concludes that a follow-up program for water quality is required. The Panel notes that the developer has committed to prepare an AEMP as part of water licensing. In the opinion of the Panel, the AEMP which will become a condition of the water license will satisfy the need for a follow-up program addressing water related matters. The AEMP is necessary to ensure that there is proper monitoring and mitigation to deal with changes and/or unpredicted outcomes. In the opinion of the Panel the water management contingencies proposed by De Beers should be addressed by the AEMP and refined during water licensing (See Section 5.4).

In order to address uncertainties in predictions and project changes that may occur during operations and closure, the Panel requires the preparation of an AEMP as a follow-up program.

Requirements for follow-up program for water

The developer should follow the AANDC document titled Guidelines for Designing and Implementing Aquatic Effects Monitoring Programs for Development Projects in the Northwest Territories, June 2009 in the development of its Aquatic Effects Monitoring Program (AEMP), including action levels and the related management response framework. The AEMP should be designed and implemented by the developer and overseen by regulators and should include, but is not limited to:

- verifying predictions about aquatic effects due to the Project and revise predictions based on mine operations experience;
- verifying whether narrative water quality objectives outline in Suggestion #1 are being achieved upstream, downstream, and within Kennady Lake as described in this Report and implement mitigations if necessary to ensure water quality objectives are maintained;
- developing and implementing a water management contingency plan that includes contingent water treatment, in the event that water quality is not suitable for discharge during the operations and closure phase. The water management contingency plan should include:
 - using expanded storage capacity in the system with no discharge;
 - discharging at different times of the year when the water quality allows;
 - separating the water sources and sequestering poor water in isolated areas;
 - maximizing the use of poor quality water in the process plant where the water will ultimately be directed to one of the mined out pits later during mine operations;
 - removing suspended solids with a combination of flocculants and a settling pond;
 - increasing the storage capacity of the water management system;
 - reducing the lake refilling time;
 - installing a water treatment plant to deal with specific water quality issues;
- monitoring mercury concentrations in edible fish tissue in the raised D-E-N lakes prior to and following raising the lakes and during operations; and
- confirming that there is not a connection with adjacent watersheds after flooding has occurred with Fletcher and Walmsley Lakes and the Hoarfrost River as identified through Traditional Knowledge by the LKDFN and implement appropriate mitigations if the water quality and quantity objectives are not being met in any adjacent watersheds as a result of the Project.

6 Impacts on fish and aquatic life

The Gahcho Kué Project requires the dewatering of most of Kennady Lake. During dewatering, areas upstream from Kennady Lake will be flooded. During dewatering and throughout mine operations there will be changes to water flow downstream of the mine. This section describes potential impacts to fish from changes in flows downstream of Kennady Lake, the proposed fish habitat compensation plan and the fish salvage operation.

6.1 Impacts to fish due to changes in downstream flows

6.1.1 Developers' submission

In its EIS, De Beers describes Project activities and their impacts on fish and fish habitat. These activities and predicted impacts to fish and fish habitat grouped by project phase include:

Construction and operations phase

- the Project footprint in Kennady Lake will result in the loss of fish and fish habitat;
- dewatering of Kennady Lake and other small lakes will cause mortality and spoiling of fish, loss of productive capacity of Kennady Lake during construction, operations and closure and alter flows and water levels;
- isolation and diversion of upper Kennady Lake watersheds will change flow paths and dyke construction will result in the loss of stream habitat, alter water levels, result in shoreline erosion, sedimentation, and change lower trophic levels, fish communities and migration;
- construction and mining activity will result in the deposition of dust and particulate matter (from air emissions) in water bodies near the activities and increase suspended sediment and cause changes to aquatic health;

Closure and post-closure phase

- removal of temporary diversion dykes will result in changes to water levels and lake areas, changes to lower trophic levels, fish communities and migration;
- refilling of Kennady Lake will result in changes to nutrient levels in Kennady Lake which in turn will result in changes to lower trophic levels, dissolved oxygen levels, fish habitat and fish communities;
- post-closure activities may result in changes to aquatic health that may affect fish populations and abundance (PR#80 p. 8-336).

To mitigate the potential for erosion of the lake bottom sediments by water pumped from Area 7 into Area 8 during dewatering, De Beers introduced the use of diffusers to the project plan (PR#80 p 8-198). De Beers states that the potential for erosion of lake bottom sediments in Area 8 and Lake N11 will be reduced during dewatering through the use of diffusers on the discharge pipe outlets. De Beers also states diffusers, if required, will be placed as close to the surface as possible over the deepest portion of Area 8 to increase the distance between the outfall and the bottom sediments (PR#80 p. 8-210). However De Beers notes that some sediment may be mobilized despite these measures. De Beers assumes that sediment re-suspension will diminish quickly with distance from the outfall and will likely be limited to the zone of turbulence adjacent to the diffuser (PR#80 p 8-151).

In the EIS supplement De Beers notes that dewatering of Area 7 and pumping to Area 8 may change water quality and impact fish (PR#184 p. 8-17). De Beers commits to directing pumped discharge to Lake N11 and Area 8 through properly designed outfalls/diffusers to prevent erosion (PR#406 p. 10).

De Beers submitted a downstream flow mitigation plan on June 29, 2012 along with a Flow Mitigation: Field Report and Assessment technical memorandum submitted October 12, 2012. The purpose of the plan is to augment flows downstream of the natural discharge from Kennady Lake (Area 8) to avoid harmful impacts to fish populations downstream of Kennady Lake during mine operations and during refilling of the lake at closure (PR#316). The intent is to define appropriate spring spawning flow for arctic grayling, including the flow at which barriers to fish migration no longer exist and a suitable flow for rearing of arctic grayling (PR#406 p. 8). In its response to the technical report from DFO, De Beers commits to develop a flow mitigation plan in consultation with DFO in order to protect downstream fish populations (PR#352 p. 6, PR#406 p. 8).

6.1.2 Parties' submissions and recommendations

During the first round of information requests Environment Canada sought information regarding the design of the diffusers as well as mitigation for potential scour and erosion (PR#146 p. 35). Fisheries and Oceans Canada also made a joint information request submission with EC in which both parties sought an assessment of the potential effects to fish from the zone of turbulence around the diffuser (PR#147 p 32). Both parties also note that the EIS provides maximum concentrations for a range of total and dissolved parameters in Lake N11, but does not identify whether this is a whole-lake average or localized maxima around the diffuser. Both EC and DFO requested an alternatives assessment for water treatment that considered the need to treat for a range of parameters prior to discharge to the downstream receiving environment (PR#147 p 34).

In response to this request, De Beers states that the alternatives analysis has determined that active water treatment would not eliminate the need for a water treatment pond (PR#147 p.66-3). De Beers' noted that elevation in total suspended solids (TSS) in Lake

N11 is likely to be limited to a mixing zone adjacent to the diffuser. De Beers also stated that mitigation and adaptive management may be considered to further reduce any potential for TSS loading (PR#176 p DFO&EC_4-4). With regards to diffuser design, De Beers contemplates simple diffuser structures to dissipate the energy of pipeline discharge to further reduce potential erosive energy. De Beers also provided examples of floating pontoon/barge diffusers and simple end-of-pipe baffle attachment to dissipate the energy outward and upward from the end of the pipeline (PR#179 p. 35-2). De Beers' mitigation for lake bed scour is to locate the pipeline discharge point in sufficiently deep water. If necessary De Beers would apply a layer of riprap over the affected lakebed or channel to mitigate scour (PR#179 p.35-3). De Beers also contends that they do not expect physical fish habitat disruption from turbulence associated from the diffuser (PR#179 p. 63-1).

DFO also noted their expectation that De Beers will provide a quantification of the zone of turbulence for diffusers prior to or during the regulatory phase, if diffusers are selected (PR#323 p. 7). In their technical report DFO also recommends De Beers commit to establishing minimum water level thresholds with a mitigation action plan to be initiated should these thresholds be approached. This recommendation was made in order to protect littoral habitats in water-withdrawal lakes including Area 8 (PR#323 p.13). In its technical report DFO also notes that De Beers states that all diffuser intakes will have screens that meet the criteria outlined in Appendix II of the DFO Freshwater Intake End-of-Pipe Fish Screen Guideline (PR#323 p. 7).

In EC's closing comments they indicate a need for further discussion about De Beers proposed 200 m effluent mixing zone in Lake N11 (PR#421 p.3).

DFO notes in its technical report that the developer has committed to developing operational procedures and protocols for a flow mitigation plan during detailed engineering design phase of the Project. DFO believes that a flow mitigation plan can be developed that meets the flow requirements for arctic grayling including the rates, timing and duration of water flow in order to minimize downstream impacts from mine operations (PR#323 p. 8-9). DFO recommends that De Beers commit to and implement a revised flow mitigation plan that is adaptable and can adjust to site-specific changes in downstream waters and include:

- a summary of available overwintering habitat in the Project area once the mine is operational;
- measures to mitigate changes in water residency times and hydrologic pathways;
- detailed downstream flow measurements, including from Lake N11 and N1; and
- a detailed plan on how downstream monitoring will be conducted (as part of the AEMP) (PR#323 p. 9).

6.1.3 Panel analysis and recommendations

The Panel is satisfied with the developer's responses to the concerns of the parties regarding minimizing changes to downstream water flow and related impacts on fish and fish habitat downstream from the Project.

The Panel notes that De Beers has committed to develop and implement a flow mitigation plan in consultation with DFO in order to protect downstream fish populations. This plan will require details that describe mitigation and an adaptive framework that can respond to change experienced during operational conditions in all project phases. The Panel is confident that the developer, in consultation with DFO, will prepare and implement the mitigation measures contained within this plan so that impacts to fish and fish habitat are minimized.

The Panel acknowledges commitments made by the developer to reduce the adverse impacts on water and fish from sediment loading at the effluent discharge point in Lake N11. These mitigation measures include properly designed and positioned effluent outfall or diffuser configurations.

Based on the evidence and information submitted, the Panel is of the opinion that provided the developer constructs, operates and closes the mine and implement its commitments, there will likely not be significant adverse impacts to fish or fish habitat downstream from Kennady Lake as a result the Project, including dewatering activities.

6.2 No-Net-Loss Plan for fish

6.2.1 Developer's submission

In its EIS, De Beers provided an overview of a fish habitat compensation plan. This habitat compensation plan is needed in order to offset habitat loss in accordance with current Fisheries Act requirements and policies related to harmful alteration, disruption or destruction of fish habitat.

In its initial conceptual compensation plan, De Beers quantified the affected habitat areas and presented a proposed plan to achieve No-Net-Loss of fish habitat (PR#184 p 8-8). A summary of the developer's fish compensation achieved with the proposed conceptual compensation plan at the time of EIS submission is shown in Table 5.

Table 5: Summary of fish habitat compensation achieved with the proposed conceptual compensation plan (PR#80 p 10-71)

Compensation Description	Compensation Habitat Area (ha)	
	During Operations	After Closure
Newly Created Habitat		
Option 1b – Construction of Impounding Dykes F, G, E1 and N14 to the west of Kennady Lake to raise Lakes D2, D3, E1 and N14 to 428 masl elevation	149.7	-
Option 1c – After closure, further raise the water level in Lakes D2, D3, E1 and N14, and the surrounding area, to 429 masl and reconnect the flooded area to Kennady Lake through Lake D1	-	195.9
Option 2 – Construction of Impounding Dyke C between Area 1 and Lake A3, Dyke A3 to the north of Lake A3, and Dyke N10 between Lakes A3 and N10 to raise Lake A3 to 427.5 masl elevation	31.1	31.1
Option 10 – Widening the top bench of pits (to create shelf areas) where they extend onto land	-	13.7

De Beers contended that raising water levels in Lakes A3, D2, D3, and E1 within the Kennady Lake watershed would increase lake habitat area, which would likely benefit fish residing in these lakes (PR#184 p8-8). De Beers also noted that while dyke construction would isolate fish populations within the B, D, and E watersheds for the duration of mine operations they expected that the diversion watersheds would support self-sustaining populations of fish species. Dyke construction would permanently isolate fish in Lake A3. (PR#184 p8-8)

De Beers anticipated that the residual fish community in Area 8 of Kennady Lake would consist of small-bodied fish species. De Beers predicted that lake trout and round whitefish might not continue to persist in Area 8 throughout the operational period. This would be due to existing overwintering limitations in Area 8 and the removal of alternative overwintering habitat in Areas 2 through 7. (PR#184 p 8-9)

De Beers expects that a fish community will become re-established in Kennady Lake post-closure but predicted that fish community structure might be different than the original structure due to changes in trophic status. The change in trophic status from baseline is result of phosphorus release from the Fine PK Facility into the lake.

De Beers also predicted that the B, D, and E watersheds would be the primary source of initial fish migrants into the refilled lake. Once Dyke A was removed fish would also enter from Area 8. De Beers noted that the final fish community of Kennady Lake would likely continue to be characterized by low species richness (PR#184 p 8-10)

De Beers predicted at closure that the water levels in the raised lakes would return to baseline levels and the fish and lower trophic communities would adjust to the new lake levels. Habitat conditions for spawning, rearing, and overwintering would be similar to pre-Project conditions. (PR#184 p 8-9)

The EIS supplement, submitted April 23, 2012, presented mitigation to the fine PK facility that altered the Project plan. Notably, Area 1 was removed from the facility to mitigate an increase in lake phosphorus levels. As a result, the lake trophic status is projected to return to oligotrophic status (PR#184 p 8-36). Lake A3 is no longer affected by the Project (PR#184 p 8-25) while Lakes D2, D3 and E1 are still subject to lake level raising.

In response to technical session Undertaking #1 De Beers provided additional information regarding the fish habitat compensation plan that showed nutrient concentrations in Kennady Lake will increase (projected to 0.009 mg/L) within the oligotrophic range. De Beers also stated that the fish habitat compensation plan will be developed in consultation with DFO and with input from local communities. Additionally, De Beers made plans to review and seek input on habitat compensation (PR#229 p. 4).

On June 29, 2012 De Beers provided the Gahcho Kué fish habitat compensation plan update (PR#249). The update evolved from the original conceptual compensation plan resulting from ongoing meetings with DFO and mitigation of the fine PK facility. Meetings between DFO and De Beers took place between May 26, 2011 and June 27, 2012 (PR#275 p1). De Beers stated that the updated compensation plan includes habitat development and habitat enhancement structures. Habitat development consists of the construction of impounding dykes to increase the lake depth and surface area. Widening of the top bench of pits will also take place to create shelf areas. Habitat enhancement structures include the construction of finger reefs in Kennady Lake, and construction of habitat structures on the decommissioned mine pits/dykes (PR#249 p 2).

In the June 2012 compensation plan update, De Beers continued to use the construction of impounding dykes to raise Lakes D2, D3, E1, and N14 during operations as a way of creating fish habitat for the purposes of compensation. De Beers maintained that raising the water level farther above the operational compensation lake will create added habitat. (PR#249 p 3) As well, De Beers stated that should contingency options for compensation be required in the event that the primary compensation option does not achieve the level of compensation that is anticipated, then those will be determined as part of the water licence and permitting phase. (PR#249 p 3)

From August 10, 2012 to September 13, 2012 De Beers conducted workshops at the project site and community visits to provide opportunities for Aboriginal groups to receive more information about the Project and to provide their input on proposed monitoring programs. On September 20, 2012 De Beers invited Aboriginal communities to a jointly-hosted meeting with DFO. The purpose of the meeting was to clarify any uncertainties surrounding the development of fish habitat compensation plans and to provide an

opportunity for community members to express ideas and perspectives related to fish habitat compensation and potential off-site options (PR#381).

On November 13, 2012 De Beers submitted their No-Net-Loss Plan (PR# 360). Updates to the fish compensation plan include:

- D-E-N lakes no longer the primary source of fish habitat compensation;
- pursuit of offsite options for fish habitat compensation;
- construction of a clear span bridge at the Redknife River crossing to rehabilitate fish migration paths;
- research initiatives that will account for the loss of habitat while portions of Kennady Lake are dewatered (PR#360) (PR#358 p 35).

In its response to the DFO technical report, the developer committed to continue to work on the fish habitat compensation plan with community and regulatory input during the permitting phase. (PR#352 p. 7) De Beers' summary of commitments table states that they are committed to working with DFO, Environment Canada and Aboriginal communities on the finalization of options to achieve No-Net-Loss of fish habitat. Commitments in the table further state that De Beers will monitor to evaluate the effectiveness of habitat compensation, and will include evaluation of both physical and biological characteristics (PR#406 p. 11).

6.2.2 Parties' submissions

In its correspondence to the Panel regarding second round of information requests, DFO noted that flooding to make fish habitat is not a preferred option for fish habitat compensation (PR#219 p1). DFO requested DeBeers continue to explore additional compensation options beyond the flooding of the D-E-N lakes area. DFO made the request due to the timing of when the compensation area would be constructed and the uncertainties associated with its success. DFO also raised concern about the potential environmental impacts associated with flooding the terrestrial environment (PR#261 p 2).

In its technical report, DFO notes that the developer has committed to developing a fish habitat compensation plan in order to offset losses to fish habitat from the construction and operation of the mine. The fish habitat compensation plan is part of the required *Fisheries Act* Authorization. Both physical fish enhancement projects and research intended to reduce uncertainty are proposed and flooding of lakes is no longer proposed as a habitat compensation option. (PR#323 p. 9)

As described in the above section, input by the parties during the summer of 2012 contributed to the evolution of the fish habitat compensation plan. This input included meetings with DFO and engagement with Aboriginal communities and the developer is committed to continuing these discussions. As a result, flooding of lakes as a fish habitat compensation option is no longer proposed by the developer.

DFO states in its technical report that they will continue to work with De Beers to develop a compensation plan that offsets short term and permanent fish habitat loss from the Project. DFO further states that the fish habitat compensation plan will need to address uncertainties in the developers' predictions of habitat loss for fish. The final fish habitat compensation plan needs to include input from DFO and affected communities and specific details of the plan will be dependent on habitat loss associated with an approved mine plan. DFO states that a fish habitat compensation plan submitted by De Beers that offsets impacts to fish and fish habitat in a manner that is acceptable to DFO, is required to ensure that predicted impacts to fish and fish habitat are identified and approaches to offset the impacts are developed. (PR#323 p. 9-10)

In its technical report, Deninu Kué First Nation contends that the collection of fisheries baseline data in Kennady Lake was only partially completed by the developer, and that the fisheries density data was not an accurate portrayal of the Kennady Lake population. DKFN believe that the population of fish in Kennady Lake has been underestimated. In order to address this concern, DKFN recommends specific fish sampling techniques to better determine the actual number of fish in Kennady Lake. (PR# 327)

In its response to the DKFN technical report, De Beers states that it is confident with its reported abundance of fish larger than 7 cm in Kennady Lake as described in the EIS. However, De Beers notes that the additional population estimation fish studies recommended by DKFN have been included in the draft Fish-Out Plan (PR#311) and the draft No-Net-Loss Plan (PR#355-PR#358). According to the developer, the opportunity to validate predictions of fish populations in Kennady Lake and population estimate methods will occur during the fish-out in Areas 2-7 of Kennady Lake. (PR#353 p. 3-4)

In its technical report, DFO provides recommendations intended to minimize impacts from the Project on fish and aquatic life (PR#323). In its response to the DFO technical report, De Beers commits to many of these recommendations (PR#353). The recommendations De Beers has committed to include:

- using standardized, repeatable methods for all aquatic and fisheries sampling in the AEMP;
- providing a table with updates ice thickness measurements and on-going winter water quality monitoring data;
- a summary of fish habitat characteristics in streams to be potentially affected by the Project;
- looking for opportunities to restore Area 7 earlier in the mine plan;
- developing and implementing a sediment and erosion plan for the construction of each dyke to control sediment release along with contingency plans;
- utilizing *in situ* flocculation and other applicable best management practices to minimize the risk of sediment-laden water affecting downstream habitats;

- developing a revegetation plan for riparian and aquatic vegetation as part of interim reclamation and closure planning and as part of the AEMP (PR#352 p. 2-9).

In its final comments submission, DFO re-iterates these same recommendations and notes that they will continue to work with the developer and other parties in order to minimize the adverse impacts of the Project on fish and fish habitat. (PR#413)

6.2.3 Panel analysis and recommendations

The Panel acknowledges that De Beers has committed to working with DFO, EC and Aboriginal communities on the finalization of options to achieve No-Net-Loss of fish habitat. The Panel also notes commitments made by De Beers regarding monitoring to evaluate the effectiveness of habitat compensation (PR#406 p. 11). Further, the Panel acknowledges that DFO and EC have the regulatory instruments in the *Fisheries Act* to protect fish and fish habitat and ensure that the developer meets its regulatory responsibilities.

The Panel is of the view that while the fishery resource in Kennady Lake will be lost for several decades due to mining, lake refilling and lake recovery, it will in time return to fish habitat. The Panel's view is based on all evidence, in particular evidence given by DFO and the developer during the public hearing in Yellowknife (PR#403 p. 280-282) and in DFO's closing comments. The Panel relies on DFO's statement that with respect to the re-establishment of fish in Kennady Lake:

"DFO believes that the overall objective is achievable, however, these objectives need to be clearly defined and parameters for success need to be set including timeframes, and measureable characteristics to be achieved." (PR#413 p. 3)

Based on the developers baseline work on fisheries in the regional study area, the Panel observes that the surrounding ecosystem around Kennady Lake contains numerous similar lakes with similar fish assemblages that will not be disturbed by this development. Therefore, while fish habitat will be unavailable in Kennady Lake, many other lakes in the regional study area will not likely experience adverse impacts from the Project and will be available for harvesters to use to satisfy any requirement for fish to eat.

The Panel acknowledges that there will be a loss of fish and fish habitat in Kennady Lake as a result of the Project during mine construction, operations and closure phases. Once the lake is refilled and reconnected to the watershed, however, the Panel accepts that fish and aquatic life will repopulate the lake during a period of recovery. The Panel notes that the developer has committed to the majority of the recommendations made by DFO during the course of this EIR. These commitments are key mitigation measures that in the Panel's view will prevent adverse impacts to fish during all project phases. The Panel is of the view that these commitments made by the developer will enable viable and self-sustaining fish population to return to Kennady Lake.

The Panel notes that DFO believes that Kennady Lake can be restored to a viable self-sustaining aquatic ecosystem following closure if its recommendations are implemented. Since DFO is responsible for fisheries management in the NWT, the Panel has confidence that DFO can satisfactorily protect fisheries because they have the experience and regulatory tools to do so and have expressed a willingness to work closely with the developer. Because of the developer's adoption of the majority of the DFO recommendations as mitigation, the Panel is confident that significant adverse impacts to fish can be avoided and that a fish community can be restored to Kennady Lake after mine closure.

In the Panel's view, a follow-up program is required to ensure Kennady Lake recovers so that fish habitat is restored to this lake post-closure. This follow-up program is integrated into the Aquatic Effects Monitoring Program as described below in Section 6.4 which will ensure that water quality is suitable for fish.

Based on evidence and information submitted, including the prediction from DFO that a fish community can be restored in Kennady Lake after closure, it is the opinion of the Panel that significant adverse impacts to fish from the Project are unlikely, provided the developer implements its commitments as described in this Report.

6.3 Fish-out of Kennady Lake

6.3.1 Developer's submission

In the Gahcho Kué EIS De Beers provides details on an initial fish salvage or fish out plan. Extensive aquatic baseline studies were conducted for the assessment of effects in the EIS during the period of 1996 to 2011 (PR#213 p 12). De Beers proposes that fish salvage will be conducted to remove fish from Areas 2 to 7 before and during dewatering. De Beers further states that a fish salvage will be conducted as appropriate during decommissioning the diversion channels (i.e., the connections between the B, D, and E watersheds and the respective lakes in N basin). (PR#80 p 8-401) De Beers' rationale for the fish salvage is to minimize the waste of fish caused by the dewatering of Kennady Lake.

Due to fish species variance and associated habitat preference a combination of gear types would be used to maximize capture efficiency. These gear types could include gill nets, trap-nets, minnow traps, boat and backpack electrofishing, and angling. (PR#80 p 8-378)

De Beers predicts that depending on the method used, some fish may survive after the fish salvage operation. However, De Beers states that most fish will be removed from Kennady Lake during the fish salvage conducted before and during dewatering. Areas 3-5 will be partially drawn down and will become the water management pond. In response to questions during the hearings in Yellowknife on December 5, 2012, the developer stated that the water management pond would have a depth of about 10 m (PR#396 p.98). While water will remain in Areas 3-5 (the water management pond) after dewatering, the depth,

habitat, suspended sediment and water quality conditions will not be suitable to support a fish community during mine operations (PR#80 p 8-216, 8-379)

The fish salvage also seeks to reduce the risk of entrainment or impingement in pumps during dewatering. De Beers states that intake pumps used for dewatering Kennady Lake will be appropriately screened to meet federal requirements to prevent fish entrainment or impingement. (PR#80 p 8-216) Screening and maintenance of intake pumps, is expected to reduce fish mortality. Furthermore, De Beers anticipates the mortality of small species and young life stages to be limited to a localized area. De Beers also predicts that residual effects to fish from the dewatering of Kennady Lake and Lake A1 will be negligible. (PR#80 p 8-217)

Project-specific protocols for the fish salvage will be developed prior to initiating the salvage. (PR#80 p 8-378) In the EIS De Beers notes that salvaged fish may be provided to Aboriginal communities to avoid wasting of fish. (PR#80 p 8-379) As well, fisheries data collected during fish salvages may also be used to complement data collected under the monitoring plan activities. (PR#80 p8-518)

In the EIS supplement De Beers states that a fish salvage will not occur in Lake A1 since draining is no longer required due to project design improvements with the fine PK facility. (PR#184 p 8-17)

During the technical sessions, De Beers stated that fish will remain in Area 8 of Kennady Lake throughout all phases of the Project. (PR#213 p 196) De Beers noted uncertainty with respect to the numbers of fry, juveniles, and small bodied fish that would remain in the fished-out portion of Kennady Lake. Larger fish would be salvaged and would be distributed to the communities. De Beers will finalize the development of site specific protocol of the fish out with input from DFO and the communities. De Beers also expects that the local community members will be an integral part of the field program with field crews conducting the fish salvage (PR#213 p 16).

On October 4, 2012 De Beers released the Gahcho Kué Draft Fish Out Plan to address requests from the parties for additional information on the plan. De Beers considered the plan a work in progress because additional consultation with DFO is expected to take place (PR#311p 2). Management of the fish out plan will consist of DFO habitat biologists, members from Aboriginal Communities and De Beers (PR#311 p3).

The updated outline for the fish-out of Areas 2 to 7 of Kennady Lake and Lake D1 (PR#311 p. 2) has the following objectives:

- engage local communities and ensure that fish harvested during the fish-out are fully utilized by traditional resource users;
- collect ecological information (biological, limnological, and habitat) on Arctic lakes in the Northwest Territories;

- remove all fish from Areas 2 to 7 of Kennady Lake and Lake D1 prior to development of the Project.

De Beers stated that community engagement plays a crucial role in developing the draft fish out plan. During community visits in February 2012, technical sessions and site workshops in August 2012 Aboriginal groups provided input on the fish-out plan.

Aboriginal groups expressed interest in having youth and elders involved in the fish-out as well as having the fish out coincide with key cultural events. De Beers anticipates that the fish-out will be broken down into two phases: the Catch-Per-Unit-Effort (CPUE) phase and the final removal phase. Both phases will be performed during the first year of construction activities however the removal phase of the fish-out may continue during dewatering. (PR#331 p3) The detailed designs of the sampling plan are in development. (PR#331 p 4)

De Beers noted that a habitat biologist for DFO will provide advice during the detailed sampling design of the fish-out program, receive the final reporting and ensure that collected data is entered into the Arctic aquatic database. The habitat biologist will also be involved in regular updates with De Beers. To complement the DFO habitat biologist, De Beers will also provide an experienced Project Biologist to ensure technical requirements are met for the fish-out program. Field technicians will be hired by De Beers with preference given to members from Aboriginal communities. The field technicians will be responsible for cleaning and packaging fish for shipment to the respective Aboriginal communities. (PR#331 p3)

6.3.2 Parties' submission

DFO has been engaged in the review of the proposed project at Kennady Lake since the early exploration and first consideration of mining concepts back in the late 1990's. DFO has participated in the review of the project proposal since 2006 (PR#403 p 238).

DFO recommended that the developer commit to adopting and using standardized repeatable methods for baseline data collection and that appropriate data be collected prior to any development. DFO further recommended that baseline data include data from reference lakes and an assessment of natural variability (PR#403 p 239).

In response, De Beers committed to using standardized and repeatable methods for all aquatics and fishery sampling in the aquatic effects monitoring plan (PR#403 p 239)(PR#352 p 2).

During the public hearings, YKDFN asked DFO if they believed that this project will be able to complete a full fish-out for the area that will constitute the water management pond. (PR#403 p 275) In response, DFO stated that if proper effort is applied and the protocol is followed, they are confident that a fairly significant fish-out could occur (PR#403 p275).

The YKDFN further asked if DFO agrees that if there are fish remaining, it would be illegal under the *Fisheries Act*, Section 36(3) to deposit the kimberlite and runoff from the waste rock piles. (PR#403 p276) DFO replied that after the authorizations are in place for physical impacts to fish and fish habitat, and a compensation plan is in place for the impacted area, they will not consider those confined basins of Kennady Lake to be subject to further application of the *Fisheries Act*. DFO further stated that areas authorized for subsequent mine waste would not be subject to application of the *Fisheries Act*. However, discharges from any confined basin would continue to be subject to the strict prohibitions of the *Fisheries Act*, as well as any licence conditions that would be in place (PR#403 p277).

During the technical sessions the parties also expressed concern with data relating to the fish out. DKFN commented on inconsistencies in the approaches to collecting and analysing fish baseline data (PR#212 p 83). De Beers has since committed to using standardized and repeatable methods for all aquatics and fishery sampling in the aquatic effects monitoring plan (PR#352 p 2).

6.3.3 Panel analysis and recommendations

The developer advises that the fish in Kennady Lake, except for Area 8, will need to be removed prior to mining. In the Panel's view, it is important that fish should not be wasted and that where possible they should be salvaged. The Panel is aware that experience from fish removals at other NWT mines is available to optimize the number fish salvaged and made available for community use.

The Panel acknowledges that it is important to have trained fish-out biologists on site during the fish salvage operation as proposed by De Beers. However, the Panel suggests that it is equally important to seek the input of Aboriginal communities on fish salvage operations and if possible to have community people involved directly in the salvage activities.

The Panel notes the efforts that the developer has made over the course of this environmental impact review to engage Aboriginal communities and regulators in the preparation of a fish-out plan for Kennady Lake. The Panel is confident that these efforts to discuss fish-out options with other parties and refine the fish-out plan based on the outcomes of those discussions will result in a fish salvage that has community approval.

Based on evidence and information submitted including commitments made by De Beers, the Panel is of the opinion that impacts to fish populations from the dewatering of Kennady Lake are not likely to be significant because fish populations in Kennady Lake are expected to recover after the lake is refilled once mining is completed.

6.4 Follow-up

The Panel concluded that effects from the Project on fish are not likely to be significant because fish populations are expected to re-establish in Kennady Lake in the long term. Therefore, a follow-up program is necessary to ensure that the project is designed and operated and closed in a way that will allow fish populations to re-establish following closure, and that adverse impacts to fish downstream and upstream during operations are not significant.

Follow-up monitoring for changes to water quality and quantity that may affect fish should be incorporated into the Aquatic Effects Monitoring Plan. This should include monitoring of aquatic effects and, in particular, mercury testing of fish in the raised lakes. Through the administration of its authorizations and associated monitoring, the Department of Fisheries and Oceans should also take the steps necessary to ensure that the mitigative measures committed to by De Beers are working as planned and that fish populations can eventually re-establish in Kennady Lake.

7 Impacts to caribou and caribou habitat and related impacts to people

The Terms of Reference for the Gahcho Kué Environmental Impact Statement identified caribou as the single most valued ecosystem component because impacts on caribou are likely to result in economic, social, and cultural impacts on aboriginal and other residents of the Mackenzie Valley (PR#48 p.22). The Terms of Reference noted that caribou numbers have decreased sharply in recent years and communities see cumulative impacts from diamond mines, mineral exploration and other activities within the caribou's range as a threat (PR#48 p.23).

This section examines the incremental (project-specific) and cumulative impacts of the project on caribou and caribou habitat and the effects of those impacts on people. This section is divided into 4 subsections:

- assessment approach and project specific impacts;
- impacts of the roads;
- cumulative impacts; and
- monitoring, adaptive management and follow-up.

The Panel notes that there is overlap within some of these subsections as De Beers and the parties often integrated the assessment, comments and recommendations regarding project specific and cumulative impacts of the Project and the roads. De Beers' assessment approach is described as it provides the foundation for understanding and evaluating the significance of its impact predictions.

7.1 Assessment approach and project-specific impacts

7.1.1 Developers' submission

De Beers determined that the caribou populations that may interact with the Project include the barren ground Bathurst, Ahiak, and Beverly herds (PR#80 p.7-2). De Beers estimated the annual (and seasonal) range(s) for each herd by applying a statistical estimation tool to satellite collar data that was collected over 6 to 12 years, depending on the herd (PR#80 p.7-13). Based on the satellite collar data, De Beers' concludes that the Bathurst herd has the greatest likelihood of interacting with the Project (PR#80 p.7-15). Therefore, De Beers focused its assessment of impacts to caribou and caribou habitat on the Bathurst herd (PR#80 p.7-48).

De Beers suggests that the potential Project-related effects predicted for the Bathurst herd are representative of effects for the adjacent and more easterly-distributed Ahiak herd (PR#80 p.7-15). De Beers views this assessment as conservative because, based on the satellite collar data, the Ahiak herd encounters the Gahcho Kué area less frequently than the Bathurst herd.

For the Beverly herd, De Beers concludes that the likelihood of large numbers of caribou interacting with the Project is too low to have detectable effects on the herd (PR#80 p.7-15).

For its assessment, De Beers compiled a comprehensive list of ways the Project components or activities could have an effect on caribou and proposed environmental design features and mitigation that will be applied to reduce the effects associated with each project component or activity (PR#80 p.7-51). Examples of design features and mitigations include such things as waste management best practices to reduce attractants, compact layout of surface facilities to limit the amount of disturbed area, and building low profile roads so that they do not act as a barrier to wildlife.

De Beers' assessed project specific effects as incremental changes relative to baseline values, and generally used conditions existing in 2010 as the baseline (PR#80 p.7-81). De Beers' assessment is based on residual effects which are those effects predicted to remain after the application of all environmental design features and mitigations (PR#80 p.7-14).

De Beers used a qualitative evaluation of the pathways to classify them as either having no linkages (i.e. no residual effects) or as primary or secondary pathways (PR#80 p.7-49). The primary pathways were those likely to cause a measurable environmental change which could contribute to residual effects (PR#80 p.7-49).

De Beers identified five primary pathways that were analyzed in more detail to determine the significance of the effects of the Project on caribou:

1. physical footprint of the mine decreases habitat quantity and causes habitat fragmentation;
2. footprint of the winter road decreases habitat quantity and may cause fragmentation;
3. dust deposition covers vegetation and changes the amount of quality habitats;
4. the combined indirect effects such as dust deposition, noise, and human-activity sensory effects from the Project; and
5. sensory effects such as noise, presence, lights, and smell of vehicles on the winter access road and the Tibbitt-to-Contwoyto Winter Road (PR#80 p.7-163).

The pathways with no linkages or classified as secondary were predicted to have no or negligible effects after the application of environmental design features and mitigations.

Examples of pathways that De Beers' classified as secondary include: physical hazards from the Project, increased access for harvesting associated with the access roads, and aircraft or vehicle collisions causing injury or mortality (PR#80 p.7-51). Based on the qualitative analysis, these pathways were predicted to not result in environmentally significant effects on the persistence of caribou populations or the continued opportunity for traditional and non-traditional use of caribou. These pathways were not carried forward in De Beers' overall assessment of the impacts of the Project on caribou.

During the analysis sessions for the environmental impact statement and in information requests, De Beers' was questioned on the use of the "persistence of caribou populations" as an assessment endpoint (PR#130, 137). In response, De Beers modified the assessment endpoint of "persistence of caribou populations" to the "maintenance of the abundance and distribution (or sustainability) of populations and the related impacts on the continued opportunities for traditional and non-traditional use of wildlife" (PR#163 p.1-2). De Beers states that it did not change its significance determination based on this change to the assessment endpoints because there are multiple definitions for "persistence" and as stated in the original EIS (PR#80 p.7-163) it had assessed the effects of the five primary pathways on the "population size and distribution of caribou" (PR#163 p.1-2).

De Beers predicted that the amount of habitat directly altered by the mine footprint (1.2 km²) would be 4.4% of the local study area (200 km²), and not all of the changed habitat can be reclaimed (PR#80 p.7-90). De Beers estimated that the mine footprint is 0.1% of the annual range of the Bathurst herd, based on the satellite collar data (PR#80 p.7-144).

De Beers assessed indirect habitat loss by estimating the extent of dustfall and did modeling to predict the maximum amount within and outside of the Project footprint (PR#80 p. 7-98). Within 1 km of the Project footprint, the total suspended particles are predicted to be 10 times higher than the NWT standard (PR#80 p.7-71). De Beers noted the possibility that caribou foraging on lichens in dust deposition areas may increase metal uptake, but the effects of metal uptake on caribou are not well understood (PR#80 p.7-36). De Beers conducted an ecological risk assessment and concluded that the predicted exposure for two contaminants of concern (aluminum and iron) exceeded the threshold for non-negligible risk but that the Project-related risk was low and likely to be negligible (PR#306 p.6-1).

De Beers classified sensory disturbance from buildings, people, lights, smells, and noise as a primary pathway that influences caribou movement and behaviour, which in turn can change survival and reproduction. De Beers assessed these sensory disturbances based on observation of reduced feeding by cows and calves close to the Ekati mine site and that monitoring caribou distribution around the three diamond mines has shown fewer caribou closer to the mines (PR#80 p.7-96).

The area around a development in which caribou occurrence and behaviour is affected, possibly due to sensory disturbance and low quality habitats, is called the zone of influence.

The zone of influence around a mine site appears to be greater than the estimated spatial extent of the independent effects from infrastructure, activities, dust, air emissions or noise (PR#80 p.7-96). Previous research has shown that the extent of the zone of influence around mine sites is variable depending on the characteristics of the mine and geographical features such as large lakes, but it typically extends out 10 to 30 km from a mine (PR#80 p.7-39). Based on the zone of influence at other diamond mines in the area, De Beers estimates that the zone of influence around Gahcho Kué will be 15 km (PR#80 p.7-18).

De Beers assessed the chances of caribou encountering the estimated zone of influence around Gahcho Kué using the movements of the satellite-collared cows from 1996-2009. The annual encounter rate was low – of the 194 pathways taken by the collared cows, only 21 encountered the Project’s predicted 15 km zone of influence and cows spent 1-2 days within this zone (PR#80 p.7-121). Consequently, De Beers estimated that the effect of disturbances on caribou energy budget was low within the mine’s zone of influence.

De Beers estimated how much energy would be expended by a caribou as it moves away from a sensory disturbance. The energy costs were summed to estimate the effect on pregnancy rates (a cow needs to reach a certain level of fatness to conceive). The projected effects include a 1% decrease in calf production for the herd in an average year as a result of the Gahcho Kué mine site and the Taltson Project (PR#80 p. 7-96). Based on computer models, De Beers predicted that the caribou abundance would decrease by 1.5% in 30 years due to these two projects (PR#80 p.7-137).

De Beers classified all of the five primary pathways as having a negative (adverse) effect on caribou and that the magnitude of these effects is negligible to low. The duration of effects was medium to long term except habitat loss due to the project footprint which will be permanent. Overall, De Beers concludes that “the impacts from the Project should be reversible (except for removal of habitat on the physical footprint), and not have a significant adverse effect on the persistence of caribou populations “(PR#80 p.7-170). De Beers notes that “there is a moderate degree of uncertainty associated with this prediction, which is primarily related to the duration of impacts and the variability inherent in making long-term predictions in ecological systems” (PR#80 p. 7-170).

De Beers assessed the effects to traditional and non-traditional use of caribou based on two effects pathways:

- effects on population size and distribution changes in the availability of animals; and
- winter roads provide increased access for harvesting (PR#80 p.7-166).

De Beers states that increased access for harvesting from the access roads is a positive impact for hunters, but the magnitude of this impact is low (PR#80 p.7-167). De Beers predicted that the number of caribou harvested from improved access to the region as a result of the Project’s winter access road will be within the range of the 2010 baseline conditions (PR#80 p.7-20). De Beers also addresses the effects of increased access for

harvesting on the persistence of caribou, which is discussed below in Section 7.2 on the impacts of the roads.

De Beers states that the incremental change from the Project on caribou abundance and persistence (population size and distribution) was not statistically measurable relative to the 2010 baseline conditions. Therefore, the addition of the Project is not expected to result in a detectable change in encounter rates between caribou and people relative to the 2010 baseline conditions (PR#80 p.7-153).

7.1.2 Parties submissions and recommendations

Impacts to caribou and caribou habitat and the related effects on people were a major concern to the parties in this environmental impact review. In total, the parties made over 35 recommendations related to caribou and caribou habitat. Aboriginal parties contend that any negative impact on caribou which contributes to the need for on-going harvest restrictions is significant, and that development in general contributes to cumulative impacts on caribou. As stated by Pierre Catholique of the LKDFN:

“No matter what you do, caribou will be affected by these mines and roads. The only way to not affect the caribou is to have no mines and roads. If there is a mine, there will be roads. And if you have a road, there will be trucks on it. If they put it through, you can’t stop everything for the caribou. But maybe that is what the caribou need.”
(PR#410 p.5)

The LKDFN state the current harvest restrictions alone will not lead to caribou reaching sustainable numbers again and that caribou have been, are, and will continue to be negatively impacted by mining operations (PR#410 p.5,6). LKDFN recommends that the Project should not proceed until the Bathurst herd population recovers (PR#410 p.5).

The YKDFN state that the current situation and unprecedented restriction on Treaty Rights (harvesting) is an on-going significant impact and all development must be evaluated in this context (PR#407 p.11). Further, the YKDFN state that if the proposed Project limits the recovery of the herd in any way, it would perpetuate the hardships felt by the YKDFN membership (PR#407 p.11).

Similarly, the NSMA argue that no one is adequately addressing or investigating the declining numbers of caribou, the lack of conservation, or the cumulative effects on the herd and therefore the effects of opening and operating another mine in the region is a serious concern for the North Slave Metis members (PR#414 p.6).

The Tlicho Government identified the uncertainty and predicted duration of effects of the Gahcho Kué mine as a key concern because 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 (PR#332 p.14). The Tlicho Government states that any

incremental and cumulative impact to Bathurst caribou may not be socially acceptable to Tlicho people (PR#332 p.14).

The LKDFN, DKFN, and NWT Metis Nation explain in their Traditional Knowledge reports that the diamond mines and mine exploration and development, including related roads, have had an impact on the migratory habits of caribou. These changes in migration affect the availability of caribou which is significant to Aboriginal people because the caribou hunt is a source of cultural continuity and is a means of survival (PR#422, PR#418 ,PR#374 p.3).

The parties were concerned that De Beers' assessment underestimated the effects on caribou because the assessment was conducted at a time when caribou numbers are low. De Beers estimated the amount of interaction between caribou and the site based on caribou cows that were collared over a 6 to 12 year period, depending on the herd. The estimated amount of interaction between caribou and the site might not be representative of future conditions, when herd numbers increase and distribution of caribou changes. Other evidence, such as the caribou migration trails embedded in the landscape at Kennady Lake indicate past use of this area as a migration route (PR#422, PR#374 p.3, PR#394 p.162).

The YKDFN were concerned that given the low numbers of the Beverly herd, the effects of the Project on even a few individuals might result in a measureable change in population size (PR#137 p. 6). The YKDFN asked De Beers what the effects of the Project would be on the Beverly herd if the population increased and more caribou interacted with the site. De Beers responded that the effects of the Project on the Beverly herd are expected to be no greater than those predicted for the Bathurst herd (PR#174 p.1.5-2). Further, De Beers states that the project footprint appears to be outside the known historical distribution of the Bathurst herd (PR#174 p.1.5-2).

In their Traditional Knowledge study report, the NWT Metis Nation community members note that shifts in the movement of caribou herds, and therefore of harvesters, are essentially temporary as caribou habitat changes and regenerates, so maintaining as much potential caribou habitat as possible is essential to ensuring that these animals can adjust in the future to environmental and climate changes (PR#374 p.2).

The parties identified key assumptions and uncertainties in De Beers' predictions for project specific effects, and recommended monitoring to test impact predictions and mitigation to reduce adverse impacts. The YKDFN and the Tlicho Government note that De Beers' estimation that the zone of influence around the site is 15 km is a key assumption in the impact predictions (PR#329, 332). Therefore, these parties recommend that the developer should be required to design and conduct monitoring to determine the size of the zone of influence through all project phases from construction to closure (PR#329, 332). They also recommend that monitoring should be conducted to determine what causes the zone of influence (PR#329, 332). The GNWT recommend that if the developer

tests for the zone of influence, standardized protocols should be implemented and that the monitoring can be used to test effectiveness of mitigation used to reduce the zone of influence and if caribou behaviour changes in relation to mining activity (PR#334 p.9).

The parties provided technical reasons why the choice of models and input parameters used to assess the effects of sensory disturbance may underestimate pregnancy rates and caribou abundance. For example, the YKDFN conducted a technical review of De Beers' energetic modeling approach and identified five main concerns with the model including incomplete consideration of the energy balance equation (PR#137 p.7). During the EIR, De Beers corrected errors in their energy model, added an encounter rate for the winter roads based on satellite-collared cows, and made some changes to proposed monitoring as requested in technical meetings and during information requests.

During the scoping phase for this project the LKDFN, DKFN, YKDFN and NWT Métis Nation raised concerns about increased dust deposition on vegetation and its potential impact (PR#164 p.8-3). During the EIR, the LKDFN state there is insufficient research on the impact of dust deposition on caribou health and recommended that the developer should be required to undertake comprehensive investigations on the health of caribou feeding around the mine site (PR#397 p.25 & 44). The YKDFN note that at the Ekati and Diavik diamond mine sites, low concentrations of dust deposition are detectable on lichen 14 to 20 km out from the mine site (PR#137 p.7). The YKDFN suggest that the low level dust deposition may be why the caribou tend to avoid the area of the diamond mines (PR#137 p.7). NSMA recommend that De Beers be required to implement a caribou tasting component as part of monitoring because of concern about potential contaminant and disturbance effects on quality of meat (PR#330, p.34).

De Beers had moderate uncertainty in its predictions on project specific impacts to caribou, but viewed this level of uncertainty as acceptable. Parties were concerned with a moderate level of uncertainty. To deal with this uncertainty, the YKDFN, Tlicho Government, NSMA, and the GNWT suggest that on-going monitoring and mitigation should be implemented.

For example, the YKDFN recommend that the impacts of the Project should be re-evaluated five years after this Report with a focus on the relationship between development and recovery of the herd (PR#345, 407). The YKDFN recommend that this evaluation should propose further mitigations to limit impacts, up to and including "mothballing the mine" until the herd populations are healthy enough for the YKDFN to be able to harvest, or communities directly acknowledge they are willing to accept the risk (PR#345, 407). The Tlicho Government explains that moderate uncertainty is not acceptable given that the Bathurst herd may already be at a threshold of social and cultural significance, and therefore to address the uncertainty the important work of mitigation, monitoring and managing impacts needs to be done in a responsible, transparent and publically accountable manner throughout the life of the Project (PR#332 p.15).

7.1.3 Panel's analysis and recommendations

Under the MVRMA, an environmental impact review of a proposal for development must consider the capacity of any renewable resources that are likely to be significantly affected by the development to meet existing and future needs. The Panel identified caribou as a critical renewable resource in particular because of the cultural, social, and economic relationships between caribou and Aboriginal and other residents of the Mackenzie Valley.

The Panel considered all of the information available on the public registry in its analysis of the evidence and its deliberations on the potential effects to caribou and caribou habitat as a result of the proposed Project and the related impacts to people. The Panel notes that harvest restrictions on the Bathurst herd have been imposed due to the herd's recent significant decline. The Panel also notes that the GNWT anticipates that the herd recovery will be slow and that continued management actions will be needed to conserve the herd (PR#409 p.3). In particular, the Panel considered the fact that caribou are not meeting existing community needs and the ability of caribou, particularly the Bathurst herd to meet future needs is uncertain.

The Panel concludes that De Beers' assessment approach is, in general, conceptually sound. The Panel agrees with De Beers' approach of assessing impacts primarily for the Bathurst herd, as this herd is currently most likely to interact with the site, and is also one of the more studied herds, thus there is more information available.

The Panel heard opinions and evidence from Aboriginal parties that the Bathurst herd may already be at a threshold where any additional changes have social and cultural significance because Aboriginal people are currently experiencing severe harvest restrictions. In addition, other residents and non-residents of the Mackenzie Valley are currently subject to a harvesting ban. The Panel recognizes that on-going harvest restrictions are of concern.

De Beers concludes that all five of the primary pathways included in the effects assessment will result in negative (adverse) effects. However, based on the magnitude, geographic extent, duration, frequency, reversibility and likelihood of these effects, the effects will not significantly affect the persistence (distribution and abundance) of caribou populations. De Beers notes that the persistence of caribou herds during large fluctuations in population size indicates that the species has the capabilities to adapt to different disturbances and therefore this flexibility (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 (PR#80 p.7-172). NWT Metis Nation explain that maintaining as much potential caribou habitat as possible is essential for ensuring that these animals can adjust in the future to environmental and climate changes (PR#374 p.2). The Panel recognizes that protecting habitat is important to the resilience of the herd.

De Beers states that the predicted incremental change from the Project on caribou abundance and persistence was not statistically measurable relative to the 2010 baseline (PR#80 p.7-153). De Beers population projections were imprecise and therefore, changes would have to be very large for statistically measurable changes to be detectable. The Panel agrees with De Beers that the uncertainty associated with its predictions is primarily related to the duration of impacts and the variability inherent in making long-term predictions in ecological systems (PR#80 p.7-170), and therefore it is not possible to make predictions that are verifiable. The Panel considered this uncertainty in its assessment of the effects.

The Panel identified other areas of uncertainty in De Beers' assessment and impact predictions:

- uncertainty because the assessment was conducted at a time when caribou numbers are very low and was based primarily on a small number of satellite collared cows;
- the assessment assumed a 15 km zone of influence around the mine site; and
- the assessment is based on residual effects, which assumes the successful application of proposed environmental design features and mitigations.

De Beers states that its population models show that hunting pressure and rates of insect harassment have stronger effects on the likelihood of persistence of the caribou herd than development (PR#80 p.7-19). However, the Panel notes that the effects of development are additive to these other effects and concludes that at a time when the Bathurst herd may be at or beyond the significance threshold, even the predicted negligible to low incremental impacts of the Project on caribou predicted by De Beers are likely to be significant.

De Beers notes that there is little known about the long-term effects from development on caribou movement and distribution at the scale of the seasonal ranges, but that the spatial extent of all current development is likely large enough to have some influence on caribou movement (PR#80 p.7-153). The GNWT states that the relative contributions of all of the factors affecting caribou and the interactions among them are not understood well enough to be able determine which factors should be managed to protect the herd (PR#403 p.152).

The Panel acknowledges that De Beers approach is to mitigate all potential effect mechanisms and the environmental design features and mitigations are based on experience and effectiveness at other mines (PR#163 p.3-3). However, De Beers also states that it is unlikely that the various mine-related effects to caribou (such as noise, dust, smells and activity) will ever be fully understood, thus limiting the ability to completely mitigate these effects and test if the mitigation is being effective (PR#163 p.3-9). In the Panel's view the list of proposed mitigations is not exhaustive and on-going research, adaptive management, and incorporation of traditional knowledge could improve the collective understanding of how to reduce adverse impacts to caribou.

The Panel concludes that a time when caribou may be at or near the significance threshold and when the effects of development on the movement and distribution of caribou are not fully understood, all land users, including developers, should be required to minimize adverse impacts on caribou. The Panel concludes the incremental effects of the Project are likely to be significant, and therefore recommends the measure below.

The Panel requires a follow-up program to test the effectiveness of the measure below and to test the effectiveness of De Beers' environmental design features and mitigations and impact predictions. The Panel acknowledges that De Beers has committed to developing a follow-up program and has submitted draft and conceptual monitoring plans during this EIR but that additional detail is required for the plans to be effective as a follow-up program. The specific requirements for the follow-up program for caribou are discussed below in Section 7.4 and the general requirements for follow-up programs are in Section 12.

MEASURE 1:

De Beers will:

- **Minimize impacts to caribou and the extent of the zone of influence around the mine site to the extent that is technically feasible.**
- **Prior to construction, develop a caribou protection plan that ensures protection of caribou and caribou habitat. The caribou protection plan should include an adaptive management framework demonstrating how the Wildlife Effects Monitoring Program and the Wildlife and Wildlife Habitat Protection Plan are linked.**

Governments, land managers and regulators will:

- **Include conditions for habitat protection in the Land Use Permit and any land tenures issued for the Project.**

7.2 Impacts of the roads

7.2.1 Developer's submission

De Beers identified two primary pathways that are likely or highly likely to lead to negative residual effects on caribou:

- the footprint of the winter road decreases habitat quantity and may cause habitat fragmentation; and

- sensory effects (e.g. noise, presence, lights, smell) of vehicles on the winter access road and the Tibbitt-to-Contwoyto Winter Road (PR#80 p.7-16).

De Beers predicted that during construction there would be up to 25 trucks per 24-hour period on the winter access road (PR#80 p.7-101). This equates to 1,500 to 2,000 trucks per year during the 8 to 12-week period that the road will be operational. During operations the traffic on the road is expected to decrease to 14 trucks per 24 hour period, and to decrease even further during the initial two-year closure period to three trucks per 24 hour period (PR#80 p.7-101).

De Beers predicted that both traffic associated with the winter road (sensory effects) and the changes to habitat patches and their connectivity caused by the road (fragmentation) can influence caribou movement and behaviour (PR#80 p.7-101). Based on the current literature and noise modeling results, De Beers predicts that the spatial extent of changes to the behaviour and movement of caribou from activity along winter roads will be within five kilometers of the road (PR#80 p.7-101). De Beers predicts that the magnitude of cumulative change to caribou movement and behaviour is anticipated to approach the limits of the 2010 baseline conditions (PR#80 p.7-101).

De Beers states that although the presence of the winter roads may represent a partial barrier to caribou and lead to some fragmentation of the population within the winter range, the roads are in operation for approximately eight to 12 weeks per year, and thus impacts on caribou population size and distribution are likely to occur and will be periodic (PR#80 p.7-161). De Beers concludes that the magnitude of the effects of fragmentation is negligible to low and the magnitude of the sensory effects is moderate (PR#80 p.7-163). Both pathways (fragmentation and sensory effects) are reversible and periodic (PR#80 p.7-163). Based on the weight of evidence De Beers concludes that the adverse impacts associated with the roads are not significant.

De Beers responded to an information request with an analysis on how often caribou encounter the Tibbett to Contwoyto Winter Road and the winter access road. Based on the satellite collared cows from the Bathurst herd between 1996 and 2010, for 8 of these years none of the collared cows encountered the 5 km corridor of the Tibbett to Contwoyto Winter Road and during the other 6 years, 5 to 25% of the satellite collared cows encountered the road (PR#163 p.4-5). None of the collared Bathurst caribou cows encountered the winter access road between 1996 and 2010 (PR#163, p.4-5).

De Beers classified other potential pathways such as increased access for harvesting due to the winter access road and reduced value of habitat due to dust deposition as secondary pathways. These secondary pathways were considered to have negligible effects after the application of environmental design features and mitigations, and therefore were not considered in De Beers' significance determination.

In response to concerns from the parties that increased access may result in effects with higher significance than De Beers predicted, De Beers committed to work with the GNWT, communities and Aboriginal governments to address potential wildlife mortalities, harvest and other issues that may arise on the Project winter access road (PR#346 p.4). De Beers also committed to work with the GNWT to develop a Memorandum of Understanding for collaborating on the development and operation of check stations along the Project winter access road (PR#346 p.4). De Beers presents road access monitoring options in the Wildlife Effects Monitoring Plan, such as:

- regular and frequent inspections by De Beers' Protective Services personnel;
- station the GNWT ENR personnel or Aboriginal monitors at a rest stops along the road; or
- survey the Project winter access road during the operating window by community monitors when caribou are known to be in the area (PR#307 p.24).

7.2.2 Parties' submissions and recommendations

The parties provided justification for their views that the impacts of the roads are likely greater than De Beers predicted. The YKDFN note that De Beers' prediction of no mine-related mortality associated with the winter road is unrealistic (PR#137 p.10). The GNWT describe how roads that can be driven by trucks enable a larger level of caribou harvest in a limited time and location compared to areas accessible only by long skidoo trips and that when the Bathurst herd was at low numbers, harvest became an important driver in the recent decline (PR#152 p.6). The GNWT states that "the presence of multiple roads in the Bathurst caribou range means that harvest of this herd will need to be monitored and managed for the foreseeable future" (PR#152 p.8). The GNWT states that "increased hunter access and harvest has the potential to be the single largest effect on the caribou of the additional road that will be built to the mine" and place emphasis on "potential" (PR#152 p.7).

In their Traditional Knowledge reports, Aboriginal parties discuss how the ice roads provide access for hunting and the advantages the ice roads give hunters (PR#374 p.3, PR#418 p.282).

The GNWT states that currently, the predicted impact of the road on increased hunting is minimal as all harvest of the Bathurst herd is closed with the exception of 300 caribou per year and the relatively low caribou numbers will mean that allowable harvest from this herd will remain low for some time (PR#152 p.7). The GNWT states that the lack of information on annual winter distribution of the herd (i.e. not just the collared cows) is a source of uncertainty in DeBeers predictions for the magnitude of the effects of access (PR#152 p.6). The GNWT states:

"The Developer's assessment is likely correct for the next few years, given that all Bathurst harvest is low and likely to remain low. However, the unpredictability of

caribou movements from year to year means that the potential for increased hunter access from roads to this mine and other mines will remain for many years, and the possibility exists that this could be a serious effect.” (PR#152 p.8)

The GNWT made recommendations for De Beers and the GNWT to develop a joint road access management plan to proactively address uncertainties about wildlife mortalities, harvest, and other issues along the road (PR#334).

The LKDFN, DKFN, NWT Metis Nation, Tlicho Government and the YKDFN all had concerns about how roads act as partial barriers to caribou and what effects the roads will have on caribou movement and behaviour. The LKDFN, YKDFN, and NWT Metis Nation note the changes in migratory patterns since the increase of mining development in the region (PR#326 p.9, #374). The LKDFN have observed that the caribou herds have moved further east, away from the current mines, and that this may be an effect of the mines and associated roads (PR#326 p.9). The NWT Metis Nation is concerned about the effects of the road on displacement of caribou including a reluctance of caribou to cross winter roads (PR#374 p. 3). The Tlicho Government questioned whether there would be monitoring to specifically document and describe the influence of road traffic on caribou behaviour and movements (PR#151 p.45). The YKDFN notes that the EIS does not meaningfully evaluate or assess how the winter roads are likely to affect caribou movement (PR#137 p. 11). The EIS only does a qualitative analysis of the effects of the roads on caribou (PR#137 p. 11).

In order to address the uncertainty associated with the effects of the road on caribou movement and behaviour, the parties recommended monitoring. The Tlicho Government, LKDFN and YKDFN all make recommendations that De Beers should be required to test whether the road acts as a barrier and how it impacts caribou behaviour (PR#332, 326, 329). The NWT Metis Nation recommend a thorough assessment of the potential specific and cumulative impacts of the winter access road on caribou migration and over-wintering patterns as a component of the environmental impact assessment process (PR#374 p.3). The LKDFN recommend the causal relationship between development and the decline of caribou should be studied. LKDFN also requested a study that accurately assesses the caribou migration and behavioral changes when caribou encounter winter roads and that this study should assesses migration patterns since the 1990s. This would provide a scientific study to back up the traditional knowledge that indicates that there have been changes in caribou migration routes since the development of the three existing mines (PR#326 p.10).

De Beers responded that they will consider these recommendations within the adaptive management response framework (PR#204), if caribou are present in suitable densities to allow for an informed assessment, and that options for monitoring are considered in the Wildlife Effects Monitoring Program (PR#344 p.4). De Beers’ also responded that the most effective monitoring would be at the regional scale, and it would support a GNWT-ENR initiative to undertake regional monitoring along the Tibbitt-to-Contwoyto Winter Road (PR#175 p. 45-2). De Beers recommends that regional monitoring should be based on data

from collared caribou and also incorporate local knowledge from communities (PR#175 p.45-2).

7.2.3 Panel's analysis and recommendations

Based on the evidence provided in this review, the three main potential adverse impacts of the roads on caribou are due to road access, sensory effects and habitat fragmentation.

The GNWT states that “the presence of multiple roads in the Bathurst caribou range means that harvest of this herd will need to be monitored and managed for the foreseeable future” (PR#152 p.8). The presence of roads has been a contributing factor to the need for management actions such as harvest restrictions.

The Panel agrees with the GNWT that the effects of access may not be significant in the short term, but if caribou use of the area increases, the effects may be significant. Increased use may occur given the unpredictability of caribou movements from year to year and past use of the area by caribou, as indicated by the caribou trails through the Gahcho Kué site. De Beers and the GNWT have committed to developing a road access management plan. The Panel agrees that the road access management plan is necessary to document the use and harvest on the winter access road. The Panel believes that the information collected from monitoring the road should be used for effective management of the herd at the regional scale and to reduce Project specific effects.

The Panel agrees with the parties that monitoring of the roads and their impacts on caribou movement and behaviour are necessary. While De Beers suggests that monitoring should be done at the regional scale, De Beers is responsible for effects and mitigation at the Project scale and therefore should monitor the effects along the winter access road. The presence of caribou along the winter access road should be monitoring using other techniques in addition to satellite collar data, such as road surveys and tracks counts in the snow. Observations at the site-specific level can be used to apply site-specific mitigation (such as convoying trucks, road closures and reduced speed) in addition to contributing to regional monitoring efforts.

De Beers concludes that because the road is only operational 8-12 weeks, frequency of the impacts on caribou is periodic. However, the 8-12 weeks that the road is operational represents a large proportion of the time that caribou are in their winter range. De Beers' analysis also indicates that magnitude of the cumulative change to caribou movement and behaviour is anticipated to approach the limits of the current (2010) baseline conditions (PR#80 p. 7-101).

The Bathurst herd is currently at or near the significance threshold, therefore any additive adverse effect that will increase effects beyond the current baseline (2010) conditions is significant. Therefore, the Panel concludes the incremental effects of the access road are

likely to be significant, and recommends the following measure and a follow-up program (described in Section 7.4):

MEASURE 2

De Beers will:

- **Construct and operate the winter access road in a way that minimizes its adverse effects as a partial barrier to caribou movement and migration;**
- **Monitor to determine the presence and behaviour of caribou along the winter access road using different methods in addition to satellite collar data, such as track counts and visual observations; and**
- **Ensure that the caribou protection plan, the Wildlife Effects Monitoring Program and the Wildlife and Wildlife Habitat Protection Plan address the effects on caribou movement and behaviour along the winter access road.**

7.3 Cumulative impacts

7.3.1 Developer's submission

De Beers approached the assessment of cumulative effects the same way as it assessed project specific effects but included existing developments and reasonably foreseeable projects. De Beers catalogued 551 existing (1996-2010) exploration and development sites which included 176 mineral explorations, six mines and the communities) and applied different sized zones of caribou avoidance depending on the type of site (PR#80 p.7-83). De Beers analyzed the cumulative effects of the five primary pathways by using habitat, energetic and population models. De Beers compared various baseline scenarios, including pre-development (reference conditions).

In the EIS De Beers predicted that the cumulative effects would result in decreases of preferred habitat of 2.7% of the spring range compared to pre-disturbance (reference) conditions, a 3.2% loss in the post-calving range, and 7.3% loss in the autumn range (PR#80 p.7-108). These values assume that the land within the project footprints is completely removed from the landscape while the areas within the zones of influence around the developments have a decreased amount of available habitat.

In response to an information request from the Tlicho Government to assess the cumulative effects at the annual range scale of the Bathurst herd, including foreseeable projects within Nunavut (PR#151 p.35), De Beers re-evaluated only the density of development across the annual range. (PR#175 p. TG_44-2). At the annual range scale with winter roads, the proportion of land cover directly and indirectly influenced by

development was 10.7% (PR#175 p.TG_44-2). This value assumes that all land cover within the footprints plus the zones of influence is removed from the landscape. This value is conservative because within the zones of influence the available habitat is actually reduced and is not completely removed (PR#175 p.TG_44-7).

De Beers modelled changes in herd abundance with different levels of insect harassment, harvest, and development. For example, De Beers predicts that effects from the Project and other existing and reasonably foreseeable developments would decrease the herd population by 12.2% relative to pre-development conditions (PR#80 p.7-139). Based on the different modelled scenarios, De Beers predicts that cumulative impacts from the Project and other developments decreases projected population sizes by a moderate magnitude (10-20% decreases compared to baseline values) and that these cumulative effects are larger when increases in insect activity levels or harvest rates are also included (PR#80 p.14-7).

De Beers predicts with moderate certainty, based on the weight of evidence from the analysis of the primary pathways, that the cumulative impacts from the Project and other developments should not have a significant negative influence on the resilience and persistence (abundance and distribution) of caribou populations (PR#80 p.7-20). Because the abundance and distribution of caribou are not predicted to change significantly, the opportunities for use of caribou by people are also predicted not to change significantly. Therefore De Beers concludes that the cumulative impacts of the Project will not have a significant adverse impact on the use of caribou by people (PR#80 p.7-20).

7.3.2 Parties' submissions and recommendations

Cumulative impacts were a major concern for Aboriginal parties in this review because in their view development is a contributing factor to cumulative effects, and that cumulative effects have affected caribou populations (PR#332, 326,410). Aboriginal parties expressed their frustrations over the lack of cumulative effects assessment and management. The YKDFN note that although cumulative effects on Bathurst caribou has been a priority issue since 1996, recommendations for a regional framework for cumulative effects assessment and management in the Diavik environmental assessment decision report have not been effectively implemented (PR#407 p.8). The LKDFN summarize the consequences of the lack of cumulative effects monitoring:

“With the lack of any real research on cumulative impacts in the region, management bodies and government authorities seem content to allow for continuous development prior to any information being discovered about the mining industry's impact to the once-vast caribou herds. Habitat fragmentation, zones of influence, noise disturbance, [are] all factors affecting caribou for each mine in the area; each of these seemingly isolated mines neglect the idea that these small factors are contributing on a larger scale to the herd numbers.” (PR# 326 p.2)

The parties focused their submissions on the need for improved cumulative effects monitoring, mitigation, and adaptive management of the Bathurst caribou herd and made a number of specific recommendations to address the lack of cumulative effects management. The DKFN state that not enough consideration goes into looking at cumulative effects of resource projects and that strong mitigations must be incorporated when dealing with caribou impacts (PR#419). The LKDFN note that there is a lack of oversight for cumulative effects on caribou, and that if approved, De Beers would operate half the active mines in the area making a case for De Beers to exercise a leadership role to accurately depict the impact of the mining operations and the winter roads on the status of caribou herds (PR#326, p.9).

The Tlicho Government recommended that an ongoing trans-boundary cumulative effects monitoring and adaptive management program be developed for the Bathurst caribou herd as part of a comprehensive herd management program and provided specific goals for the program including a review of range-wide industrial development activities relative to recovery and health of the Bathurst herd (PR# 332, 416). The YKDFN note that they expect responsible authorities to take aggressive strides to develop a co-management approach and request measures similar to those proposed by the Tlicho Government. These include the creation of an on-going trans-boundary cumulative effects monitoring program and an adaptive management approach for range management that links monitoring to effective management decisions (PR#407 p.4).

The YKDFN is concerned that when the caribou numbers were in steep decline the Government's only response was to restrict hunting and that federal and territorial governments are not fulfilling their obligations to manage cumulative effects related to caribou (PR#407 p i).

The GNWT acknowledge that many parties are concerned about cumulative effects in the Slave Geological Province and agreed that combined effects of development and natural factors on caribou are a key concern (PR#409 p.2). While the GNWT did not provide their views on the significance of cumulative effects on the Bathurst Caribou herd, they note that:

"While an individual mine may have limited impact on wildlife distribution and abundance, its contribution to the overall amount of development on the landscape may be enough such that wildlife are significantly and adversely impacted (i.e., there may be a threshold of development disturbance above which a given species is negatively impacted). It is the accumulated effects of all development that is of primary concern for all wildlife" (PR#334 p.12).

The GNWT acknowledge that a cumulative effects management program is necessary for the Bathurst caribou herd to understand and manage existing and likely future developments and natural factors. The GNWT identified ongoing monitoring to understand herd size and trend and harvest management as important components of a cumulative effects management program and described plans for further work on such a program (PR#407 p.2-3). The GNWT note that while they have the lead responsibility for

coordinating the program, it must be developed and implemented in conjunction with other governments, co-management partners, and land and wildlife users (PR#407 p.3). The GNWT also notes that the second (2011-2015) Barren ground Caribou Management Strategy for the NWT identified six priority strategies including developing approaches for monitoring and mitigating cumulative effects and developing industry best practices to manage habitat in relation land use activities and forest fires (PR#263 p. 2).

AANDC has regulatory responsibilities for land management, and during the hearing noted that it also has an important role in monitoring, but not in assessment or management of cumulative effects on caribou (PR#402 p.78, 92). At the request of the YKDFN, AANDC provided a list of projects sponsored by the Cumulative Impact Monitoring Program (CIMP). This list demonstrates that comparatively few CIMP dollars have been devoted to Bathurst herd monitoring over the last decade and that monitoring work has focused on caribou and wolf abundance and distribution and monitoring natural environmental factors such as snow pack and vegetation (PR#405).

When the GNWT was asked during the hearing to provide a timeline for development and implementation of a program to mitigate cumulative effects, the GNWT responded:

"I understand ... concerns about timeline and the fact that this [program to mitigate cumulative effects] should have been done a long time ago. I don't disagree. We don't know [when this will be in place]" (PR#403 p.97)

The GNWT reference the 2011-2015 Barren-ground Caribou Management Strategy as a document that provides guidance for the management, continued recovery and long term sustainability of NWT herds and includes a strategy and work plan for assessing cumulative impacts for NWT barren-ground caribou herds (PR#407 p.2). At the hearing, when asked about the financial commitment towards cumulative effects analysis and management, the GNWT responded:

"I also note that that strategy is really a guidance document. It would cost approximately \$19 million to implement. Currently, we only get about \$1 million per year for that strategy, and we seek other sources of funding through partnerships and through other pots of money that the GNWT can access. So we can't implement everything in that strategy; we focus on priorities." (PR#403 p.182)

The GNWT states that it develops short term harvest management actions for the herd in partnership with the GNWT's wildlife co-management partners, jurisdictional agencies, and other groups and that it also continues to work with these groups to develop an overall process for the long-term management of the herd which could include addressing cumulative effects as part of a multi-partner process (PR#407 p.3).

While the GNWT states it is looking towards long-term management of the herd which could include addressing cumulative effects, it also expresses the limitations of determining thresholds and implementing those thresholds:

“...setting a threshold is -- and it, the implications of setting a threshold, is not insignificant. Just look at the Boreal Caribou Recovery Strategy. You go over 35 percent you're in total fire management and you are in a no-development situation. And as a government, our role is not just to make sure that our wildlife are sustainable, but to also provide economic opportunities for our – our residents, for the Northerners. And it's -- it's – I mean, that's not an easy decision to make and you don't make it lightly.” (PR#403 p.202)

7.3.3 Panel analysis and recommendations

The Panel recognizes that range-wide monitoring and management of cumulative effects are government responsibilities, while developers are responsible for their contributions to cumulative effects. As land managers, AANDC has an important role in the protection of caribou habitat through its development decisions and the regulation of land use.

The GNWT has recently initiated cumulative effects programming such as hiring a cumulative effects biologist, working with AANDC to better understand what tools can be used to assess cumulative effects, and development of a caribou management strategy (PR#403 p.153). The Panel note that analyzing what tools can be used to assess cumulative effects is an early step in the process of assessing and managing effects. The Panel also notes that the current focus of the Barren ground Caribou Management Strategy for the NWT (2011-2015) is on monitoring to determine the causal effects and factors that affect caribou populations. This means that responsible authorities have not yet begun to design mitigations for cumulative effects and are unable to implement any significant mitigation efforts until they are more certain about how the various factors (e.g. predator – prey relationships, harvesting, natural and anthropogenic alteration of habitat, climate change) affect caribou populations and herds.

The evidence on the record suggests that insufficient resources and efforts have been committed to implement the Caribou Strategy (PR#403 p.182) and that the implementation of additional cumulative effects mitigation measures, other than the existing harvest restrictions for the protection of caribou, within the time frame of this Project appears unlikely.

The Panel acknowledges the initiatives that the GNWT is undertaking to address cumulative effects, and supports De Beer's commitment to contribute to the GNWT's monitoring initiatives. The Panel expects that the proposed Memorandum of Understanding (MOU) between the GNWT and De Beers will ensure that De Beers' commitment for these contributions will be fulfilled. However, the Panel notes these initiatives by themselves will not directly mitigate impacts of the Gahcho Kué Project, nor will they ensure that the impacts of the Project will not negatively impact the recovery of the herd. As stated by the GNWT at the hearing, the content of the MOU does not provide for any impact mitigation specific to the Gahcho Kué Project:

"I don't see the -- the MOU as -- as being something that's going to fill this -- this impact mitigation aspect. I see the work of the Proponent [developer] as being what -- what will give the Board that -- or excuse me, the panel, that information and that confidence." (PR#403 p.212)

Evidence provided for this review shows that governments have:

- relied on proponents to do cumulative effects assessments (PR#402 p.93);
- do not monitor changes in combined footprint or habitat availability at the range-scale (PR#405);
- focus management efforts on harvest management (PR#407); and
- do not appear to have considered the need for additional measures to reduce ongoing direct and indirect habitat loss in the Bathurst range at a time when herd abundance is extremely low.

In Section 7.1 above, the Panel determined that the Bathurst Herd may currently be at the threshold of social and cultural significance, and held that any negative impact on caribou or caribou habitat that would contribute to the need for on-going harvest restrictions is a significant adverse impact. The predicted negative cumulative effects of the project are likely significant because the herd may be at a threshold of social and cultural significance and there is no current effective management of cumulative effects to ensure the sustainability of the Bathurst herd.

To address the likely significant cumulative effects, the Panel requires De Beers to reduce its contribution to cumulative effects and for governments to develop cumulative effects monitoring and management that ensures that the effects of the Project, in combination with other developments and natural factors, do not adversely affect the sustainability of the herd, or the continued opportunity for traditional and non-traditional use of caribou, unless aboriginal parties, co-management boards, and governments accept the consequences.

The Panel concludes that measures 1 and 2 described above will minimize the Project's contributions to cumulative effects on caribou by reducing the Project's incremental (project specific) impacts. In order to ensure that significant adverse cumulative effects are not likely, the Panel requires Measures 1 and 2 above and the following measure for governments to develop cumulative effects monitoring and to implement appropriate management actions. Governments have initiated these programs, but progress has been slow. At a time when caribou numbers are low and Aboriginal and other people of the Mackenzie Valley are experiencing harvest restrictions, action on these initiatives needs to be as timely as possible.

Measure 3

The GNWT and AANDC:

- **Develop and implement a cumulative effects framework that links project specific monitoring and mitigation (project specific Wildlife Effects Monitoring Program and Wildlife and Wildlife Habitat Protection Plan) to cumulative effects monitoring and mitigation and ensure there is two-way feedback between the project and cumulative scales;**
- **The implementation of the cumulative effects framework should lead to effective management including best management practices that can be applied at the Project scale;**
- **Report annually on the development, implementation and results of the framework in a publically accessible manner.**

De Beers will:

- **Monitor project specific effects (e.g. size of the zone of influence, changes in habitat, effects of the winter access road on caribou movement and behaviour) and will report to the GNWT and make the results public on how project specific effects contribute to cumulative effects for the duration of the Project**

7.4 Monitoring, follow-up and adaptive management

7.4.1 Developers' submission

De Beers' plans for monitoring caribou are presented in several documents including: the EIS (PR#80 p.7-177), the environmental monitoring and management framework (PR#204 p.13), and the Wildlife Monitoring Plan (PR#307; 308; 310). The Wildlife Monitoring Plan includes the wildlife effects mitigation and management plan (PR#310 p.184) and a caribou monitoring plan that provides further detail on caribou monitoring (PR#308 p.43).¹² Several drafts of these plans are included in the Wildlife Monitoring Plan which

¹² Note: The Wildlife Monitoring Plan was submitted to the Panel in three sections and contains several drafts and other plans as appendices, without an overall page numbering system. Therefore this report references the page number of the PDF. This report is the most recent version.

has been revised based on consultations with stakeholders in the summer and fall of 2012. De Beers acknowledges that the plans presented are drafts and will be refined throughout the permitting and licensing phase.

De Beers states in the EIS, that the wildlife effects monitoring program will test impact predictions and reduce the level of uncertainty related to each prediction and that the principal goal of the wildlife effects monitoring program is to provide information required for the Project's environmental management system to adaptively manage the Project to protect wildlife and wildlife habitat (PR#80 p.7-177). The wildlife effects monitoring program would thus consist of environmental monitoring and follow-up programs (PR#80 p.7-178).

The conceptual caribou monitoring plan provides detail on the caribou monitoring which identifies monitoring components, effects pathways, effects assumptions and predictions, and types of monitoring (PR# 308 p.78). De Beers summarized the monitoring into main themes (**Table 6** below; PR#308 p.60) and identifies the associated studies, which are:

- wildlife surveillance monitoring;
- waste management monitoring;
- soil and vegetation monitoring;
- air quality and dust monitoring;
- direct habitat loss monitoring;
- winter access road use monitoring;
- caribou zone of influence monitoring;
- caribou activity budget monitoring; and
- contributions to the Bathurst caribou management plan (PR#308, p.60).

De Beers acknowledges a noise monitoring plan in the wildlife effects mitigation and management plan as an associated plan for effective wildlife management (PR#310 p.54). In the EIS, De Beers states that follow-up noise monitoring will be conducted once the Project is in operation to verify the predictions the noise model and the resulting disturbance area but that long-term noise monitoring is not contemplated (PR#80 p.7.II-43).

De Beers makes references to applying an adaptive management approach in many of the monitoring plans including the environmental monitoring and management framework (PR#204 p.3), the wildlife monitoring plan and the conceptual caribou monitoring plan

(PR#308 p.46). De Beers states that if changes to caribou are determined to be greater than the predictions in the environmental impact statement, or if monitoring of the project identifies potential hazards to wildlife, then options available to De Beers include:

- modify the monitoring efforts;
- implement new monitoring programs or special studies to further understand the effects; or
- implement additional mitigation to reduce the effects (PR#308 p.71).

De Beers states in the environmental monitoring and management framework that if the results of a monitoring program indicate that predicted changes are occurring beyond what was predicted, a monitoring response plan will be developed, and efforts will then be initiated to identify and respond to the source of the change (PR#204 p.6). Other adaptive outcomes of the response framework may include the continuation of monitoring as planned or adjusting the monitoring effort as necessary (PR#204 p.6). An advisory committee would prepare an annual summary report of the outcomes of adaptive management (PR#204 p.6). This advisory committee was subsequently replaced by Ni Hadi Yati, which is described in Section 13 of this Report.

In the wildlife monitoring program De Beers states that each year a monitoring report will be completed by De Beers and that a comprehensive analysis and discussion of all data from the monitoring program could be completed every five years (PR#308 p.70).

The GNWT recommended that the wildlife monitoring plan be divided and renamed into two plans: a Wildlife Effects Monitoring Plan (WEMP) and a Wildlife and Wildlife Habitat Protection Plan (WWHPP). De Beers committed to implementing the WEMP and the WWHPP as submitted to the Panel on October 4th, 2012 and that these plans will be refined prior to construction to the address the recommendations made by the GNWT and Environment Canada in their technical reports (PR#406, p. 12).

Table 6: Summary of monitoring themes and objectives (PR#308 p.60)

Monitoring Theme	Objective
Direct mine related mortality	To identify instances where the Project presents direct physical hazards to caribou
Caribou health	To identify and mitigate risks to the safety and health of caribou
Habitat loss and alteration	To confirm that the amount of total direct terrestrial landscape alteration does not exceed predictions To confirm that changes in vegetation surrounding the Project does not exceed predictions
Access	To determine the amount and type of public

	use of the Winter Access Road
Change in distribution	To determine whether the zone of influence changes in relation to mine activity
Change in behavior	To determine if caribou behavior changes with distance from the mine
Change in survival and reproduction	To contribute to the Bathurst Caribou Management Plan (To be determined through discussions with GNWT ENR)

7.4.2 Parties' submissions and recommendations

In their submissions, Aboriginal parties emphasize the need to integrate monitoring, adaptive management and mitigation, primarily to manage uncertainties in the developer's impact predictions and ensure that if adverse impacts are worse than predicted, they can be mitigated. The parties stressed that monitoring needs to inform mitigation as stated by the YKDFN: "monitoring is empty unless it feeds into management decisions" (PR#407 p.4).

The GNWT state in their technical report and closing comments that both the Wildlife and Wildlife Habitat Protection Program (WWHPP) and a Wildlife Effects Monitoring Plan (WEMP) are needed to minimize and mitigate any potential impacts of the project on wildlife and wildlife habitat. The GNWT states that "a WEMP does not include mitigation measures per se as it is, by definition, strictly a process for monitoring and testing specific effects questions" (PR#334 p. 5). The GNWT also states that the WWHPP is necessary to protect wildlife and wildlife habitat within the Project Development Area and it should include standing operating procedures for dealing with potential wildlife issues (PR#409 p.1).

The GNWT's technical report and closing statement note that the final WEMP should be developed collaboratively, using standard protocols and emphasizing regional monitoring and adaptive management. In its Closing Statement, the GNWT identify several insufficiencies in the plans submitted by De Beers and commit to work with De Beers through a Memorandum of Understanding (MOU) (PR#409 p. 5). The MOU has not yet been finalized, but will reportedly include a process for continual review and revision of the WEMP and WWHPP throughout the life of the project as well as provisions on how a cumulative effects program will be jointly developed.

The LKDFN, YKDFN, NSMA and Tlicho Government all requested independent oversight in order to ensure the effective development and implementation of wildlife monitoring and mitigation, in particular for caribou which is of primary concern for these parties (see Section 13). Tlicho Government requested that the wildlife monitoring include reporting requirements similar to the Wek'èezhií Aquatic Effects Monitoring Program (PR#332 p.15). The LKDFN, YKDFN, DKFN, and TG were not satisfied with De Beers' proposed Adaptive

Management Advisory Committee (PR#204) and therefore collaborated with DeBeers to form Ni Hadi Yati (see Section 13).

7.4.3 Panel analysis and recommendations

The Panel acknowledges De Beers' commitment to conduct follow-up monitoring as part of the Wildlife Effects Monitoring Program (PR#80 p.7-178). The Panel also recognizes the importance of caribou to Aboriginal parties and the need for monitoring, adaptive management and follow-up. De Beers responded to concerns from Aboriginal parties about caribou by preparing a stand-alone conceptual caribou monitoring plan (PR#308 p.43).

The Panel recommends that monitoring efforts should be focused on the effects that have the potential to have the greatest adverse impacts. While the Panel acknowledges that the monitoring plans presented are only conceptual at this stage, the Panel notes that the main monitoring themes identified by De Beers in the conceptual caribou monitoring plan (PR#308 p.43), do not sufficiently address all of the primary pathways that are predicted to affect caribou. For example, two of the primary pathways are sensory effects and fragmentation due to the roads and these are not explicitly addressed in the main monitoring themes identified by De Beers. The Panel recognizes that cumulative effects due to sensory effects and fragmentation caused by the roads and development in general are a major concern to Aboriginal parties, and that these effects have not been sufficiently addressed at the Project specific or cumulative scale.

Although De Beers commits to implement an adaptive management approach to monitoring, the Panel is concerned that the monitoring plans presented in this EIR do not sufficiently demonstrate how adaptive management will be implemented and lead to more effective mitigation, if necessary. While De Beers commits to an adaptive management approach, De Beers states "research on the Zone of Influence around the project is not likely to provide information helpful to adaptively manage mining operations" (PR#308 p.67). Further, De Beers states that it is unlikely that the various mine-related effects to caribou (such as noise, dust, smells and activity) will ever be fully understood, thus limiting the ability to completely mitigate these effects and testing the efficacy of mitigation (PR#163, p.3-9). In contrast the GNWT states that "monitoring can be used to test effectiveness of mitigation strategies at reducing the Zone of Influence and if caribou behaviour changes in relation to mining activity" (PR#334 p.9). The Panel concludes that on-going research, adaptive management, and incorporation of traditional knowledge could improve the ability to minimize adverse effects and test the effectiveness of mitigation.

De Beers references the Wek'eezhii Land and Water Board's adaptive management framework as a tool for linking monitoring to mitigation. The Panel supports using this framework and therefore the key components of adaptive management, namely defined action levels and proposed mitigation designs policies and practices linked to these action

levels. These pre-defined mitigations are intended to be the starting point for the adaptive management cycle and should be flexible to facilitate better methods or the use of best practices available at the time they are implemented.

As discussed in Section 7.1 and 7.2 above, the Panel has determined that follow up programs are required to address project specific and cumulative impacts of the project and the access road on caribou and caribou habitat. Measure 3 addresses the need for cumulative effects follow-up. The project specific caribou protection plan and linked Wildlife Effects Monitoring Program and Wildlife and Wildlife Habitat Protection Plan, when updated, can operate as a follow-up program for project specific effects.

The follow-up program should include, but is not limited to:

- **monitoring the zone of influence and its likely causes (e.g. noise, dust, mine activity) which can be completed as part of the Wildlife Effects Monitoring Program;**
- **using results from monitoring the extent of the zone of influence and likely causal mechanisms (completed as part of the Wildlife Effects Monitoring Program) to intensify or reduce mitigations that will minimize the zone of influence;**
- **monitoring the presence of caribou along the Winter Access Road and the effects of the road on caribou movement and behaviour;**
- **describing action levels that will be used to determine when monitoring or mitigations or changes to existing mitigation are necessary ; and**
- **demonstrating how existing baseline information (such as the caribou trails as a model for likely caribou approaches to the site) and traditional knowledge are incorporated in monitoring and management plans.**

8 Impacts to other wildlife and species at risk

The Terms of Reference for the Gahcho Kué Project required the developer to include an assessment of the impacts of the Project on wildlife other than caribou. In its EIS, the developer accordingly discussed carnivore mortality (EIS Section 11.10), other ungulates (EIS Section 11.11) and species at risk and birds (EIS Section 11.12), all of which had been identified by the Panel as subjects of note.

Section 8.1 of this Report considers the impacts from the Project on wildlife other than caribou, specifically muskoxen and moose. Section 8.2 discusses impacts on species at risk. The species at risk that may frequent the region affected by the Project include carnivores (grizzly bear and wolverine) and bird species (rusty blackbird, horned grebe, peregrine falcon and short-eared owl).

8.1 Impacts on ungulates – moose and muskoxen

8.1.1 Developer's submission

In Section 11 of its EIS, the developer conducted an effects assessment of the impacts of the Project on muskoxen and moose in the local study area (200 km² centered on mine site) and regional study area (5,700 km² from Reid Lake in the northwest, MacLellan Lake in the southwest, Cook Lake in the southeast and Fletcher Lake in the northeast. Parts of the regional study area are both above and below the treeline and a portion of the winter road crosses the regional study area. (PR#80 11.11-2-7) The developer states in the EIS that muskoxen have been observed in the regional study area through incidental observation during caribou surveys, and that during the summer of 2004, muskoxen were observed within a few hundred meters of the Gahcho Kué camp. Traditional knowledge collected by the developer indicates that muskoxen are using the area more frequently than in the past. (PR#80 p. 11.11-16 – 11.11-20)

The developer states in its EIS that moose in low densities may move into the tundra portion of the regional study area from spring to winter and into the forested areas during the winter. Traditional knowledge gathered by the developer indicates that moose are not common in the barrenlands or the regional study area with only occasional sightings in the regional study area. (PR#80 p. 11.11-21,22)

The developer's effects assessment for muskoxen and moose focused on:

- changes to habitat quantity due to direct loss of habitat from the Project footprint and habitat fragmentation that may alter the movement and behavior of these species;
- changes to habitat quality, movement and behavior from dust deposition from mine activities on forage vegetation and sensory disturbance such as the presence of

people, noise, light and smells that can alter movement and behavior which can influence survival and reproduction (PR#80 p. 11.11-57).

The developer considered the effects of the project on muskoxen and moose in terms of project-specific changes from baseline conditions. In its EIS, the developer concluded that the predicted incremental effects would not have a significant adverse impact on the persistence of muskoxen and moose populations (PR#80 p. 11-105-106). In its 2012 EIS supplement, De Beers notes that the project footprint will be reduced by 60 ha because of the revised design of the fine PK facility. This change in the area of habitat affected is an improvement but does not alter the predicted impacts or the developers' conclusion that the Project will not significantly alter the abundance or distribution of muskoxen and moose. In addition, no significant impacts to traditional use of muskoxen and moose were predicted. (PR#184 p. 11-32)

The wildlife management plan submitted by De Beers states that its focus will be on monitoring project-related effects on caribou, grizzly bear and wolverine, but that incidental observation of species such as muskoxen and moose will also be recorded (PR#307 p. 1-5). De Beers has committed to preparing and implementing the renamed Wildlife Effects Monitoring Plan (WEMP) and Wildlife and Wildlife Habitat Protection Plan (WWHPP) and to implement adaptive management if the monitoring associated with these Plans indicate that effects on these populations are occurring. DeBeers anticipates input from the GNWT, Environment Canada and Ni Hadi Yati (PR#406 p. 12) to achieve this goal.

8.1.2 Parties' submissions

In its ethno-history report, Deninu Kué First Nation document the history of the decline of muskoxen numbers in the NWT due to overhunting in the 19th to early 20th century and their re-population of historic range in the central mainland of the NWT west of the Thelon Sanctuary as a result of hunting restrictions. The ethno-history report cites a 2001 GNWT publication that indicates, based on government surveys, muskoxen numbers have doubled in the muskoxen management unit east of Lutsel K'e between 1989 and 1998. Deninu Kué people still harvest a limited number of muskoxen in this region. (PR#418 p. 111-115)

Information from the *Traditional Knowledge of the Gahcho Kué Nene*, submitted by the LKDFN confirm that muskoxen are now found further south, in the vicinity of the Project site and within the treeline (PR#422). Muskoxen were observed near the Project site during a community field trip to the Project site in August 2012 (PR#396 p. 53)

8.1.3 Panel analysis and recommendations

The Panel is aware that the primary wildlife concern for Aboriginal groups, co-management bodies and regulators with respect to impacts from this Project is caribou. The Panel is mindful that impacts to other wildlife species from the construction, operation

and closure of Project are predicted and that mitigation measures to reduce project-related impacts to other wildlife, such as muskoxen and moose are required.

The Panel acknowledges the commitment from the developer to prepare and implement its WWHPP and WEMP and that monitoring and mitigation to reduce project-related impacts to wildlife, including muskoxen and moose will be included in these wildlife management plans and programs. The Panel acknowledges that some of the mitigation measures proposed by the developer for caribou will likely mitigate impacts on muskoxen and moose. Significant impacts to these two species are unlikely because there are few muskoxen and moose in the Project area.

In the opinion of the Panel it is not likely that significant adverse impacts to other ungulates (muskoxen and moose) will occur from the Gahcho Kué Project provided the developer constructs, operates and closes the mine as proposed and implements its commitments described in the EIS and in the commitments tables included in this Report.

8.2 Impacts to species (grizzly bear and wolverine) at risk and birds

8.2.1 Introduction

The *Species at Risk Act*¹³ imposes specific responsibilities for the Panel in the environmental impact review of the Gahcho Kué Project. Subsection 79(2) of the *Species at Risk Act* states that if the project is likely to affect a listed wildlife species or its critical habitat, the Panel:

“must identify the adverse effects of the project on the listed wildlife species and its critical habitat and, if the project is carried out, must ensure that measures are taken to avoid or lessen those effects and to monitor them. The measures must be taken in a way that is consistent with any applicable recovery strategy.”

The Terms of Reference for the Gahcho Kué Project requires the developer to conduct an assessment of the effects of the Project on species at risk and birds as a subject of note (PR#48 p. 37-38). De Beers described the impacts from the Project on species at risk and birds in section 11 of its EIS and incorporated experience from other diamond mines in its analysis and effects assessment.

Terrestrial species at risk that overlap the regional study area for the Project include the horned grebe (western population), peregrine falcon, short-eared owl, rusty blackbird, grizzly bear and wolverine (western population). These species are all designated as “special concern” by the Committee on the Status of Endangered Wildlife in Canada

¹³ *Species at Risk Act*, S.C 2002, c.29 , ss. 79(2)

(COSEWIC) and are either on Schedule 1 (official list of species at risk) of the *Species at Risk Act* or are being considered for addition to Schedule 1 (PR#333 p. 27-28). None of these species' status is such as to require the identification of critical habitat within the Project study area.

8.2.2 Developers' submission

Rusty blackbird, horned grebe, peregrine falcon and short-eared owl were identified by the developer as the avian species at risk in the regional study area for the EIR. De Beers describes potential impacts from the Project on avian species at risk as changes to habitat quantity and fragmentation (project footprint) and changes to habitat quality, movement and behavior (dust deposition, noise and other sensory disturbance) (PR#80 p. 11.12-93). In particular, there is a risk of damaging or destroying bird nests from direct loss of habitat due to flooding of land on the west side of Kennady Lake when dykes are constructed to keep water away from the mining operation.

In its EIS, De Beers proposed key mitigation measures for avian species at risk (and other birds) including clearing land outside of the breeding season (May 15 – September 15), avoiding disturbance to active nests and preventing birds from nesting on man-made structures. In addition, general mitigation measures for migratory birds were identified in the developers WEMP. As described in the developers responses to the EC technical report, these include setback distances from nests (unless the nest is within the established footprint), surveys of water bird use of collection ponds and the water management pond as part of wildlife surveillance monitoring, notifying EC of injuries or mortalities to migratory birds and implementing an upland bird monitoring program (PR#348 p. 7-9). De Beers also states that they will adhere to the minimum flight altitude of 650 m to reduce aircraft disturbance to birds as recommended by Environment Canada, avoid excessive aircraft circling or hovering over areas likely to have birds and inform pilots of these recommendations (PR#348 p. 9-10).

The developer's conclusion is that impacts from both this Project and in combination with other projects on avian species at risk would be negligible to low and should not significantly influence the persistence of avian species at risk (PR#80 p. 11.12-148). In its EIS supplement, De Beers states that the 60 ha decrease in disturbed habitat resulting from the fine PKC facility (mitigated) will not change the conclusions that the Project will not significantly affect the abundance or distribution of species at risk, upland breeding birds, water birds, and raptors (PR#184 p. 11-35).

Barren ground grizzly bears and wolverine were discussed in the context of species at risk by the developer in Section 11.12 of its EIS (PR#80). Both species are listed as species of special concern under the *Species at Risk Act*. An analysis of impacts from the Project on these two species was conducted, mitigation proposed and a determination of significance of residual impacts was made.

In its discussion on carnivore mortality in Section 11.10 of its EIS, De Beers describes primary adverse impacts on grizzly bears and wolverine as follows:

- direct effects from changes in habitat quantity and fragmentation from the physical footprint and winter roads (habitat loss);
- indirect effects from changes in habitat quality, movement and behavior (dust deposition, noise and human activity sensory disturbance); and
- effects from changes in survival and reproduction from negative interactions with projects due to site attractions such as food waste and shelter (direct mortality). (PR#80 p. 11.10-97, 11.10-172)

De Beers notes that mitigation practices to reduce negative interactions of grizzly bears and wolverine with mining activities at the other mine sites in the Slave Geologic Province, have improved since diamond mining began in 1998 (PR#80 p. 11.12-156). Mitigation and monitoring for grizzly bear and wolverine intended to address Project impacts are described in the developer's wildlife monitoring plan (PR#307 p. 5-14 – 5-19, PR#308, PR#310). De Beers further clarifies in its list of commitments (PR#406) that it will implement the separated and re-named Wildlife and Wildlife Habitat Protection Plan and Wildlife Effects Monitoring Program and address recommendations made by the GNWT and Environment Canada. In addition, both the WWHPP and WEMP will be adaptively managed during the life of the Project with input from Ni Hadi Yati (PR#406 p. 11).

With respect to grizzly bear and wolverine, De Beers states that the incremental and cumulative impacts from this Project and other developments would not be significant and that there would be no significant adverse impact to the use of grizzly bear and wolverine by people (PR#80 p. 11.12-156-158). The 2012 EIS supplement confirms that the reduction in disturbed habitat resulting from the change to the fine PKC facility (mitigated) will not alter the developers' conclusion that the impacts of Project will not significantly affect the abundance and distribution of carnivores, including grizzly bears and wolverine (PR#184 p. 11-30).

8.2.3 Parties' submissions

In its technical report, Environment Canada confirms that the developer has accurately identified the avian species at risk in the regional study area for the Project. Environment Canada states that the general mitigation measures, such as clearing land outside the migratory bird breeding season, setback distances to avoid disturbance to nests and surveillance monitoring of ponds proposed by the developer will help mitigate and monitor potential adverse impacts to migratory birds and avian species at risk from the Project (PR#333 p.20-28). In its closing argument, Environment Canada states that De Beers has committed to the recommendations made in its technical report (De Beers Responses to EC technical report PR#348 p. 5-10) with respect to migratory birds and avian species at risk prior to the public hearings (PR#421 p.1).

The *Traditional Knowledge of Gahcho Kué Nene* submitted by LKDFN states that the Gahcho Kué (Kennady Lake) area is an important stopping place for migratory birds passing through in spring and fall. The reason is that the creeks feeding into Kennady Lake contain small fish which are an important food source for birds and the abundance of berries around Gahcho Kué provides a rich feeding ground for migratory birds. (PR#422)

Peregrine falcons and short-eared owls are raptors and are species at risk that fall under the management responsibility of the GNWT. Raptor and raptor nests are protected under the territorial *Wildlife Act*. The GNWT notes in its technical report that the developer has committed to conducting raptor nest occupancy surveys to monitor the distribution, abundance and productivity of raptor nests. Further, the GNWT states that it understands the developer will test specific impact predictions on raptors similar to the tests that take place at other mines (PR#334 p. 11).

Grizzly bears and wolverine are species at risk within the regional study area of the Project that are under the management responsibility of the GNWT. In its technical report, The GNWT notes that De Beers has committed to participating in a joint regional grizzly bear DNA study in partnership with the other diamond mines. The GNWT expects that this study will assist in determining whether and to what extent mines influence the abundance and distribution of grizzly bears at the local and regional scale. The GNWT also states that the developer has committed to conducting a wolverine DNA survey in the Project study area. According to the GNWT, these monitoring initiatives can be used by the GNWT and others in addressing cumulative effects monitoring and management (PR#334 p. 9-11, PR#403 p. 150).

A grizzly bear and wolverine monitoring study design is described in the developer's WEMP (PR#307 p. 5-14 – 5-19). In its technical report, YKDFN states that the proposed distribution of hair snagging cells in the study design may not be sufficient to achieve the objectives of the study. Rationale for this conclusion provided by YKDFN is that the proposed survey grid design is not extensive enough. In order to address this deficiency, YKDFN recommends that the grizzly bear and wolverine study design should “sample the area south of the proposed grizzly bear grid to provide better coverage of areas potentially affected by mine-related activities” and “conduct full wolverine sampling within the 12-14 km area centered on the mine site” (PR#329 p.16-17). During its presentation at the public hearing on December 7, the GNWT stated that De Beers has committed to participating in future workshops with the GNWT and wildlife co-management partners to refine specific monitoring details with these studies in order to address cumulative effects on carnivores (PR#403 p. 150-152).

In its closing statement, the GNWT states that De Beers has committed to work with the GNWT to further develop and refine both the WWHPP and WEMP and that this will be achieved through a Wildlife Memorandum of Understanding between De Beers and the GNWT (PR#409). The intent of the MOU is to ensure that there is a process for

collaboration, review and development of the wildlife monitoring and management plans, which includes matters such as species at risk (PR#409 p. 4-5).

8.2.4 Panel's analysis and recommendations

The Panel acknowledges the design mitigation features built into the Project and commitments made by developer intended to mitigate potentially adverse impacts to birds and species at risk. In particular, the Panel refers to commitments made by De Beers in response to the technical report submitted by Environment Canada that mitigate impacts to avian species at risk. While some of these commitments were not included in the developer's final list of commitments (PR#406), the Panel has included these as commitments in Table C-2 because they were committed to in the developer's response to technical reports, during the final stages of this EIR.

The Panel understands that the monitoring programs for species at risk described above are built upon ongoing monitoring initiatives at the existing diamond mines in the region and will be incorporated into the WEMP and WWHPP for the Gahcho Kué Project. The Panel supports the developer's commitments regarding continued dialogue with Environment Canada, the GNWT, Ni Hadi Yati and others in developing wildlife monitoring and management plans and programs. When guided by the principles of adaptive management, these monitoring programs will be instrumental in reducing the adverse impacts of this development on species at risk.

In the opinion of the Panel it is not likely that significant adverse impacts to species at risk will occur from the Gahcho Kué Project provided the developer constructs, operates and closes the mine as proposed and implements its commitments described in the EIS and in the commitments tables included in this Report.

8.3 Cumulative impacts

8.3.1 Developer's submission

DeBeers predicts that the proposed Gahcho Kué project will contribute to low to moderate magnitude cumulative impacts on carnivores, birds, and species at risk, and concludes that the Project's contribution and combined effects will not be significant (PR#80 p.13-15). De Beers concluded impacts from the Project and other reasonably foreseeable developments would not have a significant adverse impact on the persistence of muskoxen and moose populations (PR#80 p.11-105).

8.3.2 Parties' submissions and recommendations

The GNWT acknowledged that many parties are concerned about cumulative effects in the Slave Geological Province and agreed that combined effects of development and natural factors on grizzly bears and wolverine are a key concern for which a follow-up program

should be adopted (PR#409 p. 2). The GNWT stated that a Wildlife and Wildlife Habitat Protection Plan (WWHPP) is needed to minimize and mitigate any potential impacts of the project on wildlife and wildlife habitat. In its closing statement, the GNWT indicated that the draft WWHPP submitted by DeBeers needs to be expanded to include standard operating procedures for dealing with potential wildlife issues (PR#409 p. 1).

The GNWT's closing statement identified the Wildlife Effects Monitoring Plan (WEMP) as the main mechanism for testing predictions made in the EIS, and indicated that the final program should be developed collaboratively, using standard protocols, and emphasizing regional monitoring and adaptive management (PR#409 p. 2). DeBeers committed to contribute to joint grizzly bear and wolverine DNA hair-snagging studies and a North American Peregrine Falcon Survey at the request of the GNWT and EC (PR#409), and this generally satisfied the GNWT and EC recommendations. However, the GNWT indicated that specific monitoring protocols for carnivores still need to be refined and committed to work with DeBeers to ensure this occurs and is documented in a Memorandum of Understanding (MOU) between the GNWT and DeBeers. The MOU has not yet been finalized, but will reportedly include a process for continual review and revision of the WEMP and WWHPP throughout the life of the Project as well as provisions on how a cumulative effects program will be jointly developed. This MOU will include provisions to ensure that the GNWT review and recommendations regarding wildlife management plans and programs and DeBeers' responses are made public (PR#409 p. 4-6).

YKDFN suggested that the proposed layout of the grizzly bear and wolverine hair snagging program may not allow Project-related effects to be identified and proposed changes to the layout to address their concern (PR# 329 p.16)

8.3.3 Panel analysis and recommendations

The Panel does not anticipate significant adverse cumulative impacts to other wildlife, including species at risk provided the developer constructs, operates and closes the mine as proposed, implements its commitments described in the EIS and in the commitments tables included in this Report. These commitments include updating the Wildlife Effects Monitoring Program and Wildlife and Wildlife Habitat Protection Plan to include recommendations made by the GNWT and EC in their technical reports prior to mine construction and adaptively managing the WWHIP and WEMP during the life of the Project with input from GNWT, EC and Ni Hadi Yati. (PR#406 p. 12) In addition improvements can be made through the wildlife Memorandum of Understanding between De Beers and the GNWT, and based on on-going consultation with aboriginal organizations.

The Panel is in agreement with the GNWT and other parties who have suggested that a follow-up program should be adopted for wildlife. The Panel also notes that in the broader context that the GNWT cannot address cumulative effects on wildlife by itself because it lacks the authority to control land use. AANDC is a necessary party to any such an initiative.

8.4 Follow-up program

A follow-up program is required for both project specific and cumulative impacts to wildlife from the Project. Follow-up can be addressed through the commitment by the developer to prepare and implement a WEMP and WHHPP. Responsible authorities must develop cumulative effects monitoring and management that assesses the contributions of development activities towards cumulative effects, and works towards management of development-related effects.

Cumulative effects management of wildlife and wildlife habitat should be designed so it will result in best practices being implemented at the Project specific scale. In this way, outcomes from the cumulative effects monitoring will result in individual projects reducing their contributions to cumulative effects. In this way De Beers can manage the contribution of the Gahcho Kué Project to cumulative effects on wildlife and wildlife habitat. Therefore the WEMP and the WHHPP must be designed as a follow-up program that:

- is prepared by De Beers prior to mine construction;
- addresses recommendations made by GNWT and EC in their technical reports;
- is adaptively managed by De Beers during the life of the Project with input from GNWT, EC and Ni Hadi Yati;
- contributes to regional cumulative effects monitoring; and
- incorporates information from the regional cumulative effects monitoring into the project specific management of the Gahcho Kué Project.

9 Impacts to other components of the biophysical environment

In this section of the Report the Panel considers the impacts from the Project on other specific components of the biophysical environment. This section does not consider each subject of note from the Terms of Reference, but focuses on key topics. Topics addressed below are:

- impacts to air quality;
- impacts to permafrost, terrain and stability of project components; and
- impacts to the environment at mine closure.

9.1 Impacts to air quality

The Terms of Reference for the Gahcho Kué Project required the developer to conduct an assessment of the impacts of the Project on air quality as a subject of note (PR#48 p. 36). In its EIS, the developer accordingly discussed changes to air quality within the airshed potentially affected by the Project (local study area) as well as an assessment of cumulative effects on air quality resulting from the Project in addition to the Snap Lake Mine (regional study area). (PR#80 p.11.4-1)

9.1.1 Developer's submission

In its EIS, De Beers used air quality modeling to predict changes to air quality from both Project and regional (Snap Lake Mine) emission sources. These sources included:

- exhaust from combustion sources (generators, heaters, waste incinerators);
- diesel exhaust from mobile equipment (excavators, haul trucks, loaders);
- fugitive dust from mine pit activities, transport activities and ore processing;
- wind-blown lake-bed dust from drained Kennady Lake areas;
- diesel engine exhaust from traffic on the winter access roads; and
- aircraft emissions during take-off and landing. (PR#80 p. 11.4-21)

The modeling approach is described in detail in Section 11.4 and related appendices of the EIS.

Atmospheric emissions from Project activities can affect air quality and cause adverse impacts to water quality, wildlife, fish, vegetation, visibility, odour perception and human health. Impacts from changes to air quality as a result of the Project are also described in other sections of the EIS including the effects assessment section on caribou, water quality and fish in Kennady Lake, downstream water effects, vegetation, carnivore mortality, other ungulates, species at risk and birds and the proposed national park (PR#80 p. 11.4-1, 11.4-73).

Specific air emissions that can affect air quality during mine construction and operations and use of the winter access road include sulphur dioxide (SO₂), nitrogen oxides (NO_x), carbon monoxide (CO), particulate matter (PM), total suspended particulate (TSP) and dust emissions. The dewatering of Kennady Lake may also result in dust emissions from the dewatered lake bed. (PR#80 p. 11.4-16)

In its EIS, De Beers commits to standard mitigation methods to reduce air emissions including but not limited to, properly maintaining mine equipment to maximize fuel efficiency and using low sulphur diesel. With respect to waste incineration, the incinerator will be engineered and operated to meet CCME emission standards for dioxins and furans. Project waste will be screened and material not suitable for incineration will be set aside and only material approved for incineration will be combusted in the approved incinerator. (PR#80 p. 11.4-17)

The largest emissions of dust from project activities are transport related. To minimize dust and particulate matter emissions into the atmosphere, De Beers will spray water on haul roads during the summer, manage vehicle speeds to limit dust emissions and will consider limiting the height from which material is dropped onto conveyors. Based on experiences from the Ekati diamond mine, De Beers does not anticipate dust from the drained lake bed, but will monitor this potential in an Air Quality Effects Monitoring and Management Plan (AQEMMP) and develop contingencies should monitoring indicate that excessive dusting from the lake bed is occurring (Pr#80 p. 11.4-18)

The mitigation proposed for the fine PKC facility in the 2012 EIS supplement results in potentially less surface area for dust emissions from the Project, but the change from the impact predictions in the original EIS is expected to be negligible (PR#184 p. 11-6).

As part of its assessment of the impacts of the Project on air quality, the proposed national park was used by the developer as a key assessment location within the local study area in determining significance of impacts. The reason for this is that in the developer's view it is the closest location to the Project that people will regularly use in the future. De Beers predicts that the magnitude of impacts to air quality within the area of interest in the proposed national park is low. Therefore, impacts to air quality from the Project were classified by the developer in its EIS as not environmentally significant. (PR#80 p. 11.4-71-74)

In its responses to technical reports and in its final list of commitments, De Beers commits to developing and implementing the AQEMMP and incineration management plan (IMP) in consultation with both the GNWT and Environment Canada (PR#346, PR#348, PR#406 p. 13).

Specific mitigation measures described in the developers incineration management plan include, but are not limited to:

- selection of highly-efficient combustion equipment;

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- operation of the incinerator at optimal conditions (e.g., manufacturer recommended temperature, pressure);
 - waste segregation policies;
 - worker education;
 - waste diversion methods to minimize dioxins, furans, and mercury emissions from the incinerator;
 - on-site recycling program;
 - development of management plans to guide actions and documentation needs around air quality (PR#318 p. 1-4).

In its Closing Argument, De Beers advises that while in its view there is no regulatory gap on the issue of air quality, due to perception, De Beers is committed to entering into a memoranda of understanding (MOU and also called an Air Agreement) with the GNWT. De Beers states that the GNWT has regulation making powers for air quality under the NWT *Environmental Protection Act*¹⁴ and as a result there is no regulatory gap in the NWT pertaining to air emissions. De Beers notes that they will refine both air management plans with the GNWT and EC and include input from other parties. (PR#423 p. 10-12)

9.1.2 Parties' submissions

The GNWT observes in its technical report that it has worked with both the developer and Environment Canada to develop the draft AQEMMP and IMP, which were submitted by De Beers in October 2012 (PR#318, #320). In particular, the GNWT notes that the AQEMMP includes response planning and a mechanism for setting monitoring levels or thresholds that would trigger adaptive management actions. The GNWT recommends that the developer commit to the development and implementation of these plans and consult with both themselves and EC during plan development and implementation. (PR#334 p. 3-4)

During the public hearing on December 7, 2012, the GNWT advised the Panel in its presentation on air quality that the GNWT and De Beers have committed to working together to develop a formalized approach to capture commitments made regarding air quality concerns that might be excluded from the regulatory process. The purpose of this approach, referred to as an "Air Agreement" in the GNWT presentation and elsewhere during the hearing by the GNWT as a Memorandum of Understanding (MOU), is to ensure that air quality management and protection measures are maintained during the life of the Project. (PR#403 p. 146-147, 170-171 and PR#386 p. 16)

During the hearings YKDFN expressed concern on the enforcement of air quality commitments made by the developer. The GNWT responded to this concern by stating that the terms and conditions for incinerators as well as reporting and some

¹⁴ R.S.N.W.T. 1988, c.E-7 as amended.

monitoring requirements can be included in land use permits or water licenses (PR#386 p. 167-173) The GNWT stated during the hearings that in its view, De Beers has already done an adequate plan for air management for its Snap Lake mine and that it believes De Beers will also be able to prepare a similarly adequate plan for the Gahcho Kué Project (PR#386 p. 173).

YKDFN express the view in their technical report that an incinerator management plan needs to be monitored effectively so that Aboriginal groups and government agencies have sufficient information to determine whether or not the developer is in compliance with CCME guidelines. YKDFN cite concerns with air emissions based on experiences with poorly operated incinerators at other industrial developments. Poorly operated incinerators can result in adverse impacts to air quality. YKDFN notes, however, that the Snap Lake mine, also operated by De Beers, has “the best incinerator/air emissions record...because management plans were written into an environmental agreement”. YKDFN recommends that the Panel make a measure that as part of an environmental agreement, a monitoring regime for air emission should be put in place to ensure that the developer is conforming to CCME guidelines. (PR#329 p. 18-19)

In its final comments, the GNWT provides further information on the “Air Agreement” between the GNWT and De Beers that was described during the public hearings. The purpose of the Air Agreement is to ensure that the air quality commitments made by the developer are captured and upheld. It would ensure that air quality management and protection include monitoring, mitigation and adaptive management strategies, define roles and responsibilities and include dispute resolution measures. The Air Agreement would be finalized prior to the regulatory phase of the Project. (PR#409 p. 5-6)

In its technical report, Environment Canada gives support to the approach presented in the developer’s draft AQEMMP and IMP and recognizes that De Beers has committed to develop both of these monitoring and management plans. EC requests that the commitment to develop and implement these programs and plans be formalized by the Panel as a measure. (PR#333 p. 31)

9.1.3 Panel analysis and recommendations

The Panel acknowledges that the developer has worked with both the GNWT and Environment Canada throughout this EIR on the development and refinement of the AQEMMP and IMP. The Panel supports the commitment that De Beers will continue to work with the two Government regulators during the preparation implementation of the two plans. The Panel acknowledges that mitigation measures incorporated into these plans will minimize adverse impacts from air emission to the environment.

The Panel is encouraged with the approach taken by De Beers and the GNWT to prepare an MOU or Air Agreement, which the Panel understands should bring clarity to monitoring,

inspection and enforcement matters surrounding impacts to air quality from Project air emissions. This will alleviate some of the uncertainty expressed by the parties regarding concerns with inspection and enforcement of air quality management at the Project site. In the Panel's view, the lessons learned at other mine sites on ways to reduce adverse impacts to air quality from mine sites, such as the proper operation of incinerators, will assist the developer in continuing to improve on ways to minimize impacts.

The Panel observed that there was confusion among the parties during the hearings, especially the Government of the Northwest Territories, regarding who was responsible for regulating impacts to air quality in the NWT. For the purposes of this Report of EIR, the Panel agrees with DeBeers Canada who state in their closing argument that the GNWT has regulatory authority over air quality under the NWT *Environmental Protection Act*. In the Panel's view, there is therefore no regulatory gap regarding air quality in the NWT because the territorial government can regulate air emissions.

Environment Canada was clear in its submissions to the Panel. That department has no existing legislation over air quality in the NWT. It has, however, produced guidelines on the control of dioxin and furan emissions and DeBeers has committed to meeting those guidelines.

The GNWT's *Environmental Protection Act* applies to the whole of the Northwest Territories (ss.2(1)). That *Act* would not apply if DeBeers had a licence or permit issued under the authority of Parliament (that is under federal legislation) to release atmospheric emissions into the environment (see EPA ss.2(2)). But the Panel has no evidence that such legislation exists or that such permits will be issued.

In the Panel's view, there is therefore no regulatory gap regarding air quality to be addressed in this Report because the territorial government has the authority to regulate air emissions.

The Panel notes that the developer has committed to implementing mitigation measures in order to reduce air emissions including proper operation of its incinerator, meeting vehicle and generator emissions standards, managing vehicle speeds and watering roads to reduce dusting.

In the opinion of the Panel it is not likely that significant adverse impacts to air quality will occur from the Gahcho Kué Project, provided the developer constructs, operates and closes the mine as proposed and implements its commitments described in the EIS and in the commitments tables included in this Report.

9.2 Impacts to permafrost, terrain and stability of project components

The Terms of Reference for the Gahcho Kué Project required the developer to consider permafrost, groundwater and hydrogeology as a subject of note in its EIS. Accordingly, the

potential of the Project to disrupt or change permafrost distribution as well as the impacts related to accumulation of permafrost into project infrastructure are described by De Beers in Section 11.6 of its EIS. Environmental design features are described to address the effects of project activities on permafrost so that there are no primary pathways and no residual effects (PR#80 p. 11.6-39, 44)

The developer recognizes overlap of this subject of note with other key lines of inquiry and subjects of note in its EIS. In the context of this section of the Report of EIR, the sections of the developer's EIS that have linkages but are not discussed directly include long-term biophysical effects, closure and reclamation, mine rock and kimberlite storage and climate change.

The Panel acknowledges the overlap in the developer's EIS and has combined several of these overlapping EIS subjects of note for the purposes of this section of the Report. In this section of the Report, the Panel discusses the impacts from the Project on permafrost, terrain conditions and stability of project components including mine waste management facilities, dams and dykes. Construction and operations of dams, dykes and waste management facilities are project components that may cause changes to permafrost. These changes could lead to changes to mean annual soil temperature, thickness of the active layer and seasonal frost penetration. These changes are discussed below in the context of how the Project activities may change the environment (presence or absence of permafrost) and how those changes could have adverse impacts to dams, dykes and mine waste management facilities during construction, operations, closure and post-closure of the mine site.

9.2.1 Developer's submission

In its EIS, the developer states that the Project is located in the zone of continuous permafrost with permafrost encompassing 90-95 % of the land portion of the Project area. Permafrost is found in varying degrees of thickness (120-310 m) with reduced permafrost depth near Kennady Lake, due to the warming influence of the lake. Thermistor temperature measurements conducted by the developer at the Project site indicate a mean annual permafrost temperature range from -0.5 to -2.5 degrees Celsius.

An open talik (a patch of unfrozen ground surrounded by permafrost) exists beneath Kennady Lake in areas where the water is more than 2 meters deep (PR#80 p. 11.6-9). A closed talik has a permafrost zone below an unfrozen horizon, while an open talik penetrates through the entire permafrost depth. Both types of taliks may be found in the Project study area.

Project activities that could change permafrost conditions include:

- dewatering Kennady Lake;

- establishment of mine rock piles, the coarse PK pile, the fine PKC facility and other above ground earthen structures;
- construction of roads and the airstrip;
- construction and operation of heated buildings;
- stripping of ground vegetation and subsoil layer, and
- temporarily flooding selected areas around adjacent lakes (PR#80 p. 11.6-38, 39)

The potential impacts of these project activities on permafrost include:

- greater frost penetration and establishment of permafrost in the exposed lakebed;
- placement of warm waste rock or processed kimberlite on the ground will form closed taliks which will freeze back over time;
- permanent placement of dams and dykes will allow for expansion of permafrost into these areas;
- heat from buildings will form closed taliks;
- removal of insulating vegetation layer could lead to cooler soil temperatures;
- flooding of lakes could result in expanded taliks under those lakes (PR#80 p. 11.6 39).

De Beers states that the impact of the removal of insulating vegetation layers can be mitigated with environmental design features and will not result in detectable environmental change or residual effects (PR#80 p. 11.6-40). For the other potential impacts De Beers states that anticipated changes in permafrost conditions are limited in geographic extent and have limited influence on potential effects to valued components (PR#80 p. 11.6-40). De Beers concludes that all of the effects related to changes in permafrost could be mitigated through environmental design features, or the environmental change would result in negligible residual effects and therefore an assessment of the significance of residual effects is not necessary (PR#80 p. #11.6-44).

In its EIS, De Beers describes uncertainties related to the thermal and physical properties of foundation materials at the project site (moisture content, thermal conductivity), and uncertainties in the properties of material to be produced as a result of mining that will interact with permafrost. For example, temperature and moisture content of mine rock and PK and salinity in the fine PKC facility can all influence permafrost and talik formation. (PR#80 p. 11.6-45)

In its 2012 EIS supplement, De Beers indicates that the beneficial effects of frozen conditions will not be relied upon for the performance of the mine waste management facilities (PKC facilities and waste rock piles) or the water management dams and dykes. De Beers further states that the integrity of Project infrastructure is not dependent on and will not be adversely affected by the development of permafrost (PR#184 p. 11-44).

The developer has made commitments to monitor permafrost conditions at the site because of the uncertainties listed above. De Beers states that they will develop adaptive

management plans should impacts to permafrost be different from predictions, and implement those plans as required. (PR#80 p. 11.6-45)

9.2.2 Parties' submissions

In its technical report, NRCan notes that they are generally supportive of the developer's approach for detailed design of dykes and mine waste management facilities. NRCan points out, however, that due to uncertainties with foundation materials, more detailed geotechnical investigations are required to support final design so that the constructed infrastructure performs as intended and minimizes adverse impacts to the environment. For instance, site specific data from additional geotechnical investigations at dyke alignments is necessary to determine if permafrost thaw will be an issue for foundation stability and dyke performance. In addition, summer and winter placement of material in the fine PKC facility could result in frozen and unfrozen layers, which could affect seepage and pile stability. The developer responded to this concern by stating that experience at other mines indicates that this is not expected to impact the stability of the PK pile. (PR#328 p. 3-4)

NRCan supports the statement by De Beers that they will include consideration of climate change in their evaluation of foundation conditions and thermal performance during detailed design (PR#406 p.6). NRCan agrees that the developer's conclusions appear reasonable based on experience at other mines, but suggest that monitoring of the stability of the PK piles could ensure that deformation of the cover for the PK piles is not excessive and that they perform as designed (PR#328 p. 3-4).

In its technical report, NRCan offers recommendations for consideration during the detailed design phase of the Project. Recommendations regarding dykes, and in particular for the dykes that will remain at closure including dykes A1 and D, are as follows:

- the developer is to conduct further geotechnical investigations including collection of information on ground thermal conditions along dyke alignments to better characterize foundation materials;
- the developer is to conduct thermal analysis to evaluate the long-term thermal behavior of permafrost foundations. The analysis should incorporate the site specific geotechnical data and consider the effect of increases in water level (such as that will occur on the upstream side of dyke A1) and potential effects of a changing climate; and
- monitoring plans to be developed to monitor thermal performance and stability of dyke foundations to determine if mitigation is required. (PR#328 p. 4-5)

NRCan provides the following recommendation to address potential adverse impacts to mine waste management facilities:

- the developer is to develop a monitoring plan for the processed kimberlite facility to assess the condition and stability of the pile and to determine the need for mitigation should there be instability or deformation of the cover affecting the performance. (PR#328 p. 5)

In De Beers' response to NRCan's technical report, De Beers states that it commits to all of NRCan's recommendations (PR#340). However, NRCan notes in their closing statement (PR#408) that De Beers' commitment table does not fully reflect these commitments. NRCan emphasizes the importance of their recommendations in both their technical report (PR#328) and final comments (PR#408).

9.2.3 Panel analysis and recommendations

In the Panel's opinion, the recommendations made by NRCan should be implemented. These recommendations provide guidance on factors that should be considered in the detailed/final project design or subsequent monitoring and follow-up plans to ensure that environmental impacts are minimized. The Panel emphasizes the commitments made by De Beers in response to NRCan's recommendations (PR#340) by including these in the list of commitments in this Report (Table C-2 in Appendix C).

Based on the evidence and information submitted, it is the opinion of the Panel that significant adverse impacts to permafrost and resulting negative impacts on project component stability are not likely, provided that the developer constructs, operates and closes the mine as proposed and implements its commitments including provisions for monitoring and adaptive management as described in the EIS and in the commitments tables included in this Report.

9.3 Long-term biophysical impacts after mine closure

Long-term biophysical effects, closure and reclamation were discussed as a key line of inquiry by De Beers in Section 10 of its EIS submission. The developer acknowledged connections in its effects assessment on this topic with other valued ecosystem components related to the Project. Therefore Section 10 of the EIS is a stand-alone summary with a focus on the key findings of the analyses that are reported elsewhere in the EIS. (PR#80 p. 10-2)

In this section of the Report of EIR, the Panel considers the long-term impacts to the environment based on the developer's conceptual closure and reclamation plan, long-term changes to aquatic life in Kennady Lake and how changes to Kennady Lake may affect the downstream watershed. Water quality at closure is discussed in Section 6 of this Report.

9.3.1 Developer's submission

A conceptual closure and reclamation plan was prepared by the developer and is included in its EIS (PR#80 p. 10-60 - 87). Closure and reclamation planning includes progressive

reclamation and designing for closure and is consistent with the objectives of the *Mine Site Reclamation Guidelines for the NWT (INAC 2007)*. The goal of the reclamation planning is to minimize lasting environmental impacts from the Project and allow areas disturbed by mining to return to a self-sustaining ecosystem as quickly as possible (PR#80 p. 10-12).

Based on project changes, updates were made to closure and reclamation in De Beers' 2012 EIS supplement. The major changes relate to reducing the footprint of the fine PKC facility by eliminating Area 1 in order to reduce long-term phosphorous loadings. The fine process kimberlite is relocated from Area 1 to the 5034 and Hearne pits. Coarse process kimberlite that was to be used to reclaim Area 1 is relocated to the west mine rock pile. The Project footprint is reduced by 60 ha and the height of the west mine rock pile is increased from 70 m to 94 m. (PR#184 p. 10-5, 6) Project changes described in the closure and reclamation section of the 2012 EIS supplement are incorporated into the reclamation program described below.

Key components of the reclamation program, including during operations are as follows:

- salvage and stockpile soil, overburden, and lakebed sediments from areas of disturbance;
- create or expand fish habitat areas during construction and operations phases;
- progressively reclaim Area 2 of the fine PKC facility;
- progressively reclaim portions of the south mine rock pile;
- progressively reclaim portions of the west mine rock pile, with final height at 94 m
- progressively backfill the 5034 Pit;
- partially backfill the Hearne Pit.

Components of the reclamation program at the end of operations are as follows:

- remove potentially hazardous materials from site;
- dismantle and remove or demolish all buildings and related structures;
- remove all above-grade (ie. above ground level) concrete footings and foundations;
- construct additional fish enhancement structures (although most will be constructed during operations);
- refill Kennady Lake using natural runoff supplemented by water drawn from Lake N11;
- cut channels in dykes B, K and N to begin filling the areas around Tuzo Pit and 5034 Pit and allow for lowering of all dykes below final planned lake elevation;
- upon refilling of lake and achieving appropriate water quality, breach and /or partially remove Dyke A to connect the reclaimed portions of Kennady Lake with Area 8;
- monitor conditions over time to evaluate the success of the Closure and Reclamation Plan and using adaptive management and newer proven methods available, adjust the plan, if necessary; and

-
- comply with legal requirements for closure and reclamation in effect at the end of operations

(PR#80 p. 10-12,13 and PR#184 p. 10-7)

The developer considered the effects of residual impacts (after environmental design and mitigation) on aquatic life based on classification of future conditions 100 years from initiation of the Project (PR#10-21). In the opinion of the developer, the long-term impacts of the Project on the suitability of water to support a viable and self-sustaining aquatic ecosystem will not be significant for the Kennady Lake watershed and the downstream watershed (PR#80 p. 10-22). The 2012 EIS supplement states that:

“the projected impacts on the suitability of water downstream of Kennady Lake to support a viable and self-sustaining ecosystem, and on the abundance and persistence of Arctic grayling, lake trout and northern pike are considered to be not environmentally significant for both the Kennady Lake watershed as well as its downstream watershed.” (PR#184 p. 10-15)

9.3.2 Parties' submissions

A discussion of the parties' views with respect to water quality at closure are discussed in Section 6 of this Report, Impacts to Water Quality. This section focuses on fish and aquatic life and physical mine site components at closure.

DFO considered the impacts of the Project on fish and aquatic life at closure in its technical report. In the view of DFO, the primary consideration after mine operations should be the return of what remains of Kennady Lake to a self-sustaining aquatic environment with a fish community structure that is similar to what is in the lake currently. In order to achieve this goal and support sustainable fish populations, components of the aquatic ecosystem must be restored in areas impacted by mining before allowing fish to re-colonize the lake. (PR#323 p. 10) DFO states that efforts should be made after mine operations to re-establish riparian and aquatic vegetation so that after closure, a viable self-sustaining ecosystem will be in place with similar habitat characteristics to pre-mining conditions. To this end, revegetation efforts should include:

- stockpiling organic overburden, sediments and lake bed materials for use in revegetation;
- replacing and enhancing lost northern pike spawning and rearing habitat (PR#323 p. 10).

In its technical report DFO recommends that during the refilling of Kennady Lake, all fish species should be excluded until the impacted areas of Kennady Lake are restored to the extent that they can support fish and that a comprehensive aquatic and riparian re-

vegetation plan should be developed and implemented in consultation with DFO (PR#323 p. 10,11).

In its response to the DFO technical report, De Beers commits to preparing a revegetation plan for riparian and aquatic vegetation and will develop the plan in consultation with DFO (PR#352 p. 8). This plan would be included in the AEMP. The developer also states that it will use adaptive management when making decisions regarding reconnecting Kennedy Lake to surrounding fish-bearing waters, and if monitoring indicates that the water is unsuitable for fish then breaching of dykes would be delayed (PR#352 p. 7, 8).

The Tlicho Government states in its technical report that it plans to conduct mine closure research on specific mine components with the intent of providing guidance on diamond mine closure. Accordingly, the Tlicho Government recommends that the developer work with Aboriginal authorities to develop a component-based closure plan (PR#332 p. 12). In its response to this Tlicho Government recommendation, De Beers commits to working together with Aboriginal authorities in the development of the closure plan (PR#342 p. 6, 7).

In its closing statement, YKDFN describes the importance of developing a closure and reclamation plan as early as possible given past experiences with mining in their traditional territory. Specifically, YKDFN recommends that the development of a closure plan should be done in collaboration with communities, use industry best practices and be completed within one year of this Report of EIR (PR#407 p. 11).

Other recommendations from the parties regarding mine closure and water quality issues are discussed separately in Section 6, Impacts to Water Quality.

9.3.3 Panel analysis and recommendations

The Panel acknowledges that closure and reclamation planning is conceptual in nature during the EIR phase and that more detail will be required during mine permitting. The Panel notes that the developer has committed to involving Aboriginal organizations in setting goals and objectives for closure and developing the closure and reclamation plan in accordance with AANDC guidelines.

The Gahcho Kué Project is different from previous NWT diamond mines in that it has a comparatively short operational life of only 11 years. This means that there is some urgency in preparing a closure plan early in the operational life of the mine. The Panel expects that lessons will be learned from the closing of existing diamond mines in the NWT prior to the commencement of closure for this mine, and that the parties and the developer will be able to modify and improve closure planning methods and techniques for the Gahcho Kué Project.

The closure and reclamation of mine sites is regulated under a Water Licence and detailed plans will be required as part of licensing for this Project. Specific closure activities and end land use objectives will require engagement between the developer and communities in the regulatory phase in order to address specific issue of concern. The Panel is confident that the Mackenzie Valley Land and Water Board will require the developer to prepare and implement an acceptable detailed plan to close the mine site. However, because of the short mine life and concerns from the parties with the uncertainty of the developer's long-term closure predictions, the steps required in the completion of an approved progressive closure and reclamation plan should be accelerated.

Based on the evidence and information submitted, the Panel is of the view that the mine site area will return to a state that is safe for fish, wildlife and people. Commitments by the developer to return Kennady Lake to a lake with a similar fish species assemblage, with water that is safe to drink and fish that are safe to eat is the primary reason for this conclusion of the Panel.

In the opinion of the Panel it is not likely that significant adverse impacts to the environment at closure will occur provided the developer constructs, operates and closes the mine as proposed and implements its commitments including provisions for monitoring and adaptive management as described in the EIS and in the commitments tables included in this Report.

10 Impacts to the cultural environment and incorporation of traditional knowledge

In this section of the Report of EIR, the Panel considers the impacts of the Project on the cultural environment of the residents and communities of the NWT. The Panel also outlines how Traditional Knowledge has been incorporated into the Project phases.

10.1 Developers' submission

Cultural values are described by the developer in the EIS in the Subject of Note: Culture, Heritage and Archaeology. The effects from the Project on the three interrelated themes of language, cultural landscapes and archaeological resources are described. The residual effects to cultural values after the implementation of proposed mitigation are then presented (PR#80 Section 12.7).

De Beers acknowledges the value of retaining language in the transmission of culture between generations. There is a general decline in the use of Aboriginal languages in the communities but the decline is not equal between communities. De Beers expects that the Project will have a negligible effect on the use or loss of language but commits to:

- continue to support community cultural programming
- support aboriginal languages being spoken at the work site (PR#80 p. 12-285)

The developer describes cultural landscapes in terms of place names and legends, specific cultural and environmental features of traditional territory such as features involving seasonal movements, traditional travel routes and locations of spiritual importance. A small permanent change in the cultural landscape is predicted. (PR#80 p. 12-299) De Beers recognizes that connections between people and the land are important and will work with Lutsel K'e and Parks Canada, once the Park is established, to keep the relationship with people and the landscape. (PR#80 p. 302)

An archaeological assessment was conducted by the developer and 80 archaeological sites were recorded in the local study area. All sites with a high potential for impact from the Project have been assessed through testing. The developer's preference is to avoid these sites, but where this is not possible, mitigation including collection and systematic recovery may be required. (PR#80 p. 12-300 and Appendix 12.III)

De Beers provided the Panel with commitments during the course of this EIR to incorporate traditional knowledge into all project phases (assessment, permitting, construction, operations and closure). These commitments are compiled by the developer in its summary of commitments table and included in this Report. Some of the key commitments are listed below:

- the results of traditional knowledge and traditional land use studies will be used to further inform predictions of Project impacts, to evaluate additional mitigation or refine existing mitigation when needed and identify incorporating traditional knowledge into monitoring programs;
- De Beers will engage with communities to provide opportunities to discuss the Project and traditional knowledge that community members are willing to provide;
- De Beers will involve elders and students from Aboriginal communities to participate in on-site monitoring (PR#406 p. 4).

In its closing argument, the developer notes that it has funded six traditional knowledge studies during the course of this EIR. De Beers states that these studies have informed Project design and that the studies will continue to be used to inform monitoring and management plans including closure planning as the Project proceeds through the regulatory phase. (PR#423 p. 3-4)

10.2 Parties' submissions

In its presentation to the Panel during the public hearing on December 7, 2012 (PR#403), YKDFN presented an update on its traditional knowledge and traditional use study for the Project area. The findings presented to the Panel during the hearings include the following:

- Gahcho Kué is on a major trail system connecting the East Arm's north shore 'villages' with the large lakes of the upper Lockhart drainage basin (Clinton-Colden, Aylmer and Mackay) where fall caribou hunts, and winter musk-ox hunts, took place;
- camp locations, and a network of minor trails, suggest that there has been extensive trapping activity in the area;
- a northward extension of the treeline along the Bedford Creek 'canoe route' is used as a means for accessing the southward migration of caribou in the fall. Because of their unique geographical position, the small lakes 25 km south of Gahcho Kué are surrounded by traditional camps that have likely been used for hundreds if not thousands of years. (PR#372 p. 3-16)

The YKDFN proposes to use this traditional knowledge information to assist the developer in mine design and operations, in wildlife monitoring and in planning for mine closure. (PR#372 p. 16) In response, De Beers commits in its summary of commitments table to consider incorporating traditional knowledge into all project phases. The summary of commitments table (PR#406 p. 4) prepared by the developer and included in this Report provides a description of how De Beers will achieve this commitment.

The Tlicho Government, in its technical report, stresses the importance of engaging traditional knowledge holders in such a way that the information can best be incorporated into the various mine phases. In order to do this, Tlicho Government recommends that De Beers hold sessions with traditional knowledge holders, so that traditional knowledge can

inform development of the Wildlife Effects Monitoring Program and the Aquatic Effects Monitoring Program. (PR#332 p. 8) In its response to this recommendation, De Beers commits to work with aboriginal authorities in holding planning session to engage traditional knowledge holders during the preparation of the WEMP and AEMP. (PR#342 p.4)

The Deninu Kué First Nation submitted an Ethno-history Report in December 2012 This Report provides a historical context of the Deninu Kué First Nation and documents past and present occupation and use of the barren lands north and east of Great Slave Lake. The Report focuses on the inter-relationship between the land, wildlife and people documented through interviews with traditional knowledge holders and mapped information. With specific reference to the Project, the Report documents long-term use of the Gahcho Kué area by the DKFN and the importance of the barren ground caribou hunt as a source of cultural continuity and as a means of survival. In the Report interviews with aboriginal harvesters are documented. They describe the interaction between caribou and diamond mines and how mine exploration and development impacts the migratory habits of caribou and hunting. In the view of the DKFN, the Project represents an impediment to caribou migration patterns which in turn adversely effects First Nation culture (PR#418, PR#420 p. 301-316,356)

Lutsel K'e Dene First Nation submitted a traditional knowledge study to the Panel for its consideration after the public hearings. This study was submitted under confidential cover to the Panel and was not placed on the public registry. However, the study was made available to the developer and the Panel has incorporated the information from that study into this Report. The study describes traditional knowledge and traditional use of the land, water, wildlife, fish and plants at the Project site and surrounding area. Information is compiled from first hand interviews with traditional knowledge holders. Caribou and their interconnection with the way of life of the people of Lutsel K'e is a focus of the study. Travel routes, trails, cabins, camp sites and cultural values of the land are described. The study includes recommendations to mitigate the impacts from the Project on the values referenced in the study. Practical mitigation to reduce impacts to caribou is provided in the study and relates to modifications to mine rock piles, access road construction, monitoring and mine reclamation. (PR#422)

In its technical report, NSMA provides recommendations on how the developer can improve the integration of traditional knowledge into mine site planning. In particular, NSMA recommend that De Beers hire a "traditional knowledge director" at the mine. The positions should have "decision making powers and the authority to mitigate impacts on wildlife during high impact seasons" (PR#330 p. 8). The developer responded to this recommendation by stating that as part of the Wildlife Effects Monitoring Program it is considering hiring a senior-level traditional knowledge specialist for the Project (PR#354 p. 3, PR#307 p. 1-4). In a document submitted November 20, 2012, NSMA state that they signed a traditional knowledge agreement on November 2, 2012 and submitted an interim report to the developer on November 19 (PR#379 p. 3) During the December 6, 2012

public hearings in Yellowknife, NSMA presented interim traditional knowledge information to the Panel. (PR#402 p. 166-184)

In its technical report, the GNWT observed that the developer has identified actions to address the impacts of the Project on local culture, heritage and archaeology. The GNWT recommends that De Beers continue to work with communities and the GNWT to support traditional language and cultural pursuits and to preserve and conserve traditions and heritage sites. (PR#334 p. 19-20) In its Response document, De Beers states that it will continue to work with the GNWT and aboriginal communities to promote cultural preservation, sustainability and traditional language use and that these activities will be included in the socio-economic monitoring plan. (PR#346 p. 11)

The GNWT states that the Prince of Wales Northern Heritage Centre has worked with the developer on the *Archaeological Management Plan – October 2012* for the Project. The GNWT recommends in its technical report that this plan be implemented. (PR#334 p. 19-20) The developer states in its Response to the GNWT Report that it has implemented this plan. (PR#346 p. 11)

Prior to the public hearings, the NWT Metis Nation submitted information to the Panel gathered during community traditional knowledge study sessions. This submission included information on traditional use of the Gahcho Kué area including hunting, fishing, trapping and travel through the area. The NWT Metis Nation state that they are particularly concerned with impacts from the Project on the migration and over-wintering patterns of barren ground caribou north of McLeod Bay and the Hearne Channel. This area has been heavily used for harvesting caribou in the past. The NWT Metis Nation are concerned that cumulative impacts from the Gahcho Kué winter road, in addition to the existing winter roads to the other diamond mines, may increase adverse disturbance and displacement effects on caribou including a reluctance to cross winter roads. (PR#374 p. 3) In order to address these concerns, NWTNM recommend a thorough assessment of the potential Project-specific and cumulative impacts of the winter access roads on caribou migration and over-wintering patterns needs be conducted. (PR#274 p. 3) NWTNM also provided recommendations on the use of eskers and request to be involved in the fish-out and how best to use the salvaged fish (PR#374 p. 5)

10.3 Panel analysis and recommendations

The Panel recognizes the commitment made by De Beers to incorporate traditional knowledge into all phases of the Project. The Panel encourages the developer to continue gathering traditional knowledge from holders of that information and to incorporate traditional knowledge information into the Project design, operation and closure. Aboriginal groups have received support from the developer to prepare traditional knowledge and traditional use reports.

The traditional knowledge reports submitted to the Panel contain mitigation measures that the developer should consider as it moves into the detailed design and permitting phase of the Project. The Panel agrees with aboriginal parties that it is particularly important that the developer include traditional knowledge and direct on the ground monitoring by aboriginal people during the construction and operations phases of the mine. In this way, behavioral information on wildlife and particularly caribou can be gathered by people who have traditional and cultural ties to the landscape. Practical use of traditional knowledge in this manner can lead to operational changes at the mine and minimize both project-specific and cumulative impacts on caribou.

The Panel acknowledges the commitment by De Beers to support community cultural programming and to support the use of aboriginal languages at the mine site.

In the opinion of the Panel, the developer has made best efforts to support traditional knowledge and traditional use studies by aboriginal groups for integration into the Project. In addition, the developer has committed to use traditional knowledge in monitoring during mine operations to further inform predictions of Project impacts and evaluate options for mitigation. The Panel acknowledges that De Beers will involve elders and students from aboriginal communities to participate in monitoring at the mine site.

As a result of the commitments by De Beers to address cultural values and incorporate traditional knowledge into all phases of the Project including monitoring, it is the view of the Panel there will not be significant adverse impacts to cultural values provided the commitments are followed.

11 Impacts to social and economic values

In this section of the Report of EIR, the Panel considers the impacts of the Project on social and economic values to communities in the NWT.

11.1 Developers' submission

In order to fulfill the requirements of the Terms of Reference, De Beers conducted a socio-economic impact assessment (SEIA) of the Project in its EIS (PR#80 Section 12).

The local study area for the SEIA is the North Slave and South Slave Regions of the NWT. Communities in this study area include Behchoko, Gameti, Whati, Wekweètì, Yellowknife, Dettah, N'Dilo, Lutsel K'e and Fort Resolution. The regional study area is the entire NWT. (PR#80 p. 12-11)

11.1.1 Community engagement

In its EIS the developer describes engagement activities it has conducted with communities, the public and regulators during the Project's exploration phase (1998-2005), during the EA phase (2006) and from release date of the EIR Terms of Reference to filing of the EIS (2007-2010). Specific engagement activities have included:

- community meetings;
- meetings with community leaders;
- site visits;
- newsletters; and
- newspaper and radio interviews, website updates. (PR#80 p. 4-5 – 12)

During the public hearings in Yellowknife, De Beers provided a summary of its community engagement since filing its EIS with the Panel in December 2010:

- November 2011 – hosted a workshop in Yellowknife to provide overview of Project
- February 2012 – visited communities to seek input on monitoring and mitigation programs
- August 2012 – workshops for community members at the Project site
- August/September 2012 – wildlife working group meeting and workshop
- September 2012 – workshop on fish habitat compensation plan (PR#396 p. 46, 47)

A comprehensive description of community engagement by De Beers from May - November 2012 is presented in the *Gahcho Kué Project Community Engagement Update* submitted to the Panel on November 20, 2012 (PR#381-384). A key purpose of the various meetings, workshops and site visits with aboriginal groups was for De Beers to seek input on proposed monitoring programs for the Gahcho Kué Project and to provide an opportunity for individuals to contribute or offer traditional knowledge. (PR#381 p. i)

During the public hearings in Yellowknife, De Beers stated that they would continue to consult and incorporate traditional knowledge during the Land and Water Board's regulatory process, in refining the fish-out program, during development of the aquatic effects monitoring program, in the development of closure and reclamation plans and through implementation of Ni Hadi Yati (PR#396 p.58)

11.1.2 Impacts to the economic and social environment

In its EIS De Beers makes predictions on economic change related to the Project. In summary, the developer predicts a positive and significant impact on the economy of the NWT, because the Project will extend industrial activity during a time when other diamond mines move towards closure within the next ten years. Government revenues will benefit from the Project, a moderate contribution will be made to the growth of a skilled local labour force and the impact on local businesses will be positive. (PR#80 p. 12-19, 20)

During the December 5, 2012 public hearings, the Chief Operating Officer of De Beers Canada addressed the Panel and advised that the capital investment to build the Project will be approximately \$650 million. De Beers predicts that the total gross domestic product contribution during construction and operations of the Project will be \$3.9 billion of which more than 80% will flow to the NWT. In the opinion of De Beers, there will be substantial direct socio-economic benefits to northern residents through employment and training. (PR#396 p. 39, PR#423 p. 17))

With respect to social change, the developer predicts the Project will have a positive and moderate influence on employment noting that additional jobs will be available, but that the benefit will depend on the capacity of communities and individuals to fill them. A positive impact on education and skills upgrading is predicted including a positive impact on employment opportunities for women. The developer does not predict a substantial increase in negative lifestyle choices such as increased drug or alcohol consumption, crime, sexual and spousal assault and mobility. In addition, the developer believes the Project will not have a negative impact on social disparity, the cost of living or social problems. (PR#80 p. 12-20)

11.1.3 Developer commitments

De Beers has provided many commitments to minimize adverse social impacts and to maximize economic benefits to communities from the Project. The following is a brief list of some of the key examples of De Beers' commitments to maximize employment, procurement, education and training for the benefit of aboriginal groups and communities in the NWT:

- recruiting and employing as many aboriginal and NWT residents as possible, building on recruitment, training and retention strategies as already implemented at the Snap Lake Mine;

- implementing the Gahcho Kué Human Resources Strategy;
- preparing a Job Description Booklet for the Gahcho Kué Project;
- supporting training including apprenticeships, trades training positions and the development of professional occupations;
- maintaining the De Beers' NWT Business Policy by sourcing its procurement needs from aboriginal and NWT businesses as much as possible;
- requiring contractors to provide information to allow for reporting on hiring and employment according to the De Beers hiring priority;
- publicly reporting on hiring, employment and procurement outcomes; and
- meeting with aboriginal groups annually to review and discuss socio-economic results and reports, including reports produced by De Beers specific to aboriginal communities participation in the Project. (PR#406)

A complete list of specific socio-economic commitments related to employment, education and training, procurement and business development, health, wellness and culture, reporting, adaptive management, planning for closure and incorporation of traditional knowledge into all Project phases is found in De Beers' summary of commitments (PR#406 p. 1-4) and included in Appendix C of this Report.

De Beers also commits to entering into a socio-economic agreement with the Government of the Northwest Territories that will be for the benefit of the entire population of the NWT (PR#406 p. 1).

11.2 Parties submissions and recommendations

During the public hearing on December 5, 2012, the Premier of the GNWT, Bob McLeod, spoke to the Panel and stressed the beneficial impacts that diamond mining has had on the NWT over the past fourteen years. The Premier advised the Panel that diamond mining accounts for 24% of the territorial gross domestic product and that the people of the Northwest Territories have benefitted substantially in terms of jobs, businesses and income. The Premier noted that the GNWT's past experience with diamond mining gives the government confidence that this Project can be managed in a way that benefits the economy and residents of the Northwest Territories. In the view of the GNWT, the Project is important to the long term strength of the economy of the NWT and the well-being of its communities and people. (PR#396 p. 25-28)

11.2.1 Impacts due to project start date (economic scenario study)

In their technical reports, both YKDFN and Tlicho Government suggest that the economic benefits from the Project might be greater if the construction phase for the Project began in 2018 or later so that the beginning of this Project would coincide more closely with the projected closure dates of other diamond mines in the NWT. These two parties state that commissioning this Project concurrent with ongoing operations of the larger diamond mines will result in low hiring of northerners and aboriginal people because the eligible

workforce is already working at one of the existing mines. These parties, along with LKDFN (PR#410) and the NSMA (PR#220 p. 18) are concerned that the majority of employees at the Gahcho Kué Project will need to be hired from outside the NWT. YKDFN and Tlicho Government state that, employment for aboriginal and northern people and other benefits would be better realized if this Project were delayed. To find out whether this prediction was valid, YKDFN and Tlicho Government recommended that an independent economic analysis be conducted to evaluate likely economic scenarios to determine which of those scenarios would provide maximum benefits to residents of the Mackenzie Valley (PR#329 p. 21 and 332 p. 10-12).

This economic analysis was submitted by De Beers in November 2012 prior to the public hearings as technical memorandum titled *Testing Resource Development Scenarios to Determine Impacts on the Economy and Labour Force* (PR# 363, #371). The study considered different Project start date scenarios (2013, 2014 and 2018), outlined the study assumptions, described the methodology for measuring “the greatest benefits to the NWT” for each scenario and discussed the outcomes. The study found that even though the Project is small relative to the other diamond mines it is important in reducing the negative impacts from the closure of the two larger diamond mines within the next decade. The study concludes that while there may be benefits to the economy gained with a 2018 start date, they would only be realized beyond the year 2026. Forecasting that far into the future cannot be done with confidence, according to the study, and the difference in start dates scenarios “is somewhat negligible and could easily be influenced by a variety of changes in the NWT or Canadian economy which NWT residents have little or no control over” (PR#363 p. 22).

11.2.2 Impacts on employment, business and training

In its technical report, the GNWT provides recommendations to maximize benefits to residents of the NWT on subjects of employment, education, training, advancement, promotion and business development.

The GNWT provides specific recommendations for De Beers in its Technical Report, requesting:

- information regarding quantitative aboriginal and northern resident hiring predictions for each phase of the Project;
- a forecast regarding how many workers and for what positions De Beers expects to hire southern workers for each phase of the project;
- reporting on recruitment and employment outcomes and other indicators as per Snap Lake;
- expansion of pickup points beyond the local study area;
- monitoring and annual reporting of contractor employment data and the programs and practices put in place to support training and development of a skilled northern workforce, including apprentices; and

- clarification on the process De Beers will use to ensure that contractors meet employment and recruitment commitments made by De Beers (PR#334 p. 16-17)

In its response to the GNWT technical report, the developer commits to recruiting and employing as many aboriginal and NWT residents as possible, and building on De Beers' experience with recruitment, training and development and retention strategies at the Snap Lake Mine. In addition, De Beers makes commitments regarding contractor hiring such as requiring contractors to outline in their bids a plan to hire and develop aboriginal and northern employees. Reporting of contractor performance regarding northern employment training and apprenticeships will be made public. (PR#346 p. 6-8)

At the November 30, 2012 public hearings in Dettah, people from the Yellowknives Dene emphasized to the Panel the need for the developer to hire as many aboriginal people as possible to benefit northern communities. Individuals at the hearing stressed the importance of providing training opportunities to aboriginal employees at the mine and the need for aboriginal people to be able to obtain managerial positions at the mine (PR#393 p.73, 89, 94).

The NSMA states in its technical report that one of the constraints to hiring aboriginal people is the two-week-on two-week-off shift rotation and a lack of clarity on which communities will be designated pick-up points. In order to increase aboriginal employment at the mine, NSMA recommends direct flights from NWT communities to the mine site and consideration of a more flexible work rotation schedule to maximize work opportunities for aboriginal residents.

The NSMA also believe that training and career advancement is critical to encouraging aboriginal employment at the Project. To accomplish this NSMA recommends that De Beers develop a workplace education strategy to assist employees with professional development and training opportunities so that aboriginal and northern employees can increase education levels and pursue supervisory and management roles. (PR#330 p. 27-28)

In its closing argument, De Beers confirms its commitment to supporting apprenticeships, trades training positions and the development of professional occupations and that it will report annually on the success of these initiatives. (PR#423 p. 17-18)

11.2.3 Impacts to health and wellness

In its technical report, the GNWT describes meetings it has had with De Beers where commitments were made by the developer to minimize adverse impacts to the health and wellness of individuals and to government health and social services programs. As a result of these meetings, the GNWT believes that the majority of these concerns have been addressed through developer commitments and indicates that continued meetings to address outstanding issues can be included as part of a socio-economic agreement with De Beers (PR#334 p. 22-23).

Tlicho Government recommends in its technical report that the developer work with the Tlicho Government to provide adaptive support for social wellness programming and fund on-the-land counselling programs as an alternative to the standard employee assistance program committed to by the developer (PR#332 p. 11-12). In its response to the Tlicho Government's technical report, De Beers commits to meeting and discussing this alternative in order to allow for flexibility in counselling services (PR#342 p. 6).

Lutsel K'e is the closest community to the Gahcho Kué Project. In its closing comments, LKDFN state that many promises have been made to their community from past mines, but that they have experienced little real progress and that the benefits from mining to date have not offset the adverse environmental and social impacts (PR# 410 p. 8). Specific challenges that LKDFN have faced in realizing benefits from existing mines and the concerns that continue include maximizing employment and the 2 week-in 2 week -out shift rotation (PR#410 p. 13). These views were stated by LKDFN during all phases of this EIR.

LKDFN believe that discussions with the developer should focus on how De Beers can fit into the social wellness plan of the community rather than just focussing on the benefits of employment opportunities (PR#410 p. 6). LKDFN believes that a better approach to longer term sustainability needs to include improved discussions between the developer and the community including its Health and Social Services Department. (PR#410 p. 6) In the view of LKDFN, the Project should be delayed to a more suitable time when there is less risk of environmental and social degradation.

In its closing comments YKDFN acknowledges that diamond mining in the NWT has brought benefits and that the potential benefits from this Project are important. However, the available pool of YKDFN members available to benefit from this Project is limited during the time when other diamond mines continue operations. (PR#407 p. 7)

In its technical report, NSMA state that in its opinion, the Project may have adverse impacts on the health and wellness of employees. To address these concerns NSMA recommends De Beers implements preventative measures including counselling, and programs that encourage positive lifestyle choices. (PR#330 p. 23-26) In response to these concerns, De Beers commits to specific mitigation to address health and wellness impacts in its October 19, 2012 meeting with GNWT (PR#321) and repeats these and other related commitments in its summary of commitments. (PR#406 p. 2)

11.2.4 Socio-economic impacts at closure

The GNWT notes in its technical report that the 11-year operating mine life is considerably shorter than the existing diamond mines in the NWT. Temporary suspension of mine production due to outside market forces is also a possibility. Risk of temporary work stoppages and a short mine life can impact employment and increase demand for support and services, such as unemployment and counselling. In order to address this issue, the

GNWT recommends that the developer work with the GNWT to ease employees' transition to new jobs upon mine closure (PR#334 p. 17-18).

NSMA also state in its technical report that there will be adverse impacts to aboriginal employment and aboriginal businesses at mine closure and that addressing impacts to the human environment should be a key goal of the closure and reclamation plan. To mitigate these impacts, NSMA recommend that the transitioning of employees after mine closure be included in the closure and reclamation plan, and that 3 years prior to closure a closure socio-economic impact assessment should be completed to assist employment and business transitioning (PR#330 p. 31).

In response to concerns from the parties regarding impacts to employees at closure De Beers commits to:

- engage aboriginal communities regarding the Project during all phases and discuss employee transition to new jobs leading up to permanent closure as part of community engagement;
- conduct a study, 3 years prior to closure, that assesses the effects of closure and assists the company with the transition of employees (PR#406 p. 3);

11.2.5 Socio-economic agreement

In its technical report, the GNWT recommends that a formal follow-up program in the form of a socio-economic agreement for the life of the Project between the GNWT and De Beers be a condition of Project approval (PR#334 p. 25). In its response to the GNWT technical report, the developer advised the Panel that De Beers and the GNWT are negotiating a socio-economic agreement for the Project (PR#346 p. 15).

During the public hearings the GNWT emphasized that a socio-economic agreement is an essential follow-up program that monitors and tests socio-economic predictions, evaluates successes, identifies gaps and uses adaptive management to maximize benefits. The GNWT confirmed that they would negotiate a socio-economic agreement with De Beers to formalize the developer's commitments, including reporting commitments. The GNWT believes that this agreement with its associated commitments along with Impact Benefits Agreement to be negotiated between aboriginal groups and the developer will address many of its project-related socio-economic concerns. (PR#403 p. 140-142)

In its final comments, the GNWT re-iterates its recommendation that the Panel include the requirement for a socio-economic follow-up program in its Report of EIR pursuant to section 117(3)(c) and 134(2) of the *MVRMA* as follows:

“De Beers Canada Incorporated and the Government of the Northwest Territories shall negotiate and sign a follow-up program in the form of a Socio-economic Agreement”.

The GNWT has followed this approach for all major resource developments since the comprehensive study for the Diavik Diamond Mine concluded that a follow-up program was required to evaluate the effectiveness of mitigation measures and determine if those measures need to be adapted during the life of the project. The GNWT recommends the same approach for the Gahcho Kué Project and believes that it is crucial to include the socio-economic agreement as a condition of Project approval. (PR#409 p. 6-7)

In its technical report, the NSMA states that because of the developer's need for southern workers, in-migration of workers is anticipated. This can increase the cost of living, including transportation and housing and increase the use of regional infrastructure and services. In order to address this concern, NSMA recommends that the developer negotiate a socio-economic agreement with aboriginal groups and not just the bilateral agreement proposed between De Beers and the GNWT. (PR#330 p. 21-22)

11.3 Panel's analysis and recommendations

The Panel recognizes that it is the goal of both the developer and the parties to maximize the benefits and minimize any adverse social and economic impacts from the Project on the people and communities of the NWT. Operation of the Snap Lake mine has provided De Beers with first-hand experience in addressing social impacts and maximizing economic benefits to communities, aboriginal groups and governments in the NWT. In the Panel's view this experience can assist the developer in adapting social and economic policies and programs that have been effective at Snap Lake to the Gahcho Kué Project. This Project provides the opportunity for the developer to implement lessons learned from Snap Lake to improve and refine social and economic programs and policies where appropriate.

The Panel recognizes that De Beers and the GNWT have committed to develop a Socio-Economic Agreement as a follow-up program, which will serve as a mechanism that ensures monitoring and reporting of social and economic concerns and to allow for testing of the developers socio-economic predictions made in its EIS.

The concerns voiced by some aboriginal groups based on their experiences with the existing diamond mines underscores the importance of monitoring, managing and follow-up on social and economic predictions and commitments. In the opinion of the Panel, implementation of the commitments by De Beers will ensure that the benefits from the Project are maximized and adverse impacts to communities are minimized. During the public hearing in Dettah, the Panel heard from individuals who want to take advantage of the positive benefits from this mine. The Panel is of the view that this Project should benefit all aboriginal groups. The Panel acknowledges that it is the responsibility of De Beers to address employment challenges expressed by aboriginal groups so that community members experience direct benefits from this Project. It is the view of the Panel, that a close relationship between the developer and aboriginal communities is needed so that benefits to community members can be realized.

The Panel is aware that impact benefit agreements are being negotiated between De Beers and aboriginal organizations (PR#241 p. 102 #403 p.141) although no specific commitment to complete such an agreement is on the public record. These negotiated agreements may include policies and programs that minimize adverse social impacts and provide benefits to aboriginal groups.

In the Panel's view the commitments described by the developer and referenced in this Report are comprehensive and communities will see real benefits with minimal adverse impacts from the Gahcho Kué Project. In the opinion of the Panel a follow-up program is required to examine and monitor the developer's predictions ensure that commitments are implemented. The Panel agrees with the GNWT that the Socio-Economic Agreement between the GNWT and De Beers is a follow-up program.

Based on the evidence and information provided, it is the opinion of the Panel that the adverse social impacts from the Project are not likely to be significant provided the developer implements its commitments including the negotiation and implementation of a final Socio-Economic Agreement with the GNWT.

11.4 Follow-up program

The Panel concludes that a follow-up program is required to ensure that the developer's commitments are implemented, that adverse social impacts are not significant, and to maximize benefits to residents of the NWT. The Panel believes that the Socio-economic Agreement between the GNWT and De Beers can satisfy the needs of a follow-up program. The Socio-Economic Agreement should monitor and test the developer's socio-economic predictions, evaluate successes, identify gaps and use adaptive management to maximize benefits for all NWT residents. Follow-up monitoring and reporting can determine if commitments and mitigation measures need to be adapted during the life of the Project.

The GNWT and De Beers commit to negotiating and implementing a Socio-Economic Agreement as a follow-up program to formalize the developer's commitments. These commitments reduce adverse social impacts and maximize benefits from the Project to all residents of the NWT. The Socio-Economic Agreement includes commitments for reporting by De Beers as a key part of follow-up. (PR#406 p.1-4) This ensures transparency so that the GNWT and NWT residents can track whether commitments made by the De Beers are being followed.

12 Summary of monitoring, adaptive management, and follow-up

Sections 5 to 11 in this Report identify the need for follow-up programs to monitor impacts to water, fish, wildlife (in particular caribou), and socio-economics as a condition of Project approval. This section presents the Panel's rationale and general requirements for the follow-up programs. De Beers identified and proposed monitoring or commitments to meet some of the requirements for follow-up. This section provides an overview of De Beers' general approach for monitoring, adaptive management and follow-up, followed by the parties' submissions and recommendations and the Panel's rationale and general requirements for the follow-up program.

12.1 Developer's submission

DeBeers states that through application of its proposed environmental design features and mitigations, and other programs and actions to address effects from the Project on socio-economic and cultural environments, no significant adverse effects are likely to result from the proposed Gahcho Kué project. De Beers states that it will be implementing monitoring and mitigation programs throughout the construction, operation, and closure phases to track commitments and performance (PR#396 p.38).

De Beers states the proposed monitoring programs will:

- deal with the uncertainties associated with the impact predictions;
- deal with uncertainties associated with the environmental design features and mitigation that are included as part of the Project;
- identify unanticipated effects; and, inform adaptive management (PR#80 p.6-28).

As required in the Terms of Reference, De Beers identifies three types of monitoring that may be applied during the Project:

- **Compliance inspection** which involves monitoring the activities, procedures, and programs undertaken to confirm the implementation of approved design standards, mitigation, and conditions of approval and company commitments;
- **Environmental monitoring** to track conditions or issues during the development lifespan and subsequent implementation of adaptive management; and
- **Follow-up monitoring** which is designed to test the accuracy of impact predictions, reduce uncertainty, determine the effectiveness of environmental design features, and provide appropriate feedback to operations for modifying or adopting new mitigation designs, policies, and practices (PR#80 p.6-28).

If monitoring or follow-up detects effects that are different than predicted, or identifies the need for improved or modified design features, then adaptive management will be implemented. This may include increased monitoring, changes in monitoring plans, or additional mitigation (PR#80 p.6-28).

De Beers defines adaptive management in several of the monitoring documents submitted during the EIR and acknowledges that there are multiple definitions for adaptive management (PR#204, 307, 310). In the conceptual environmental monitoring and management framework submitted to the Panel in May 2012, De Beers references guidance documents from the Wek'eezhii Land and Water Board which describes an adaptive management response framework that links monitoring results to management response (PR#204 p.3). This document defines adaptive management as adhering to four themes:

- learning in order to reduce management uncertainties;
- using what is learned to change policy and practice;
- focusing on improving management;
- doing the above in a formal, structured and systematic way“ (PR #204 p 3).

The environmental monitoring and management framework presents a preliminary concept map for the environmental monitoring and management of the Gahcho Kué Project (PR#204 p.5). De Beers states that if the results of a monitoring program indicate changes beyond those predicted are occurring, a monitoring response plan will be developed, and efforts will then be initiated to identify and respond to the source of the change (PR#204 p.6). Other adaptive outcomes of the response framework may include the continuation of monitoring as planned or adjusting the monitoring effort as necessary (PR#204 p.6). An advisory committee would prepare an annual summary report of the outcomes of adaptive management (PR#204 p.6). This advisory committee was subsequently replaced by Ni Hadi Yati, which is described in Section 13 of this Report.

The environmental monitoring and management framework outlines preliminary approaches for monitoring wildlife, soils and vegetation, aquatic effects, groundwater and air quality (PR#204). In this document De Beers states:

*“Although similar monitoring programs exist at other mine sites, detailed study designs are site-specific and cannot be broadly applied without due consideration.....Detailed monitoring program development requires substantial work and involves considerable regulatory, community and stakeholder input, and careful consideration of available TK [Traditional Knowledge]. Therefore, **it is understood that some monitoring components may be adjusted as the Project proceeds through the Environmental Impact Review (EIR) process based on on-going monitoring, stakeholder input, the Panel’s decision report and the subsequent permitting process** [emphasis in source document].”*
(PR#204 p. 4)

De Beers provided additional information on monitoring in draft versions of monitoring plans submitted to the Panel during this Environmental Impact Review. The developer states that these plans will be revised as necessary based on-going consultation with regulators and Aboriginal groups (

Table 7). Waste management plans, which may be combined into more general plans, will be developed as part of the regulatory process and will form part of the Land Use Permit and Water Licence applications (PR#406 p.6). De Beers also committed to designing and implementing other monitoring and management plans (**Table 7**).

Throughout the EIR, De Beers made many specific commitments related to monitoring, adaptive management and follow-up. These are discussed in Sections 5 to 11 and presented in Appendix C. For example, De Beers commits to:

- monitoring the basins in Kennedy Lake during closure including the mine pits (PR#348 p.3);
- monitoring mercury concentrations in edible fish tissues in the raised D-E-N lakes;
- conducting plant surveys for species considered “at risk”;
- hydrological monitoring of downstream water bodies including potential connections to Hoarfrost River;
- monitoring of the seepage water quality and thermal conditions in the waste storage facilities;
- monitoring of dyke performance throughout their construction and operating life as well as many other commitments (Appendix C).

De Beers acknowledges that the socio-economic monitoring and mitigation programs to be outlined in the agreement with the GNWT will be suitable as a socio-economic follow-up program for the Project (PR#423 p.18).

Table 7: Proposed monitoring and management plans

Monitoring or management plan	Reference/ Status	Valued Component or Project component
Drafts submitted during the EIR		
Air Quality and Emissions Monitoring and Management Plan	PR#320	Waste Management
Fish Habitat Compensation Plan (No-Net-Loss Plan)	PR#355,356, 357,358	Fish
Fish Out Plan	PR#311	Fish
Flow Mitigation Plan	PR#254, 316	Fish
Incinerator Management Plan	PR#318	Waste Management
Wildlife Effects Monitoring Program	PR#307,308,310 (named Wildlife Monitoring Plan)	Wildlife Waste Management
Wildlife and Wildlife Habitat Protection Plan	PR#310 p.184 (named the Wildlife Effects Mitigation Plan submitted as an appendix to the Wildlife Monitoring Plan)	Wildlife Waste Management
Commitments to complete plans at later date		
Aquatic Effects Monitoring Program	Commitment	Water and aquatic life
Effluent and Surface Water Management Plan	Commitment	Waste Management
Emergency Response and Spill Contingency Plan	Commitment	Risk Management
Explosives Management Plan	Commitment	Waste Management
Hazardous Materials Management Plan	Commitment	Waste Management
Landfarm Management Plan	Commitment	Waste Management
Landfill Management Plan	Commitment	Waste Management
Mine Rock Management Plan	Commitment	Waste Management
Preliminary Closure and Reclamation Plan	Commitment	Water Biophysical Environment
Re-vegetation Management Plan	Commitment	
Road Access Management Plan	Commitment	Wildlife
Sediment and Erosion Management Plan	Commitment	Waste Management
Soil and Vegetation Monitoring Plan	Commitment	Wildlife
Surveillance Network Program	Commitment	Water and aquatic life
Socio-economic Agreement	Commitment	Socio-economic

12.2 Parties submissions and recommendations

As described in Sections 6 to 12 of this Report, the parties are concerned about the uncertainty in the proponent's predictions, the effectiveness of proposed environmental design features and mitigation, and the effectiveness of the developer's use of adaptive management to ensure that adverse effects are not greater than predicted. The parties to the review agree that further definition of project-specific and regional cumulative effects follow-up programs are needed. In their technical reports, the parties made over 50 recommendations related to monitoring, with the majority of the recommended measures for monitoring focused on wildlife and water quality, quantity and related aquatic effects.

Many of the recommendations from the parties were about the need for monitoring the effects of the project on wildlife, how the effects should be monitored, and the need to link monitoring results to management responses (PR#329 p.10,12,14,15,16; PR#332 p.26,26,26,27; PR#334 p.7,9, 12,12, PR#326 p.12; PR#330 p.34; PR#333 p.22,26,27,29). The LKDFN, YKDFN, NSMA and Tlicho Government requested independent oversight in order to ensure the effective development and implementation of wildlife monitoring and mitigation, in particular for caribou, which is a primary concern for these parties (PR#326 p.7, PR#329 p.8, PR#330 p.12, PR#332 p.9). In their closing comments the LKDFN, YKDFN, and Tlicho Government note that the proposed consultation body, Ni Hadi Yati, may address the need for independent oversight, if an agreement between the Aboriginal parties and De Beers is successfully negotiated (see Section 13 on oversight).

The GNWT recommends in its technical report that De Beers should describe its intended annual and periodic reporting procedures (particularly when De Beers will provide results from monitoring programs or evaluation of adaptive management) and that monitoring results and analyses be completed prior to requesting the Annual Wildlife Research Permits for upcoming field work (PR#334 p.15). De Beers responded that it would "discuss opportunities to coordinate the timing of reporting with the GNWT and Aboriginal groups" (PR#346 p.5).

The parties' recommendations for monitoring water quality, quantity and related aquatic effects address uncertainty associated with modeled predictions and the role of adaptive management in ensuring adverse effects on the aquatic ecosystem are not significant. Government agencies (AANDC, DFO, EC) made recommendations for monitoring and managing water (PR#325 p.18, PR#323 p.7,9, PR#333 p.2,3,4,5) and in particular requirements for an aquatic effect monitoring program (PR#325 p. 15, PR#333 p.14, 15). Aboriginal parties focused recommendations regarding water monitoring on the incorporation of Traditional Knowledge in monitoring plans, and their recommendations on water focused on narrative water quality objectives.

In its closing comments, AANDC suggests that the existing regulatory process comprehensively addresses land and water related matters and recommends that

mitigation, monitoring, and environmental management measures be incorporated into regulatory authorizations, permits, and licences wherever possible (PR#412 p. 5).

The GNWT states in its closing comments that it believes that the primary authority to ensure environmental monitoring and reporting for the Project is the Mackenzie Valley Land and Water Board through its Land Use Permit and Water Licence authorization systems (PR#409 p.4). Further, the GNWT states that for some matters, such as species at risk, regional scale monitoring by co-management authorities is also required and any additional communication on environmental monitoring for the project with Aboriginal organizations is best achieved through agreement between affected communities and De Beers (PR#409 p.4).

12.3 Panel analysis and recommendations

The Panel acknowledges that the developer's conclusion of no significant adverse impacts from the Project is based on its analysis of residual effects after proposed mitigation and environmental design features are implemented. De Beers' project includes design features and mitigative strategies as well as plans and programs to minimize adverse impacts (and to enhance positive impacts in the case of socio-economic issues). The EIS presented by De Beers is also based on modelled predictions. The Panel recognizes the inherent uncertainty associated with modelling and that many factors influence the quality of modelled predictions, including the type of model itself, the assumptions associated with it, and the input parameters. Unanticipated circumstances or events and changes to the mine plan during operations may result in Project effects that are different than predicted. Therefore, as discussed in Sections 5 to 11 in this report, follow-up programs are required for specific valued components.

The Panel agrees with the developer that designing monitoring programs requires substantial work and involves considerable regulatory, community and stakeholder input, and careful consideration of Traditional Knowledge. Therefore, the Panel requires that the monitoring and follow-up programs be developed in collaboration with experts and Aboriginal communities and governments during the licensing and permitting phase and the results and ongoing adaptive management actions must be reported and reviewed throughout Project construction, operation and closure.

Both DeBeers and the parties to this review reference the Wek'èezhii Land and Water Board Response Framework as a way to implement adaptive management and ensure that desired outcomes are achieved. This Response Framework includes pre-defined 'action levels' that trigger alternative monitoring and changes to project mitigation designs, policies, and practices, that, taken together, avoid adverse significant effects.

Upon careful review of De Beers' monitoring and adaptive management plans submitted during this EIR, the Panel notes that while conceptual monitoring and mitigation approaches are generally described and references are made to adaptive management, action levels and alternative monitoring, mitigation, or management actions are only

defined for a few potential effects. The information provided in the plans does not demonstrate how the monitoring results will inform management actions such as changes in mitigation designs, policies, and practices, in particular when such changes will be required, and how they will be implemented in a timely manner. The Panel assumes these details will be developed during the land permitting and water licensing phase.

For adaptive management to be effective it needs:

- pre-defined action levels or thresholds; and,
- proposed mitigation designs, policies, and practices linked to these action levels as a clear and testable starting point for adaptive management.

The Panel acknowledges that action levels proposed by De Beers will need to be determined in collaboration with regulators, aboriginal groups and that these levels may change over time based on the adaptive management process. The Panel recommends that these key elements of adaptive management should be incorporated into the follow-up programs.

Pre-defined mitigations are intended to be the starting point for the adaptive management cycle and should be flexible to facilitate better methods or the use of best practices available at the time they are implemented. For example, the magnitude of the interaction between caribou and the site is a key assumption in the EIS. If monitoring indicates caribou are frequenting the site more than predicted (e.g. caribou are moving through the site during migration), then mitigation measures to prevent impacts on caribou may need to be implemented during the actual migration event. For example, to eliminate disturbance to caribou, noise may need to be reduced and/or trucks may need to be restricted from driving on the rock pile, or flights to the site may need to be curtailed for a short period during the migration. This type of mitigation would need to be implemented within the time frame of the migration, and is not something that can be written up in annual monitoring reports to be dealt with the next year.

The Panel is of the view that the follow-up programs need to address impact predictions at both the project specific and, where appropriate, at the cumulative effects scales. Previous diamond mine reviews have included recommendations intended to improve the collective understanding of project-specific and cumulative impacts and proposed mitigation measures, but these initiatives have not been completely successful. The parties to this review indicate that this clearly demonstrates that existing project-specific and regional monitoring, mitigation, and management processes and tools should continue to be tested and improved through follow-up programs. The Panel acknowledges that monitoring and management of cumulative effects is the responsibility of the GNWT and Aboriginal Affairs and Northern Development Canada (AANDC), because these governments have the mandate for land, water, and wildlife. Project specific follow-up programs can provide useful contributions to cumulative effects monitoring and management. In addition,

cumulative effects monitoring should provide information that can be applied at the project-specific scale to reduce an individual project's contributions to cumulative effects.

The Panel is of the view that the follow-up programs should be developed and implemented by the developer and overseen by regulators, with the requirements for follow-up incorporated into regulatory authorizations, permits, licences, or other legally binding agreements. The responsible authorities should ensure the developer reports on its monitoring results and how those results provide feedback to operations for modifying or adopting new mitigation designs, policies, and practices. Where cumulative impacts are a concern, regulators, or responsible authorities, should ensure that the results from cumulative effects monitoring and management provides feedback (such as best management practices) that can be applied at the Project specific scale. The Project specific follow-up programs should also contribute to cumulative effects monitoring, so that cumulative effects can also be managed at the cumulative effects scale.

The Panel agrees with AANDC that the existing regulatory process has the capacity to comprehensively address water related matters including follow-up (PR#412 p. 5). Follow-up requirements for fish, which are not incorporated into the Aquatic Effects Monitoring Program, should be incorporated within the Department of Fisheries and Oceans authorizations. As the primary authority for wildlife, the GNWT (and Environment Canada where applicable) has the mandate for ensuring follow-up related to caribou and other wildlife is implemented. Requirements for follow-up related to wildlife habitat should be incorporated into the Land Use Permit. The GNWT also has the mandate for socio-economic issues in the NWT and is the responsible authority for ensuring follow-up related to socio-economic issues.

The Panel outlines the general requirements for the follow-up programs below. The specific requirements for different valued components are outlined in Sections 5-11 and in Appendix A.

Objectives

The first objective of the follow-up programs is to test the soundness of the environmental impact review. This means that each follow up program should test:

- the impact predictions;
- effectiveness of De Beers' environmental design features and proposed project mitigations;
- effectiveness of adaptive management proposed by De Beers as part of the Project; and,
- that all of the commitments made during the EIR are followed through and address their intended purposes.

The second objective of the follow-up program is to test the effectiveness of the mitigative or remedial measures imposed as conditions of approval of the Project .

Guiding Principles

- Follow-up monitoring should provide appropriate feedback to operations for modifying or adopting new mitigation designs, policies, and practices.
- Follow-up programs should apply adaptive management principles that effectively link monitoring results to management actions by using action levels and predefined management responses as a starting point to the adaptive management cycle.
- Follow-up programs should apply best practices for mitigation and adopt new best practices as they become available.

Roles and Responsibilities

- Follow-up programs should be developed by the proponent in collaboration with regulatory, community and stakeholder input, and careful consideration of Traditional Knowledge.
- Existing regulatory authorities are responsible for ensuring the follow-up programs are designed and implemented and that they hold the developer accountable for the components of the follow up programs that are the developers' responsibilities. This should be done through land use permits, water licences, authorizations, and legally binding agreements.
- Governments are responsible for cumulative effects monitoring and management while De Beers is responsible for minimizing and reporting on its contributions to cumulative effects.

Timing and Duration

- Follow-up programs should be developed as soon as possible, following approval of the Project, to maximize consultation between the Developer, Aboriginal parties and responsible authorities and allow for thorough review through the land use permitting and water licencing phase.
- Follow-up programs should be conducted through all phases of construction, operation and closure. Intensity of monitoring can change depending on monitoring results and changes to operations.

13 Oversight (Ni Hadi Yati)

13.1 Developer's submission

During this environmental impact review, DeBeers adopted the position that no independent oversight body is required for the Gahcho Kué project and proposed an Adaptive Management Advisory Committee (AMAC) as a company-led alternative at the May 2012 technical sessions (PR#203, 204).

De Beers proposed that there would be a monitoring program framework for the Project which is comprised of monitoring and management plans to assess the performance of key management actions, evaluate key impact predictions, and identify emerging issues (PR#203 p.8). De Beers proposed that monitoring reports for aquatic and terrestrial components of the environment would be provided to the AMAC and this committee would carry out an adaptive management response framework (PR#203 p. 9) which would link monitoring results to management responses (PR#204 p. 3). Management responses could include continued monitoring, changes to monitoring programs as necessary, and/or operational changes to the Project (PR#203 p.10).

De Beers proposed that the AMAC would consist of regulators, aboriginal groups and the developer with terrestrial and aquatic sub-groups being co-chaired by De Beers and an agency with the responsibility for the environmental component under consideration (aquatic or terrestrial). A draft terms of reference for the AMAC that describes its purpose, objectives, structure, roles and responsibilities, deliverables and funding mechanism was submitted on June 29, 2012 (PR#252).

Aboriginal parties indicated in their technical reports that the AMAC does not address their needs, such as addressing regulatory gaps, providing independent oversight and a mechanism for incorporating traditional knowledge in monitoring and project operations (PR#329 p.8; PR#326 p.5; PR# 332 p.15; also see Section 13.2 below). Therefore, LKDFN, DKFN, Tlicho Government and YKDFN initiated a collaboration with De Beers to develop an oversight and adaptive management model for the Project, called Ni Hadi Yati. This model was outlined to the Panel at the public hearings on December 5th, 2012 in a collaborative presentation made by the Aboriginal parties and De Beers (PR#375; PR#396). During the public hearing the NSMA and NWT Metis were also invited to join Ni Hadi Yati (PR#375 p.7). A letter describing the Ni Hadi Yati (PR#417) was submitted to the public record at the same time as the closing statements by the parties.

As described in the letter (PR#417) and at the public hearings (PR#396) Ni Hadi Yati's purpose is to provide Aboriginal groups with technical capacity to review and provide input into the development of environmental monitoring and management plans for the life of the Project. Ni Hadi Yati is intended to be project specific and does not have a role with respect to cumulative effects monitoring and management (PR#417 p.2). However, "Ni Hadi Yati participants are free to recommend to De Beers ways for the Project to

contribute to additional cumulative effects initiatives that may be developed by government in the future” (PR#417 p.2). The letter describes key features of how Ni Hadi Yati will operate:

- the aboriginal groups that participate in Ni Hadi Yati will each select a lands department representative to meet with De Beers as a group to determine technical review needs on an annual basis (PR#417 p.2);
- the Ni Hadi Yati requests that federal and territorial governments review materials, attend meetings and provide, upon request, a detailed peer review of materials, with a goal to align the process of Ni Hadi Yati with the responsibilities of existing regulatory processes (PR#417 p.2);
- De Beers will fund third party expert consultants to provide reviews, if necessary (PR#417 p.3);
- aboriginal participants will be able use the information from reviews to make recommendations to De Beers or to the Mackenzie Valley Land and Water Board (MVLWB) with respect to plans that fall within its scope (PR#417 p.4);
- when De Beers receives a recommendation for adaptive management, it will give full consideration to the request will provide rationale in writing for implementing or rejecting the recommended action (PR#417 p.4); and
- technical reviews, correspondence, including DeBeers responses will be posted to a website developed by Ni Hadi Yati (PR#417 p.4).

During the public hearing, proponents of the joint Ni Hadi Yati proposal asked the Panel to consider including three measures in the report of EIR:

- “De Beers and interested Aboriginal parties to the EIR shall further develop Ni Hadi Yati as outlined in the joint presentation and shall enter into a contract for its implementation.
- Ni Hadi Yati will ensure Aboriginal Party capacity to participate in the holistic environmental stewardship of the Gahcho Kué Project.
- the Government of Canada and the Government of the Northwest Territories shall lend available technical resources to the Ni Hadi Yati.” (PR#375 p.12)

The letter submitted after the public hearing indicated that the parties to Ni Hadi Yati have developed a schedule to finalize such a contract by March 31, 2013 (PR#417 p.5).

DeBeers’ view is that Ni Hadi Yati is advisory only, does not constitute an independent oversight body or monitoring agency, and does not have an enforcement role (PR#423 p.13). In its closing argument De Beers states that:

“Regardless of Ni Hadi Yati, De Beers has made the commitment to develop annual engagement plans that will consider the need for capacity funding for Aboriginal groups to participate in meetings to review reports and provide input on adaptive management” (PR#423 p. 15).

In its closing argument, DeBeers stated that in its opinion there is no regulatory gap pertaining to the Project that needs to be addressed by Ni Hadi Yati or any other monitoring agency, as enforcement is the responsibility of AANDC and other existing regulators, including DFO, EC, the GNWT, TC and the MVLWB (PR#423 p. 14).

13.2 Parties' submissions and recommendations

In their technical reports, LKDFN, Tlicho Government, YKDFN, and NSMA recommended that an independent oversight body and/or environmental agreements be negotiated for the Gahcho Kué Project in order to meet community concerns and ensure environmental compliance (PR#326; 329; 330; 332). Some of the main reasons for the parties wanting independent oversight and environmental agreements are because:

- there is a need to ensure that the important work of mitigation, monitoring and managing impacts to environment and wildlife is done in a responsible, transparent and publically accountable manner throughout the life of the project (PR#332 p.15);
- there is a need to ensure incorporation of traditional knowledge in the operation of the mine (PR# 329 p.20; PR# 330 p.34; PR#332, p.7);
- lessons have been learned from the other three diamond mines that wildlife, air quality and traditional knowledge use represent clear gaps in the regulatory system (PR#326 p.5; PR#329 p.6); and
- impacts to caribou, which is the most important resource to aboriginal people, are not being addressed at this time by any regulator or any government other than harvest restrictions, and therefore there needs to be an agreement or contract to ensure implementation of monitoring and mitigation to reduce impacts (PR#329 p.6; PR#416 p.5).

Subsequent to the technical report submissions, the First Nations collaborated on developing the Ni Hadi Yati as an alternative to the AMAC. Signatories to the final submission on the Ni Hadi Yati proposal were DKFN, Tlicho Government, YKDFN and De Beers (PR#417 p.5). LKDFN is listed as a party to Ni Hadi Yati but did not sign the final submission (PR#417 p.5).

During the public hearing counsel for the Panel asked Ni Hadi Yati participants to consider alternatives in the event that a binding agreement for Ni Hadi Yati was not signed and asked the parties to comment on their positions in their closing statements. LKDFN focused their closing statement on their position that the Project should be delayed until a more suitable time and did not comment on Ni Hadi Yati (PR#410 p.2). DKFN focused its closing statement on ensuring that DKFN rights, duties, treaty, traditions and way of life continues and did not specifically comment on Ni Hadi Yati (PR#419).

YKDFN stated that if the Panel adopts the measures proposed in the joint Ni Hadi Yati presentation (see proposed measures in Section 13.1 above) then the following measures that had been recommended by YKDFN no longer need to be considered by the Panel:

- (1) An extra regulatory agreement that brings into being an arms-length oversight body;
- (2) An enforceable and collaboratively designed Wildlife Effects Monitoring Plan with a dispute resolution system to deal with design quality and implementation; and
- (3) A contractual environmental agreement between the company and First Nation (PR#407 p.3).

Further, YKDFN states that if the Ni Hadi Yati agreement includes a dispute resolution system then its suggested measures that deal with regulatory gaps and the contents of particular plans will also be addressed through Ni Hadi Yati. These measures (#7 to 10 in the YKDFN technical report) are for:

- (7) An on-going trans-boundary cumulative effects monitoring program across the range of the Bathurst herd;
- (8) An adaptive management approach for range management;
- (9) Re-evaluation of impacts of the project 5 years after the report of EA, with particular focus on relationships between developments and recovery of the herd which will include proposal for further mitigations, up to and including mothballing the mine, if necessary; and
- (10) A comprehensive mitigation and monitoring plan that examines the barrier effects of the winter access road on caribou (PR#407 p.3).

If there is no measure in the Report of EIR to ensure a contract for Ni Hadi Yati, YKDFN's fall-back position is that the preceding measures (#1-3 and 7-10) must be implemented to ensure that significant concerns and environmental impacts do not occur (PR# 407 p.5).

The Tlicho Government supports Ni Hadi Yati and notes that their Chief's Executive Council has approved participation in forming Ni Hadi Yati (PR#416 p.4). Tlicho Government states that independent oversight will be achieved through the Ni Hadi Yati body (PR#416 p.4). They request a measure requiring the developer and the parties to collaboratively conclude an extra-regulatory agreement to host Ni Hadi Yati that brings into being an arms-length oversight body and a measure to develop an enforceable Wildlife Monitoring Plan to be undertaken principally by De Beers and given force through a contractual environmental agreement between the company and the First Nations (PR#417 p.4). The Tlicho Government notes there would be a need for dispute resolution (PR#417 p.5).

The NSMA states that they cannot make a decision regarding Ni Hadi Yati at the time of the closing comments as they have not been fully informed (PR#414 p. 5). NSMA first became aware of Ni Hadi Yati at the public hearings and the joint submission (PR#417) was not available for review prior to the parties submitting their closing statements. NSMA is concerned because it does not have the same resources as other Aboriginal groups. Because Ni Hadi Yati plans to allocate capacity and resources collectively NSMA is

concerned that collective decisions may not be equitable with regard to finances or resources (PR#414 p.5). In their closing statement NSMA proposed three measures:

- the developer will allocate sufficient funding for the NSMA to participate in Ni Hadi Yati in a fair, equitable, and meaningful manner;
- the developer will hire a full time executive director/traditional knowledge expert for the Ni Hadi Yati in order to inform Aboriginal parties of any mine in-compliances and facilitate traditional knowledge mobilization among the Aboriginal parties and De Beers; and
- the Government of Canada and the GNWT shall ensure that the developer enters into an environmental agreement that is consistent with those negotiated for similar mines within the Slave Geological Province (PR#414 p.5).

Government agencies indicated that while details have not yet been finalized, they are supportive of the Ni Hadi Yati proposal. AANDC suggests that Ni Hadi Yati be captured as a commitment between the developer and the Aboriginal parties (PR#412 p.5). AANDC commits to participate in Ni Hadi Yati depending on available resources and as long as duplication with other regulatory mechanisms is avoided (PR#412 p.5). The GNWT states that “as with other monitoring bodies the GNWT will participate upon request and provide technical advice on air and wildlife on an as-needed and as-available basis” (PR#409 p.5).

During the public hearing LKDFN presented recommendations from their Traditional Knowledge Report. Recommendations relating to oversight include:

- the proposed project be continually monitored by the Lutsel K’e Dene;
- create caribou monitoring teams from Lutsel K’e that would provide continuous 24-hour monitoring during each 2 week migration period;
- the Gahcho Kué spur and winter roads should be monitored and managed in a way that is acceptable to Lutsel K’e. This means effective consultation;
- De Beers support the involvement of LKDFN at all stages of decision-making; and
- De Beers should have regular meetings with LKDFN, especially when discussing changes to the project (PR#397 p. 20 to 22).

The Traditional Knowledge Report submitted by Lutsel K’e provides additional detail on how the Project can be continually monitored by Lutsel K’e Dene (PR#422 p.63). This would involve hiring a full time land and water monitoring team composed of four community members working in two-week shifts around the mine site (PR#422 p.63). The monitoring team would be equipped with its own cabin and vehicle, be free to move around the mine site, its zone of influence, and the ice road in order to monitor the land, water and wildlife for potential adverse effects of the mine (PR#422 p.64).

13.3 Panel analysis and recommendations

The Panel supports the Ni Hadi Yati initiative because it was developed in the spirit of collaboration and could be inclusive of all aboriginal groups in the Project area. The Panel heard the parties to Ni Hadi Yati express confidence that a satisfactory agreement could be reached. The Panel recognizes that the Ni Hadi Yati was conceived in a comparatively short period of time, and accordingly all governance and implementation details may not have been considered by the time the concept was presented at the public hearing. However, based on the collaboration shown to date, the Panel is encouraged by progress made by Ni Hadi Yati.

The Panel agree that if negotiations are successful Ni Hadi Yati could provide a forum for Aboriginal parties to become better informed about the Project and for Aboriginal parties to explain how Traditional Knowledge can be incorporated in the operation of the mine. In the opinion of the Panel, the Ni Hadi Yati can contribute to transparency and make the developer more publically accountable throughout the life of the Project. In other words Ni Hadi Yati, if implemented, could assist De Beers in developing and maintaining a “social licence to operate”. The Panel is of the view that if Ni Hadi Yati is implemented, it could satisfy some of the reasons why Aboriginal parties want independent oversight and/or environmental agreements; namely to ensure mitigation, monitoring and managing impacts to environment and wildlife are done by the developer in a transparent and publicly accountable manner throughout the life of the Project and to help ensure incorporation of Traditional Knowledge in the operation of the mine.

The Panel notes that the Ni Hadi Yati does not fully address the issues raised by Aboriginal parties regarding impacts to caribou at the cumulative effects scale or the lack of regulatory enforcement related to air quality and wildlife issues. Ni Hadi Yati is not intended to be a regulatory body, and therefore it has no enforcement role. However, the Panel also notes that by making recommendations directly to the developer, project specific issues may be addressed.

Ni Hadi Yati is not intended to have a role with respect to cumulative effects monitoring and management, and therefore the parties’ recommendations for trans-boundary cumulative effects assessment and range management for caribou is not within the scope of Ni Hadi Yati. There seems to be differing expectations regarding Ni Hadi Yati’s role, and this may be due to the fact discussions for Ni Hadi Yati were only at the preliminary stages when it was presented in this EIR.

The Panel recognizes that Ni Hadi Yati is an agreement between Aboriginal parties and the developer and therefore is limited to the actions that these parties have the authority to undertake. Cumulative effects assessment and management at the herd-wide scale is a government responsibility. However, Ni Hadi Yati should allow Aboriginal parties to be better informed about the Project, and can use this information to provide recommendations to government. The Panel has recommended a measure for caribou (see

section on caribou) which specifies reduction of project specific impacts, and subsequently cumulative impacts as well as a follow-up program for caribou (see Section on follow-up). The Panel is of the view that Ni Hadi Yati can provide a forum for discussion on project-related impacts.

The Panel considered the proposed measures presented in the Ni Hadi Yati presentation (PR#375 p.12 and presented in Section 13.1 above). One of the measures is for Government agencies to provide technical review of monitoring and management plans and reports. In their closing statements the government agencies stated that they are willing to provide technical review and input as long as duplication with other regulatory mechanisms is avoided and that they have sufficient resources to fulfill requests. The Panel interprets these closing comments made by government agencies as commitments. The Panel notes that when government agencies cannot provide appropriate review, De Beers will fund third party reviews.

The other two measures proposed in the joint presentation are for De Beers and other interested Aboriginal parties to enter into a contract for the implementation of Ni Hadi Yati and to ensure that Aboriginal parties participate in the holistic environmental stewardship of the Project. De Beers, DKFN, YKDFN and Tlicho Government signed the letter proposing Ni Hadi Yati, which included an indication that they have developed a schedule to finalize a contract before the completion of this EIR and LKDFN showed support for Ni Hadi Yati in its technical report. Based on this evidence, the Panel is of the view that De Beers and Aboriginal parties have committed to negotiating a contract for Ni Hadi Yati. The Panel acknowledges that commitments form part of the Scope of Development and thus Ni Hadi Yati should be viewed as a project component by regulatory authorities during the licensing and permitting phase of the Project.

Based on review of the evidence submitted in this EIR, the Panel notes Aboriginal parties have identified components that should be incorporated into Ni Hadi Yati to ensure effective implementation. The Panel agrees with these recommendations and suggests that, if not already completed, a binding agreement for the implementation of Ni Hadi Yati include:

- a funding mechanism that is fair and equitable to all Aboriginal parties and encourages participation of all impacted Aboriginal parties; and
- a dispute resolution system.

The Panel acknowledges that the parties who formed the Ni Hadi Yati and De Beers agree that Ni Hadi Yati is a replacement for the adaptive management advisory committee (AMAC). The Panel is of the view that adaptive management is a key component of Project operations to ensure that significant adverse environmental impacts do not occur. Regardless of the mechanism developed to provide input from Aboriginal parties to adaptive management, De Beers remains responsible for adaptive management- namely monitoring, mitigation and making changes to the project as necessary to ensure

predictions of the EIS are accurate and that significant adverse impacts do not occur. Monitoring, adaptive management and follow-up are discussed further in Section 12

The Panel agrees that while the focus of Ni Hadi Yati is on the technical review needs of Aboriginal parties, there is an excellent opportunity to use the forum for incorporating Traditional Knowledge into the Project (PR#417 p.4). The Panel respects Ni Hadi Yati's initiative to seek the expertise of a Traditional Knowledge expert and to strive to hold at least one Ni Hadi Yati meeting per year on the land. However, to directly involve Traditional Knowledge in the holistic environmental stewardship of the Project, which is one of the objectives of Ni Hadi Yati, the Panel is of the view that Aboriginal parties should have the opportunity to collect Traditional Knowledge about the impacts of the Project.

Traditional Knowledge is not strictly facts or knowledge that can be transferred from one person to another in a board meeting, a report, or a single afternoon on the land. It is based on direct observations and experiences on the land; it is a different way of observing and interacting with the land. Therefore, the Panel suggests that in addition to reviewing reports from De Beers, regulators, and third parties and one annual meeting on the land through Ni Hadi Yati, De Beers negotiate with Aboriginal parties for the Aboriginal parties to have the capacity to collect first-hand information on the impacts of the mine. This could include creating opportunities such as monitoring using traditional values and methodologies throughout all phases of mine from construction to closure which could then be brought to the Ni Hadi Yati group.

The Panel supports the development of Ni Hadi Yati because it could create transparency, public accountability, and a forum for incorporating Traditional Knowledge throughout the life of the Project. The Panel has not issued a measure for Ni Hadi Yati because Aboriginal parties and the developer have made a commitment to negotiate a contract for its implementation and government agencies have committed to contributing technical expertise on an as-needed and as-available basis.

Appendix A: Summary of measures, suggestions and follow-up programs

MEASURE 1

De Beers will:

- Minimize impacts to caribou and the extent of the zone of influence around the mine site to the extent that is technically feasible.
- Prior to construction, develop a caribou protection plan that ensures protection of caribou and caribou habitat. The caribou protection plan should include an adaptive management framework demonstrating how the Wildlife Effects Monitoring Program and the Wildlife and Wildlife Habitat Protection Plan are linked.

Governments, land managers and regulators will:

- Include conditions for habitat protection in the Land Use Permit.

MEASURE 2

De Beers will:

- Construct and operate the Winter Access Road in a way that minimizes its adverse effects as a partial barrier to caribou movement and migration;
- Monitor to determine the presence and behaviour of caribou along the winter access road using means in addition to satellite collar data, such as track counts and visual observations; and
- Ensure that the caribou protection plan, the wildlife effects monitoring program and the wildlife and wildlife habitat protection plan address the effects on caribou movement and behaviour along the winter access road.

MEASURE 3

The GNWT and AANDC will:

- Develop and implement a cumulative effects framework that links project specific monitoring and mitigation (project specific wildlife effects monitoring program and wildlife and wildlife habitat protection plan) to cumulative effects monitoring and mitigation and ensure there is two-way feedback between the project and cumulative scales
- The implementation of the cumulative effects framework should lead to effective management including best management practices that can be applied at the Project scale
- Report annually on the development, implementation and results of the framework

in a publically accessible manner.

De Beers will:

- Monitor project specific effects (e.g. size of the Zone of influence, changes in habitat, effects of the Winter Access Road on caribou movement and behaviour) and will report to the GNWT and make the results public on how project specific effects contribute to cumulative effects for the duration of the Project.

Suggestion 1

(a) Traditional water uses in Lake N11 (outside of the initial dilution zone) and in all waters downstream of Kennady Lake should not be affected by Gahcho Kué mining activities throughout construction, operation and reclamation of the mine. Post-closure conditions in all waters in the region, including the refilled Kennady Lake, shall support all traditional water uses. Traditional water uses include:

- drinking the water
- harvesting and consuming fish

This means that:

(b) Throughout all project stages (construction, operations, closure and post-closure) the Gahcho Kué Project should be designed and managed by De Beers so that the following water quality objectives in Lake N11 or any waters downstream of Kennady Lake are met:

- water quality changes due to Project activities will not substantially alter the suitability of waterbodies to support viable aquatic ecosystems; and
- water quality changes due to Project activities will not substantially alter fish health, abundance or diversity or impact the ability of traditional users to harvest or consume fish.

(c) De Beers should monitor conditions, including water and sediment quality, during the refilling of Kennady Lake to ensure that conditions are suitable to support aquatic life before re-connecting the lake to the rest of the watershed.

Suggestion 2

During operations, part of closure planning should include the identification of potential mechanisms through which full lake mixing could occur (e.g. weathering, pit wall slumping) and use the results of ongoing investigations and studies to implement measures

such that chemocline stability will be enhanced. Once mining is complete, the information gathered should be used to improve the likelihood that successful pit lake stratification can be achieved over the long-term.

Suggestion #3

During operations, closure planning should identify and develop methods to reduce the period of time required for recovery of the refilled Kennedy Lake.

FOLLOW UP PROGRAM

Objectives

The first objective of the follow-up programs is to test the soundness of the environmental impact review. This means that each follow up program should test:

- the impact predictions;
- effectiveness of De Beers' environmental design features and proposed project mitigations;
- effectiveness of adaptive management proposed by De Beers as part of the Project; and,
- that all of the commitments made during the EIR are followed through and address their intended purposes.

The second objective of the follow-up program is to test the effectiveness of the mitigative or remedial measures imposed as conditions of approval of the Project .

Guiding Principles

- Follow-up monitoring should provide appropriate feedback to operations for modifying or adopting new mitigation designs, policies, and practices.
- Follow-up programs should apply adaptive management principles that effectively link monitoring results to management actions by using action levels and predefined management responses as a starting point to the adaptive management cycle.
- Follow-up programs should apply best practices for mitigation and adopt new best practices as they become available.

Roles and Responsibilities

- Follow-up programs should be developed by the proponent in collaboration with regulatory, community and stakeholder input, and careful consideration of Traditional Knowledge.
- Existing regulatory authorities are responsible for ensuring the follow-up programs are designed and implemented and that they hold the developer accountable for the components of the follow up programs that are the developers' responsibilities.

This should be done through land use permits, water licences, authorizations, and legally binding agreements.

- Governments are responsible for cumulative effects monitoring and management while De Beers is responsible for minimizing and reporting on its contributions to cumulative effects.

Timing and Duration

- Follow-up programs should be developed as soon as possible, following approval of the Project, to maximize consultation between the Developer, Aboriginal parties and responsible authorities and allow for thorough review through the land use permitting and water licencing phase.

Follow-up programs should be conducted through all phases of construction, operation and closure. Intensity of monitoring can change depending on monitoring results and changes to operations.

Specific Requirements for follow-up on valued components

Water and aquatic effects

The Aquatic Effects Monitoring Program should be designed and implemented to meet the requirements for follow-up. As the water licensing authority, the Mackenzie Valley Land and Water Board should ensure that the requirements for follow-up are incorporated into the Water Licence.

The developer should follow the AANDC document entitled *Guidelines for Designing and Implementing Aquatic Effects Monitoring Programs for Development Projects in the Northwest Territories*, June 2009 in the development of its Aquatic Effects Monitoring Program (AEMP), including action levels and the related management response framework. The AEMP should be designed and implemented by the developer and overseen by regulators and should include but is not limited to:

- verifying predictions about aquatic effects due to the Project and revise predictions based on mine operations experience;
- verifying whether narrative water quality objectives outline in Suggestion #1 are being maintained upstream, downstream, and within Kennady Lake as described in this Report and implement mitigations if necessary to ensure water quality objectives are maintained;
- developing and implementing a water management contingency plan that includes contingent water treatment, in the event that water quality is not suitable for discharge during the operations and closure phase. The water management contingency plan should include:
 - using expanded storage capacity in the system with no discharge

- discharging at different times of the year when the water quality allowed
- separating the water sources and sequestering poor water in isolated areas
- maximizing the use of poor quality water in the process plant where the water will ultimately be directed to one of the mined out pits later during mine operations
- removing suspended solids with a combination of flocculants and a settling pond
- increasing the storage capacity of the water management system
- reducing the lake refilling time
- installing a water treatment plant to deal with specific water quality issues;
- monitoring mercury concentrations in edible fish tissue in the raised D-E-N lakes prior to and following raising the lakes and during operations; and
- confirming that there is not a connection with adjacent watersheds after flooding has occurred with Fletcher and Walmsley Lakes and the Hoarfrost River as identified through traditional knowledge by the LKDFN and implement appropriate mitigations if the water quality and quantity objectives are not being met in any adjacent watersheds as a result of the Project.

Fish

Follow-up for changes to water quality and quantity that may affect fish should be incorporated into the Aquatic Effects Monitoring Plan. Through the administration of its authorizations and associated monitoring, the Department of Fisheries and Oceans should take the steps necessary to ensure that the mitigative measures committed to by De Beers throughout the construction, operations and closure phases of the Project are working as planned so fish populations can eventually re-establish in Kennady Lake.

Barren ground caribou and caribou habitat

The GNWT is the primary authority for wildlife, and therefore should ensure that the requirements for follow-up are met through existing licenses, permits, authorizations, or additional agreements, if necessary. As land managers, AANDC and associated regulators should ensure that monitoring and associated feedback to operations for modifying or adopting new mitigation designs, policies, and practices related to wildlife habitat are incorporated into the Land Use Permit and/or Water Licence where appropriate.

The follow up program should include, but is not limited to:

- monitoring the zone of influence and its likely causes (e.g. noise, dust, mine activity) (can be completed as part of the Wildlife Effects Monitoring Program);
- using results from monitoring the extent of the zone of influence and likely causal mechanisms (completed as part of the Wildlife Effects Monitoring Program) to intensify or reduce mitigations that will minimize the zone of influence;

- monitoring the presence of caribou along the winter access road and the effects of the road on caribou movement and behaviour;
- describing action levels that will be used to determine when monitoring or mitigations or changes to existing mitigation are necessary; and
- demonstrating how existing baseline information (such as the caribou trails as a model for likely caribou approaches to the site) and Traditional Knowledge are incorporated in monitoring and management plans.

Other wildlife and species at risk

As described above for caribou, the GNWT is the primary authority for wildlife, and therefore should ensure that the requirements for follow-up are met through existing licenses, permits, authorizations, or additional agreements, if necessary. As land managers, AANDC and associated regulators should ensure that monitoring and associated feedback to operations for modifying or adopting new mitigation designs, policies, and practices that are related to wildlife habitat are incorporated into the Land Use Permit and/or Water Licence where appropriate. Environment Canada should address follow-up for components within its jurisdiction.

A follow-up program is required for both project specific and cumulative impacts to wildlife from the Project. Follow-up can be addressed through the commitment by the developer to prepare and implement a Wildlife Effects Monitoring Program and Wildlife and Wildlife Habitat Protection Plan. Responsible authorities should develop cumulative effects monitoring and management that assesses the contributions of development activities towards cumulative effects, and works towards the management of development-related effects.

The WEMP and the WWHPP must be designed as a follow-up program that:

- is prepared by De Beers prior to mine construction
- addresses recommendations made by GNWT and EC in their technical reports
- is adaptively managed by De Beers during the life of the Project with input from GNWT, EC and Ni Hadi Yati
- contributes to regional cumulative effects monitoring; and
- incorporates information from the regional cumulative effects monitoring into the project specific management of the Gahcho Kué Project.

Socio-economic

The socio-economic agreement between the GNWT and De Beers should satisfy the needs of a follow-up program. The follow up program is required to ensure:

- that the developer's commitments are implemented; and
- that adverse social impacts are not significant.

The follow-up program should:

- include monitoring and reporting by the developer;
- identify gaps;
- help maximize benefits to residents of the NWT; and
- determine if commitments and mitigation measures need to be adapted during the life of the Project

Appendix B: List of public registry documents

This appendix contains a list of documents and corresponding Public Registry documents. Physical copies of these documents are available at the Review Board office. With few exceptions, these documents may be viewed online at the Review Board website (www.reviewboard.ca).

The following abbreviations are used in this appendix:

AEMP	Aquatic effects monitoring program
AIMA	Akaitcho IMA
AANDC	Aboriginal Affairs and Northern Development
DFO	Fisheries and Oceans Canada
DKFN	Deninu Kué First Nation
EIR	Environmental impact review
EC	Environment Canada
EMP	Environmental monitoring program
ENR	Environment and Natural Resources
GNWT	Government of the Northwest Territories
Health Canada	Health Canada
IR	Information request
LKDFN	Łutsel K'e Dene First Nation
LUP	Land use plan
MVEIRB	Mackenzie Valley Environmental Impact Review Board
MVLWB	Mackenzie Valley Land and Water Board
NRCan	Natural Resources Canada
NSMA	North Slave Métis Alliance
NTMN	Northwest Territory Métis Nation
Panel	Gahcho Kué Panel
PC	Parks Canada
Treaty 8	Treaty 8 Tribal Corporation
TC	Transport Canada
ToR	Terms of Reference
WWF	World Wildlife Fund

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PR#	Document Name	Originator	Date
1	EIR judicial review application	De Beers	28-Jul-06
2	Judicial review notification	Panel	03-Aug-06
3	Call for panel member expressions of interest	Panel	26-Jun-06
4	Chamber of mines letter re EIR order	Chamber of mines	20-Jun-06
5	DKFN letter re consultation for Gahcho Kué	DKFN	30-Nov-06
6	Response to Chief Sayine DKFN re Gahcho Kué Consultation	Panel	06-Dec-06
7	NWT Supreme Court decision on judicial review	NWT Supreme Court	04-Apr-07
8	DeBeers letter no appeal	De Beers	13-Apr-07
9	EIR proceeding notification	Panel	24-Apr-07
10	Panel ToR consultation letters	Panel	26-Apr-07
13	Party identification form	Panel	24-Apr-07
14	Draft Panel ToR Gahcho Kué	Panel	24-Apr-07
15	Akaitcho letter re panel ToR consultation	Treaty 8	04-May-07
16	Letter to NWT Treaty 8 Tribal Corp re Gahcho Kué EIR Draft Panel ToR	Panel	08-May-07
17	Letter to Gahcho Kué EIR Distribution List re Draft Panel ToR	Panel	08-May-07
18	WWF comments draft panel ToR	WWF	17-May-07
19	Treaty 8 comments draft panel ToR	Treaty 8	16-May-07
20	NSMA comments draft panel ToR	NSMA	15-May-07
21	Responsible ministers comments draft panel ToR	Minister	18-May-07
22	GNWT letter panel ToR	GNWT	29-May-07
23	EIS Terms of Reference (draft)	Panel	04-Jun-07
24	EIR work plan (draft)	Panel	04-Jun-07
25	Distribution letter EIS ToR and WP	Panel	04-Jun-07
26	Panel Terms of Reference	Panel	13-Jun-07
27	News release EIR Panel appointments	Panel	02-May-07
28	Panel ToR issuance	Panel	12-Jun-07
29	Work plan meeting June 11 participants	Panel	15-Jun-07
30	Work plan meeting notes	Panel	15-Jun-07
30	Schedule	Panel	22-Jun-07
31	Second work plan meeting notes	Panel	26-Jun-07
32	Note to File, NWTMN	Panel	28-Jun-07
33	Letter to MVEIRB re: Consultation between De Beers & Party	NWTMN	28-Jun-07
34	e-mail - Response to Message of June 28 2007	Panel	10-Jul-07
35	Transport Canada ToR comments	TC	11-Jul-07
36	DFO ToR Comments	DFO	11-Jul-07
37	DKFN ToR comments	DKFN	13-Jul-07
38	Environment Canada ToR comments	EC	11-Jul-07

39	GNWT cover letter ToR comments	GNWT	11-Jul-07
39	GNWT ToR Comments	GNWT	11-Jul-07
40	Health Canada ToR comments	Health Canada	11-Jul-07
41	AANDC ToR Comments	AANDC	11-Jul-07
42	De Beers ToR comments	De Beers	16-Jul-07
43	De Beers workplan comments	De Beers	16-Jul-07
44	NRCan ToR comments	NRCan	11-Jul-07
45	Parks Canada ToR comments	PC	11-Jul-07
46	YKDFN ToR comments	YKDFN	12-Jul-07
47	Terms of Reference covering letter	Panel	05-Oct-07
48	Gahcho Kué Terms of Reference	Panel	05-Oct-07
49	De Beers' EIS workshops	De Beers	29-Oct-07
50	De Beers Oct 30 Letter re: EIS submission	De Beers	30-Oct-07
51	Site Visit Presentation File #1	De Beers	30-Oct-07
52	Site Visit Presentation File #2	De Beers	30-Oct-07
52	Site Visit Presentation File#3	De Beers	09-Nov-07
52	Site Visit Presentation File #4	De Beers	09-Nov-07
53	Workshop Update Nov 7-07 De Beers	De Beers	29-Nov-07
54	DKFN Concerns	DKFN	06-Dec-07
55	MVEIRB letter re Tlichó Landtrans winter road	Panel	05-Dec-07
56	Request for Clarification	De Beers	19-Dec-07
57	Letter re: Tlichó Landtrans	De Beers	19-Dec-07
58	Response to De Beers Request for Clarification re: ToR	Panel	24-Jan-08
59	De Beers Letter- EIS Submission Deferred	De Beers	09-May-08
61	De Beers update on submission of EIS	De Beers	08-Dec-08
62	2008 news release on panel composition	Panel	11-Jul-08
63	Correspondence on participant funding during EIA	Panel	16-Sep-08
64	Panel to De Beers re EIS delay May 29 2009	Panel	01-Jun-09
65	June 2009 De Beers progress report on EIS	De Beers	25-Jun-09
66	EIS update from De Beers Aug 20 09	De Beers	20-Aug-09
67	De Beers update- Nov 20 09	De Beers	20-Nov-09
68	Note to File- Temporary Contact Info	Panel	05-Feb-10
69	February 2010 EIS progress update from De Beers	De Beers	19-Feb-10
70	May 2010 EIS progress update from De Beers	De Beers	20-May-10
71	Letter to De Beers re: adjournment	Panel	26-May-10
72	Reasons for Decision - adjournment	Panel	26-May-10
73	Notice to parties re: Panel composition	Panel	27-Sep-10
74	Reasons for Decision re: Panel composition	Panel	27-Sep-10
75	Notice from De Beers re: EIS filing	De Beers	03-Nov-10
76	EIS submission covering letter	De Beers	23-Dec-10

77	Gahcho Kué EIS plain language summary	De Beers	23-Dec-10
78	EIS Section 14: summary and conclusions	De Beers	23-Dec-10
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80	EIS Section 4: Community, Regulatory and Public Engagement	De Beers	23-Dec-10
80	EIS Section 5: Traditional Knowledge	De Beers	23-Dec-10
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80	EIS Section 8: Water Quality and Fish in Kennady Lake	De Beers	23-Dec-10
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80	EIS Section 11.1: Overview of Biophysical Subjects of Note	De Beers	23-Dec-10
80	EIS Section 11.2: Impacts on Great Slave Lake	De Beers	23-Dec-10
80	EIS Section 11.3: Alternative Energy Sources	De Beers	23-Dec-10
80	EIS Section 11.4: Air Quality	De Beers	23-Dec-10
80	EIS Section 11.5: Mine Rock and Processed Kimberlite Storage	De Beers	23-Dec-10
80	EIS Section 11.6: Permafrost, Groundwater and Hydrogeology	De Beers	23-Dec-10
80	EIS Section 11.7: Vegetation	De Beers	23-Dec-10
80	EIS Section 11.8: Traffic and Road Issues	De Beers	23-Dec-10
80	EIS Section 11.9: Waste Management and Wildlife	De Beers	23-Dec-10
80	EIS Section 11.10: Carnivore Mortality	De Beers	23-Dec-10
80	EIS Section 11.11: Other Ungulates	De Beers	23-Dec-10
80	EIS Section 11.12: Species at Risk and Birds	De Beers	23-Dec-10
80	EIS Section 11.13: Climate Change Impacts	De Beers	23-Dec-10
81	Note to File: EIS Distribution Jan 13 2011	Panel	13-Jan-11
82	AANDC letter re: participant funding for Gahcho Kué EIR	AANDC	03-Feb-11
83	French translation of the EIS plain language summary	De Beers	04-Mar-11
84	Deficiency statement	Panel	17-Mar-11
85	Panel Letter- April 12 2011	Panel	12-Apr-11
86	Revised Draft Workplan- Gahcho Kué EIR April 2011	Panel	15-Apr-11
87	Chipewyan translation of EIS summary	De Beers	14-Apr-11
88	Covering letter for deficiency response: Items 2, 4 and 5	De Beers	03-May-11
89	Deficiency response: Items 2, 4 and 5	De Beers	03-May-11
90	NSMA letter re: R. Crapeau	NSMA	06-May-11
91	AANDC letter re: R. Crapeau	AANDC	03-May-11
92	DFO comments on workplan	DFO	06-May-11

93	NRCan comments on draft workplan	NRCan	06-May-11
94	AANDC comments on draft workplan	AANDC	06-May-11
95	De Beers comments on draft workplan	De Beers	06-May-11
96	EC comments on draft workplan	EC	06-May-11
97	NSMA comments on draft workplan	NSMA	06-May-11
98	YKDFN comments on draft workplan	YKDFN	06-May-11
99	Tlicho comments on draft workplan	TG	11-May-11
100	Panel letter to parties re: workplan	Panel	24-May-11
101	AANDC letter to Panel re: participant funding	AANDC	27-Jun-11
102	AANDC letter to distribution list re: participant funding	AANDC	27-Jun-11
103	Participant funding guide and application form	AANDC	27-Jun-11
104	Conformity review response cover letter	De Beers	15-Jul-11
105	Response to March 17th Def statement from DeBeers Item 3	De Beers	15-Jul-11
106	Section_8_Part_1_Combined_2011_Conformity_Respsns_15Jul11	De Beers	15-Jul-11
106	Section_8_Part_2_Combined_2011_Conformity_Respsns_15Jul11	De Beers	15-Jul-11
106	Section_8_Part_3_Combined_2011_Conformity_Respsns_15Jul11	De Beers	15-Jul-11
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106	Section_8_Part_5_Combined_2011_Conformity_Respsns_15Jul11	De Beers	15-Jul-11
106	Section_8_Part_6_Combined_2011_Conformity_Respsns_15Jul11	De Beers	15-Jul-11
106	Section_8_Part_7_Combined_2011_Conformity_Respsns_15Jul11	De Beers	15-Jul-11
106	Section_9_Part_1_Combined_2011_Conformity_Respsns_15Jul11	De Beers	15-Jul-11
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106	Section_9_Part_3_Combined_2011_Conformity_Respsns_15Jul11	De Beers	15-Jul-11
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106	Appendix_8.I_WQ_Model_2011_Conformity_Respsns_15Jul11	De Beers	15-Jul-11
106	Appendix_8.II_ML-ARD_Part_1_2011__Conformity_Respsns_15Jul11	De Beers	15-Jul-11
106	Appendix_8.II_ML-ARD_Part_2_2011__Conformity_Respsns_15Jul11	De Beers	15-Jul-11
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106	Appendix_8.IV_CEB_2011_Conformity_Respsns_15Jul11	De Beers	15-Jul-11
106	Appendix_8.V_DO_2011_Conformity_Respsns_15Jul11	De Beers	15-Jul-11
106	Appendix_9.I_2011_Conformity_Respsns_15Jul11	De Beers	15-Jul-11
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107	EIS Summary: Tlicho translation	De Beers	05-Jul-11
108	Gahcho Kué EIR workplan	Panel	26-Jul-11
109	Workplan covering letter	Panel	26-Jul-11
110	Letter to De Beers: EIS conformity	Panel	26-Jul-11

111	DKFN letter to De Beers	DKFN	11-Aug-11
112	AANDC letter to DKFN re consultation Sept. 14 2012	AANDC	14-Sep-11
113	Participant funding allocations	AANDC	21-Sep-11
114	Letter to parties re: EIS analysis session	Panel	31-Oct-11
115	Letter to parties: past work on Gahcho Kué by EBA	Panel	04-Nov-11
116	Letter to parties- new dates and venue for EIS sessions	Panel	10-Nov-11
117	Agenda- GK EIS analysis sessions	Panel	14-Nov-11
118	EIS analysis session- remote participation	Panel	14-Nov-11
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124	EIS Analysis Session - Day3, Air Quality and Terrestrial	De Beers	24-Nov-11
125	EIS Analysis Session - Days 4 & 5 Aquatics	De Beers	25-Nov-11
126	Regulatory meetings - May to Oct 2011	De Beers	28-Nov-11
126	Regulatory meetings May to Oct 2011 - cover letter	De Beers	28-Nov-11
127	EIS Analysis Session - updated presentation Days 4 & 5 Aquatics	De Beers	02-Dec-11
128	Party status update and instructions	Panel	05-Dec-11
129	Information request instructions	Panel	06-Dec-11
130	Transcripts EIS Analysis Session Day 1, Nov 28	Panel	06-Dec-11
130	Transcripts EIS Analysis Session Day 2, Nov 29	Panel	06-Dec-11
130	Transcripts EIS Analysis Session Day 3, Nov 30	Panel	06-Dec-11
130	Transcripts EIS Analysis Session, Day 4, Dec 1	Panel	06-Dec-11
130	Transcripts EIS Analysis Session Day 5, Dec 2	Panel	06-Dec-11
130	EIS Transcripts - Table of Contents	Panel	19-Dec-11
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132	Party status update	Panel	20-Dec-11
133	De Beers Canada letter to Deninu Kué First Nations	De Beers	11-Oct-11
134	De Beers Canada and GNWT meeting notes	De Beers	17-Jan-12
135	IR reminder and correction on De Beers contact email	Panel	18-Jan-12
136	NRCan information requests to De Beers Canada	NRCan	18-Jan-12
137	YKDFN information requests to De Beers Canada	YKDFN	18-Jan-12
138	Lutsel K'e Information requests	LKDFN	18-Jan-12
139	Panel information requests to De Beers Canada	Panel	18-Jan-12
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141	AANDC information requests to De Beers Canada	AANDC	18-Jan-12
142	Parks Canada information requests to De Beers Canada	PC	18-Jan-12
143	Tlichó Government information requests to De Beers	TG	18-Jan-12
144	Transport Canada information requests to De Beers	TC	18-Jan-12

145	GNWT information requests to De Beers	GNWT	18-Jan-12
146	Environment Canada information requests to De Beers	EC	18-Jan-12
146	EC cover letter for information requests	EC	18-Jan-12
147	DFO and EC information requests to De Beers	DFO/EC	18-Jan-12
147	DFO cover letter for information requests	DFO	18-Jan-12
148	GNWT letter to De Beers regarding social programs	GNWT	18-Jan-12
149	Deninu Kué information requests to De Beers	DKFN	18-Jan-12
150	NSMA information requests to De Beers	NSMA	18-Jan-12
151	Tlicho Government information requests part 2 to De Beers	TG	18-Jan-12
152	GNWT IR Response from January 18th, 2012 Panel Requests	GNWT	02-Mar-12
153	GNWT IR Response #20 Gahcho Kué Project	GNWT	09-Mar-12
154	Project update and proposed technical meetings	Panel	20-Mar-12
155	Supplemental monitoring cover letter to MVRB	De Beers	16-Mar-12
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155	Fish and aquatic resources supplemental monitoring	De Beers	16-Mar-12
155	Lower trophic organisms supplemental monitoring	De Beers	16-Mar-12
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156	IR responses to Parks Canada	De Beers	30-Mar-12
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158	IR responses to EC and GNWT	De Beers	02-Apr-12
159	IR responses to NSMA	De Beers	02-Apr-12
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162	IR responses to GNWT	De Beers	03-Apr-12
163	IR responses to Gahcho Kué Panel	De Beers	04-Apr-12
164	IR responses to Lutsel K'e Dene First Nation	De Beers	04-Apr-12
165	IR responses to Environment Canada	De Beers	04-Apr-12
166	IR responses to NRCan	De Beers	05-Apr-12
167	IR responses to DKFN	De Beers	05-Apr-12
168	IR responses to AANDC Part1 (IR#1-14)	De Beers	06-Apr-12
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170	IR responses to AANDC Part3 (IR#16-22)	De Beers	06-Apr-12
171	IR responses to AANDC Part4 (IR#23)	Panel	06-Apr-12
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173	IR responses to AANDC Part6 (IR#23 Figs 2 of 2)	De Beers	06-Apr-12
174	IR responses to YKDFN	De Beers	05-Apr-12
175	IR responses to Tlicho Government	De Beers	06-Apr-12
176	IR responses to DFO and EC Part1 (IR#1-4)	De Beers	06-Apr-12
177	IR responses to DFO and EC Part2 (IR#5-26)	De Beers	06-Apr-12

178	IR responses to DFO and EC Part3 (IR#26_App Fig1)	De Beers	06-Apr-12
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180	IR responses to NRCan Part 1 Appendices	De Beers	05-Apr-12
181	IR responses to NRCan Part 2 Appendices	De Beers	05-Apr-12
182	IR responses to NRCan Part 3 Appendices	De Beers	05-Apr-12
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184	2012 EIS Supplement - Part 02 - Pg 3-23 to 7-3	De Beers	23-Apr-12
184	2012 EIS Supplement - Part 03 - Pg 8-1 to 8-40	De Beers	23-Apr-12
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184	2012 EIS Supplement - Part 07 - Pg 10-1 to 16-11	De Beers	23-Apr-12
184	2012 EIS Supplement - Part 08 - App 8-I and 8-II to Attach 8-II-1	De Beers	23-Apr-12
184	2012 EIS Supplement - Part 09 - App 8-II Attach 8-II-2 to 8-III-3-1of2	De Beers	23-Apr-12
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187	Technical meeting draft agenda and meeting format	Panel	26-Apr-12
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189	GNWT economic impact analysis submission May 2012	GNWT	01-May-12
190	DFO review of the Gahcho Kué Project	DFO	02-May-12
191	LKDFN letter regarding technical sessions	LKDFN	03-May-12
192	EIS supporting documents located on ftp site	Panel	04-May-12
193	NPMO - suggestions regarding technical session	NPMO	04-May-12
194	GNWT suggestions regarding technical session	GNWT	04-May-12
195	De Beers suggestions on technical session	De Beers	04-May-12
196	GK Project Fish Tissue Chemistry Memo	De Beers	05-May-12
197	Tech Memo Geothermal Model GK (AANDC_22 Question 3)	De Beers	05-May-12
198	Technical meeting agenda, May 22-25 - final	Panel	07-May-12
199	Webcast instructions for technical meeting	Panel	17-May-12
200	TC - information request response feedback	TC	17-May-12
201	Aerodrome Standards and Recommended Practices - TP 312	TC	17-May-12
202	Minor Waters User Guide - Transport Canada	TC	17-May-12
203	DeBeers EMMF Presentation for May 2012 Technical Session	De Beers	22-May-12
204	Environmental monitoring & management framework document	De Beers	22-May-12
205	IR response on groundwater chemistry data- 23 May 2012	De Beers	23-May-12
206	Sediment re-suspension modelling report May 23 2012	De Beers	23-May-12

207	GNWT ECE socio-economic presentation - technical session	GNWT	24-May-12
208	GNWT ITI socio-economic presentation - technical session	GNWT	24-May-12
209	Canada WQ Guidelines for Aquatic Life - Phosphorus	De Beers	23-May-12
210	Information requests 2nd round - parties to suggest topics	Panel	28-May-12
211	Water level station map with watersheds	AIMA	24-May-12
212	Gahcho Kué technical sessions May 22 Transcripts	Panel	28-May-12
213	Gahcho Kué technical sessions May 23 - Transcripts	Panel	28-May-12
214	Gahcho Kué technical sessions May 24 - Transcripts	Panel	28-May-12
215	Gahcho Kué technical sessions May 25 - Transcripts	Panel	28-May-12
216	Undertakings and commitments from technical meeting	Panel	29-May-12
217	EIS 2012 Supplement presentation from De Beers - tech meeting	De Beers	22-May-12
218	Meeting record on wildlife monitoring plan May 25, 2012	De Beers	01-Jun-12
219	DFO topics for information request round 2	DFO	05-Jun-12
220	YKDFN topics for information request round 2	YKDFN	05-Jun-12
221	GNWT topics for information requests round 2	GNWT	05-Jun-12
222	TC topic for information request round 2	TC	05-Jun-12
223	NRCan topics for information requests round 2	NRCan	06-Jun-12
224	Undertaking #4 from tech session - AANDC response	AANDC	05-Jun-12
225	EC topics for information requests round 2	EC	06-Jun-12
226	Lutsel K'e topics for information requests round 2	LKDFN	06-Jun-12
227	TG topics for information request round 2	TG	07-Jun-12
228	NSMA topics for information requests round 2	NSMA	08-Jun-12
229	Undertaking #1 from tech session - De Beers response	De Beers	08-Jun-12
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231	Undertaking #1 Figure 2	De Beers	08-Jun-12
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233	Undertaking #2 from tech session - De Beers response	De Beers	08-Jun-12
234	Undertaking #5 from tech sessions - De Beers response	De Beers	08-Jun-12
235	Undertaking #3 from tech sessions - AIMA response	AIMA	08-Jun-12
236	De Beers Canada response to June 4 letter from YKDFN	De Beers	11-Jun-12
237	Second round of focused information requests	Panel	13-Jun-12
238	Gahcho Kué Community Engagement Update Report Part 1	De Beers	14-Jun-12
238	Gahcho Kué Community Engagement Report Appendix A B Part 2	De Beers	14-Jun-12
238	Gahcho Kué Community Engagement Report Appendix C(a) Part 3	De Beers	14-Jun-12
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238	Gahcho Kué Community Engagement Report Appendix E(a) Part 6	De Beers	14-Jun-12
238	Gahcho Kué Community Engagement Report Appendix E(b) and Appendix (F) Part 7	De Beers	14-Jun-12
239	Letter from De Beers re wmp working group	De Beers	15-Jun-12

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240	Part 2 of Detailed Alternatives Analysis Report Fig 1-3	De Beers	18-Jun-12
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240	Part 17 of Detailed Alternatives Analysis Report Appendix A Fig A1	De Beers	18-Jun-12
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240	Part 20 of Detailed Alternatives Analysis Appendix A Fig A4	De Beers	18-Jun-12
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242	Letter from NWTMN to De Beers Canada	NWTMN	19-Jun-12
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244	Detailed Alternatives Analysis Report	De Beers	18-Jun-12
245	TC information request guidance - impacts to navigation	TC	21-Jun-12
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248	Note to File for Re: availability of document	Panel	25-Jun-12
249	Gahcho Kué fish habitat compensation plan - update	De Beers	29-Jun-12
250	Cover letter from De Beers on reports and memos for submission	De Beers	29-Jun-12
251	Second round focused information requests due July 16	Panel	29-Jun-12
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253	Gahcho Kué technical memorandum regarding objectives for water quality and sediment quality	De Beers	29-Jun-12

254	June 2012 flow mitigation plan for the Gahcho Kué Project	De Beers	29-Jun-12
255	Letter from Transport Canada regarding discussions with De Beers	TC	06-Jul-12
256	WMP working group - letter from De Beers Canada	De Beers	09-Jul-12
257	NRCAN round 2 Information requests	NRCAN	11-Jul-12
258	Transport Canada round 2 information requests	TC	16-Jul-12
259	Environment Canada round 2 information requests	Panel	16-Jul-12
260	Letter from TC to De Beers regarding sec 23 NWPA	TC	16-Jul-12
261	DFO round 2 information requests	DFO	16-Jul-12
262	LKDFN round 2 information requests	LKDFN	16-Jul-12
263	GNWT round 2 information requests	GNWT	16-Jul-12
264	YKDFN round 2 information requests	YKDFN	16-Jul-12
265	Tlicho Government round 2 information requests	TG	16-Jul-12
266	AANDC round 2 information requests	AANDC	19-Jul-12
267	Second round IR response due date Sept 13, 2012	Panel	23-Jul-12
268	Gahcho Kué EIS IR 2 DKFN submission July 18, 2012	DKFN	18-Jul-12
269	Responses to NRCAN IRs - round 2	De Beers	09-Aug-12
270	AKFN letter to DFO re fish habitat compensation plan	AKFN	10-Aug-12
271	Tlicho Traditional Knowledge Study	TG	10-Aug-12
272	Gahcho Kué, Next steps, Aug 10 to Dec 7, 2012	Panel	15-Aug-12
273	De Beers response to NWT Treaty #8 re fish habitat comp plan	De Beers	15-Aug-12
274	Letter from LKDFN re public hearing locations	LKDFN	31-Aug-12
275	DFO-De Beers records of meetings for fish habitat compensation	De Beers	29-Aug-12
276	De Beers re hearing location and LKDFN request	De Beers	07-Sep-12
277	Responses to GNWT IRs round 2	De Beers	07-Sep-12
278	WMP workshop invitation - Sept 18, 2012	De Beers	10-Sep-12
279	Responses to Environment Canada IRs second round	De Beers	10-Sep-12
280	Letter from the Panel to LKDFN re hearing locations	Panel	11-Sep-12
281	Gahcho Kué human resource strategy	De Beers	12-Sep-12
282	Gahcho Kué human resource strategy cover letter	De Beers	12-Sep-12
283	Responses to DKFN IRs - round 2	De Beers	13-Sep-12
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285	Responses to DFO IRs - round 2	De Beers	13-Sep-12
286	Responses to YKDFN IRs - round 2	De Beers	13-Sep-12
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288	Responses to TC IRs - round 2	De Beers	13-Sep-12
289	GNWT response to Tlicho Government TG IR 3	GNWT	13-Sep-12
290	Responses to AANDC IRs - round 2	De Beers	13-Sep-12
291	AANDC response to Tlicho Government IR TG-4	AANDC	14-Sep-12
292	WQO and SQO - IR2 responses from De Beers	De Beers	14-Sep-12
293	Note to file, technical report submission deadline, Oct 22, 2012.	Panel	17-Sep-12

294	DFO response to Tlicho Government TG IR 6	DFO	17-Sep-12
295	LKDFN letter to GK Panel re public hearing location	LKDFN	17-Sep-12
296	EC response to Tlicho Government TG IR 5	EC	18-Sep-12
297	Air Quality Assessment Update - Main Report	De Beers	28-Sep-12
298	Air Quality Assessment Update - Appendix I	De Beers	28-Sep-12
299	Air Quality Assessment Update - Appendix II	De Beers	28-Sep-12
300	Road Dust Emission Study - De Beers Canada	De Beers	28-Sep-12
301	2012 EIS Supplement errata Table 8.II.3	De Beers	28-Sep-12
302	Response to TC on Navigable Waters Info (Part 1 of 3)	De Beers	02-Oct-12
303	Response to TC on Navigable Waters Info (Part 2 of 3)	De Beers	02-Oct-12
304	Response to TC on Navigable Waters Info (Part 3 of 3)	De Beers	02-Oct-12
305	Human health risk assessment	De Beers	04-Oct-12
306	Wildlife ecological risk assessment	De Beers	04-Oct-12
307	Wildlife monitoring plan - Part 1 October 2012	De Beers	04-Oct-12
308	Wildlife monitoring plan - Part 2 October 2012	De Beers	04-Oct-12
309	Response to TC on Navigable Waters Info-Technical Memo	De Beers	04-Oct-12
310	Wildlife monitoring plan - Part 3 October 2012	De Beers	04-Oct-12
311	Draft fish out plan October 2012	De Beers	04-Oct-12
312	Letter from the Panel to LKDFN re hearing location	Panel	09-Oct-12
313	Panel's request for Traditional Knowledge reports	Panel	09-Oct-12
314	Note to File - Final Gahcho Kué hearing dates and locations	Panel	09-Oct-12
315	Letter to parties regarding TK study submission dates	Panel	09-Oct-12
316	Gahcho Kué flow mitigation: field report and assessment 2012	De Beers	12-Oct-12
317	De Beers 2012 NWT Scholarship	De Beers	17-Oct-12
318	Incinerator management plan	De Beers	18-Oct-12
319	Cover letter for incinerator plan and air quality plan	De Beers	18-Oct-12
320	Air quality plan	De Beers	18-Oct-12
321	GNWT - De Beers meeting report with commitments	GNWT	19-Oct-12
322	DFO technical report cover letter	DFO	22-Oct-12
323	DFO technical report	DFO	22-Oct-12
324	TC technical report	TC	22-Oct-12
325	AANDC technical report	AANDC	22-Oct-12
326	LKDFN technical report	LKDFN	22-Oct-12
327	DKFN technical report	DKFN	22-Oct-12
328	NRCan technical report	NRCan	22-Oct-12
329	YKDFN technical report	YKDFN	22-Oct-12
330	NSMA technical report	NSMA	22-Oct-12
331	Pre-hearing conference invitation and agenda - Nov 1st	Panel	23-Oct-12
332	Tlicho Government technical report	TG	23-Oct-12
333	EC technical report	EC	22-Oct-12

334	GNWT technical report	GNWT	25-Oct-12
335	Meeting Minutes GNWT - De Beers	GNWT	26-Oct-12
336	DRAFT Gahcho Kué hearing agenda	Panel	29-Oct-12
337	2012 Job description booklet	De Beers	01-Nov-12
338	Wildlife monitoring workshop summary	De Beers	02-Nov-12
339	Akaitcho IMA request for presentation at hearing	AIMA	02-Nov-12
340	Technical report responses NRCAN	De Beers	08-Nov-12
341	Technical report responses TC	De Beers	08-Nov-12
342	Technical report responses TG	De Beers	08-Nov-12
343	Pre-hearing conference minutes, Nov 1, 2012.	Panel	01-Nov-12
344	Technical report responses - LKDFN	De Beers	08-Nov-12
345	Technical report responses YKDFN	De Beers	08-Nov-12
346	Technical report responses GNWT	De Beers	09-Nov-12
347	Technical report responses AANDC	De Beers	09-Nov-12
348	Technical report responses EC	De Beers	09-Nov-12
349	Hearing directive - procedures	Panel	09-Nov-12
350	Gahcho Kué hearing agenda	Panel	09-Nov-12
351	Water Survey of Canada - Monitoring Water Downstream of Gahcho Kué	De Beers	13-Nov-12
352	Technical report responses DFO	De Beers	13-Nov-12
353	Technical report responses DKFN	De Beers	13-Nov-12
354	Technical report responses NSMA	De Beers	13-Nov-12
355	2012 Draft No-Net-Loss Plan Part 1	De Beers	13-Nov-12
356	2012 Draft No-Net-Loss Plan Part 2	De Beers	13-Nov-12
357	2012 Draft No-Net-Loss Plan Part 3	De Beers	13-Nov-12
358	2012 Draft No-Net-Loss Plan Part 4	De Beers	13-Nov-12
359	Northern public affairs blog submitted by Akaitcho IMA Implementation Office	AIMA	08-Nov-12
360	Cover letter for 2012 Draft No-Net-Loss Plan	De Beers	13-Nov-12
361	De Beers response to DFO Technical Report Recommendation	De Beers	19-Nov-12
362	Independent Environmental Oversight Report - submitted by YKDFN	YKDFN	19-Nov-12
363	Economic and Labour Force Implications For Resource Developments Scenarios	De Beers	20-Nov-12
364	Plain language summaries cover letter	De Beers	20-Nov-12
365	EIS update plain language summary Chipewyan	De Beers	20-Nov-12
366	EIS update plain language summary English	De Beers	20-Nov-12
367	EIS update plain language summary French	De Beers	20-Nov-12
368	EIS update plain language summary Tlicho	De Beers	20-Nov-12
369	NRCAN presentation	NRCAN	20-Nov-12
370	CVs of Gahcho Kue Panel technical advisors	Panel	20-Nov-12
371	Resource development scenarios technical memorandum	De Beers	20-Nov-12

372	YKDFN presentation	YKDFN	20-Nov-12
373	AANDC presentation	AANDC	20-Nov-12
374	Northwest Territory Metis Nation TK Summary	NWTMN	20-Nov-12
375	Draft joint presentation from Aboriginal parties and De Beers	De Beers	20-Nov-12
376	De Beers community presentation	De Beers	20-Nov-12
377	De Beers public hearing presentation	De Beers	20-Nov-12
378	DFO presentation	DFO	20-Nov-12
379	North Slave Metis Alliance Presentation	NSMA	20-Nov-12
380	LKDFN presentation	LKDFN	20-Nov-12
381	Community Engagement Update Report Part 1	De Beers	20-Nov-12
382	Community Engagement Update Report Part 2	De Beers	20-Nov-12
383	Community Engagement Update Report Part 3	De Beers	20-Nov-12
384	Community Engagement Update Report Part 4	De Beers	20-Nov-12
385	Tlicho Government presentation	De Beers	20-Nov-12
386	GNWT presentation	GNWT	20-Nov-12
387	CV of Kim Poole technical advisor to YKDFN	YKDFN	19-Nov-12
388	TC presentation	TC	21-Nov-12
389	CVs of De Beers technical advisors	De Beers	22-Nov-12
390	EC presentation	EC	22-Nov-12
391	EC cover letter for presentation	EC	22-Nov-12
392	DKFN presentation	DKFN	22-Nov-12
393	Hearing transcripts Nov 30, 2012 – Dettah	Panel	30-Nov-12
394	Hearing transcripts Dec 3, 2012 – Lutsel K'e	Panel	03-Dec-12
395	Undertaking #1 - AANDC List of CIMP Bathurst Caribou Herd Projects	AANDC	06-Dec-12
396	Hearing transcripts Dec 5, 2012 - Yellowknife	Panel	06-Dec-12
397	LKDFN presentation shown at Dec 7 public hearing	LKDFN	07-Dec-12
398	Joint presentation by aboriginal groups and De Beers	Parties/De Beers	05-Dec-12
399	Hearing directive - post-hearing filing dates	De Beers	10-Dec-12
400	NSMA presentation shown at Dec 6 public hearing	NSMA	06-Dec-12
401	Undertaking #3 - GNWT barren ground caribou range	GNWT	11-Dec-12
402	Hearing transcripts Dec 6, 2012 - Yellowknife	Panel	11-Dec-12
403	Hearing transcripts Dec 7, 2012 Yellowknife	Panel	11-Dec-12
404	NSMA presentation shown at Dec 6 public hearing	NSMA	06-Dec-12
405	Undertaking #3 part 2 - GNWT cumulative effects demonstration	GNWT	14-Dec-12
406	Undertaking #2 - De Beers commitments table	De Beers	14-Dec-12
407	YKDFN closing statement	YKDFN	18-Dec-12
408	NRCan closing statement	NRCan	20-Dec-12
409	GNWT closing statement	GNWT	20-Dec-12
410	LKDFN closing statement	LKDFN	21-Dec-12
411	TC closing statement	TC	21-Dec-12

412	AANDC closing statement	AANDC	21-Dec-12
413	DFO closing statement	DFO	21-Dec-12
414	NSMA closing statement	NSMA	21-Dec-12
415	NSMA interim TK report	NSMA	21-Dec-12
416	Tlicho Government closing statement	TG	21-Dec-12
417	Ni Hadi Yati - joint submission	Parties/De Beers	21-Dec-12
418	DKFN Ethno-history Report Part 2 p. 241-435	DKFN	21-Dec-12
419	DKFN closing statement	DKFN	21-Dec-12
420	DKFN Ethno-history report [Part 1 p. 1-240]	DKFN	21-Dec-12
421	EC closing statement	EC	21-Dec-12
422	TK report submission from LKDFN - confidential cover	LKDFN	24-Dec-12
423	De Beers Canada closing argument	De Beers	31-Dec-12
424	Closure of the public record	Panel	03-Jan-13

Appendix C: List of Commitments

Throughout the EIR process the developer made commitments in response to the parties' recommendations and to clarify the design and implementation of the Project. These commitments were summarized by the developer as an undertaking during the public hearing (PR#406) which is presented here (Table C-1). Additional commitments, which are not stated explicitly in the Developer's commitment table, are summarized in Table C-2 for clarity and to recognize that these commitments, as well as those identified by the developer were considered as part of the Project during the Panel's analysis. All commitments made throughout the EIR are considered part of the scope of development.

Table C- 8: List of commitments from the developer (PR#406).

Commitment Description	Documents/Public Hearings
Socio Economic Commitments - Agreement with GNWT	
De Beers will enter into a Socio Economic Agreement with the Government of the Northwest Territories which will be for the benefit of the entire population of the Northwest Territories.	Technical Report Responses (November 2012) GNWT 18
Socio Economic Commitments – Employment, Education and Training	
<p>De Beers commits to recruiting and employing as many Aboriginal and Northwest Territories (NWT) residents as possible, building on our current experience with recruitment, training and development and retention strategies already implemented for the Snap Lake Mine.</p> <p>De Beers has established hiring priorities.</p> <p>De Beers will have pick-up locations and travel allowances such that these optimize the employment of NWT residents.</p> <p>Maintain a 1-800 Number in the NWT for employment information and job opportunities.</p> <p>De Beers will offer incentives to assist Project employees who live in the Northwest Territories, including establishing and implementing northern benefits and relocation packages.</p> <p>De Beers will implement the <i>Gahcho Kué Human Resources Strategy</i>.</p> <p>De Beers will collaborate with the Government of the Northwest Territories (GNWT), Aboriginal communities and others on initiatives to plan, design and coordinate the delivery of education and literacy, pre-employment and on-the-job training, skill development, professional development and other related education and training programs and services that support and inform northern labour market and that enable participants to further improve their qualifications towards employment.</p> <p>During the life of the Project, De Beers commits to supporting training positions at the Project. These will include apprenticeships, trades training positions and the development of professional occupations.</p> <p>De Beers will ensure there is adequate space on the Company’s premises to pursue and successfully complete the training programs for site-based employees and contractors. An on-site learning centre will be equipped and resourced with computers and a learning centre resource library.</p> <p>Provide Financial Management Training</p> <p>Promoting the participation of women in the workforce and providing scholarships for female students attending college and/or university</p> <p>Establishing a mine orientation program for all new employees</p> <p>De Beers, through its tendering and contracting process will:</p> <ul style="list-style-type: none"> • Require all Contractors to outline in their bids, a plan to hire and develop Aboriginal and NWT Resident employees in accordance with De Beers’ Hiring Priorities; • Include in the bid evaluation an assessment of the Contractors’ plan for the above; • Incorporate into the contract document for the successful bidder, commitments to report on the employment data required by De Beers to provide the Project hiring and employment information by Hiring Priority, heritage and gender. 	<p>2010 EIS Section 12 (December 2010)</p> <p>1st Round Information Request Responses (April 2012) TG 18, 35</p> <p>Technical Report Responses (November 2012) GNWT 9, 10, 12 NSMA 5c, 11 TG 6, 8 YKDFN 13</p>
Socio Economic Commitments - Procurement and Business Development	
<p>De Beers commits to source its procurement needs from NWT and Aboriginal businesses as much as possible for the Project and to working in collaboration to help them pursue new business opportunities with the Project.</p> <p>Develop a flexible contracting approach by size and scope to match the capacity of Aboriginal businesses and NWT businesses where feasible and share business-related expertise with industry contracts to support NWT min-related business initiatives;</p> <p>De Beers will inform Aboriginal and NWT Businesses of its business opportunities first, as a measure to assist them to prepare for competitive bids.</p> <p>De Beers has established and will maintain a position with the key role and responsibility of working with NWT and Aboriginal Businesses.</p> <p>De Beers will maintain its NWT Business Policy.</p>	<p>2010 EIS Section 12 (December 2010)</p> <p>Technical Report Responses (November 2012) GNWT 15, 16</p>

Commitment Description	Documents/Public Hearings
Socio Economic Commitments – Health, Wellness and Culture	
<p>De Beers will coordinate and welcome special site visits with Aboriginal leaders</p> <p>De Beers will provide a comprehensive benefits plan to all its employees (plan concerns services to assist with family issues, work performance, career development and general health and wellness)</p> <p>De Beers will work with the GNWT and Aboriginal communities to promote cultural preservation, sustainability and traditional language use and will support Cultural events in communities</p> <p>With sufficient notice and flexibility in their rotation schedule, De Beers will provide opportunities for employees who wish to be engaged in traditional activities;</p> <p>De Beers will provide financial or in-kind support for local cultural programming, language support programs and/or on-the-land programming in communities</p> <p>De Beers will provide and maintain space at the mine site for spiritual and cultural pursuits</p> <p>De Beers will provide core policies in Chipewyan, Tâîchô, as well as in French and English</p> <p>De Beers will offer drug and alcohol programming</p> <p>De Beers will provide cross-cultural training for northern Aboriginal and non-Aboriginal workers</p> <p>De Beers will provide family counselling services for mine employees and their families.</p> <p>De Beers will include among its benefits an employee volunteer incentive program</p> <p>De Beers will collaborate with GNWT and NWT communities to disseminate information to employees and in communities related to awareness prevention areas such as: substance abuse, sexually-transmitted infections, and family violence.</p> <p>De Beers commits to work with the Tâîchô Government and with the Tâîchô Community Services Agency to learn about the alternative services and programs that the Tâîchô Government or its service agencies offer for on-the-land counselling programs and to adaptively manage opportunities in the area of health, education and social services that enhance the ability of Tâîchô citizens to participate successfully in the Project.</p> <p>De Beers commits making information regarding alternative services and programs of Tâîchô Government or its service agencies available to its Employee Assistance Program (EAP) provider.</p> <p>De Beers will make information available on site to its employees regarding its EAP and will ensure toll-free access to the EAP service provider both on and off site.</p> <p>De Beers will implement the health and wellness commitments made to GNWT and filed on the public registry on October 19, 2012</p>	<p>2010 EIS Section 12 (December 2010)</p> <p>GNWT De Beers Meeting Commitments Submitted to the Panel on October 19, 2012</p> <p>Technical Report Responses (November 2012)</p> <p>GNWT 13</p> <p>NSMA 7, 9</p> <p>TG 7, 9</p>
Socio Economic Commitments – Reporting	
<p>De Beers commits to report publicly on the following with respect to recruitment and employment and procurement outcomes:</p> <ul style="list-style-type: none"> • Hiring by Hiring Priority and job category in total numbers and percentage of total hires. • Hiring by NWT community in total numbers and percentage of total hires • Total employment in person years by hiring priority and job category in total numbers and percentage of the workforce • Total employment in person years by NWT community in total numbers and percentage of the workforce • Participation in and results of training activities undertaken by the company to increase NWT and Aboriginal employment in the Project • Report on the gross value of goods and services purchased annually through or from NWT and Aboriginal Businesses. • De Beers will report annually regarding the number of current and cumulative placements in training positions by hiring priority. • De Beers will upgrade its existing socio economic tracking systems, established for the Snap Lake Mine, to incorporate annual tracking and reporting for the Project. The upgrade will be completed upon receipt of permits to proceed and will build on its existing operations, procedures and systems, and current reporting processes it has 	<p>2011 EIS Update Section 10 (July 2011)</p> <p>Technical Report Responses (November 2012)</p> <p>GNWT 9, 10, 12, 13, 15</p> <p>NSMA 4c, 6a,c</p>

Commitment Description	Documents/Public Hearings
<p>already established with Aboriginal communities.</p> <p>De Beers will monitor and report on the outcomes of its programs and initiatives identified and committed to in the Gahcho Kué Project Human Resource Strategy.</p> <p>De Beers, through its tendering and contracting process will require its contractors to provide all relevant information to allow for reporting on hiring and employment according to the Hiring Priorities by incorporating into the contract document for the successful bidder, commitments to report on the employment data required by De Beers to provide the Project hiring and employment information by Hiring Priority, heritage and gender.</p> <p>De Beers will also work with its contractors to obtain information annually regarding their training with respect to training and apprenticeships for NWT Residents. This information will be included in the annual report produced by De Beers.</p> <p>De Beers will report on activities related to promote cultural preservation, sustainability and traditional language use in its annual report.</p> <p>De Beers will review with the NSMA how best to incorporate their cultural activities in the company's annual reporting.</p>	
Socio Economic Commitments - Adaptive Management	
<p>De Beers will meet with the GNWT to review annual report results, to discuss challenges and to identify opportunities for collaboration to overcome those challenges or to optimize NWT resident participation in the Project</p> <p>De Beers commits to meet with Aboriginal groups annually, throughout the life of the Project, to review and discuss socio-economic results and report, including reports produced by De Beers that are specific to the Aboriginal communities participation in the Project, seeking input from communities</p> <p>Meet at least annually with contractors to review their performance, including their success in contributing to the employment of Aboriginal and NWT residents and to discuss ways to work together to grow Aboriginal and NWT Resident participation in the Project.</p> <p>De Beers NWT Business Policy will apply to the Project.</p>	<p>Technical Report Responses (November 2012) GNWT 10, 15, and 16 NSMA 2a,c,d and 6b</p>
Socio Economic Commitments - Closure	
<p>In the case of temporary closure, De Beers will, where operationally feasible, collaborate with the GNWT so the GNWT can optimize its preparedness for NWT resident employees affected by a temporary closure.</p> <p>With respect to permanent closure, De Beers will meet legislative requirements and collaborate with the GNWT leading up to permanent closure to ease employee transition to new jobs.</p> <p>De Beers will continue to engage Aboriginal Communities regarding the Project during all phases and will discuss employee transition to new jobs leading up to permanent closure as part of its engagement process.</p> <p>Three years prior to Closure, De Beers will undertake a study to assess the effects of closure to assist the company with its planning for Closure to transition employees.</p>	<p>Technical Report Responses (November 2012) GNWT 11</p> <p>Public Hearing – December 5, 2012</p>
Socio Economic Commitments - Other	
<p>Staff a position with the responsibility to act as a liaison between De Beers, and the GNWT and Aboriginal groups</p> <p>De Beers commits to work with the Tăichô Government and with the Tăichô Community Services Agency on adaptively managing opportunities in the areas of health, education and social services that enhance the ability of Tăichô citizens to participate successfully in the Project.</p>	<p>Public Hearing – December 5, 2012</p>
Traditional Knowledge	
<p>De Beers is committed to considering and incorporating Traditional Knowledge (TK) into all stages to the Project life: the assessment, permitting, construction, operations and closure of the Project. This will be achieved by:</p> <ul style="list-style-type: none"> When the results of Traditional Knowledge / Traditional Land Use (TK/TLU) studies are made available, De Beers will use that information to further inform impact predictions, to evaluate whether additional mitigation or refinements to proposed mitigation is 	<p>2010 EIS Section 5 (December 2010)</p> <p>1st Round Information Request Responses (April 2012) LKDFN 2, 3, 4, and 10</p>

Commitment Description	Documents/Public Hearings
<p>needed, and to identify additional opportunities for incorporating traditional knowledge into monitoring programs.</p> <ul style="list-style-type: none"> • Develop annual engagement plans in an effort to meet its commitments. • Continuing to advance engagement activities with communities that will provide opportunities to discuss the Project and any traditional knowledge that the community is willing to provide; • Hosting site visits on a regular basis to enable the exchange of information between elders, TK holders and De Beers staff. Visiting communities regularly to provide updated information regarding the project and incorporating an opportunity in this visit for TK holders to meet with the company to provide expertise and advice; • From time to time, the company will provide community based workshops as part of the company's planning processes or to address specific topics; • Involving elders and students from their home communities together in on site and field monitoring programs from time to time; • Featuring the events and activities that the company undertakes with the involvement of elders in the company's internal newsletters to employees and in the on-site the cultural centre as a means to sharing the knowledge and advice of elders with all staff; and • Working together with Aboriginal authorities in the development of the closure plan. 	<p>TG 1, 3, 5, 6, 7, 8, 9, 19, and 27 YKDFN 4.43 and 4.44</p> <p>Technical Sessions (May 2012)</p> <p>2nd Round Information Request Responses (September 2012) LKDFN , TG 1, YKDFN 2.3, Response 2</p> <p>Technical Report Responses (November 2012) TG 10 YKDFN 12</p> <p>Public Hearing – December 5, 2012</p>
<p>De Beers acknowledges the request of the Tâïchô Government for the Company to work more closely with Aboriginal authorities in the planning of sessions that will engage Traditional Knowledge holders, particularly when there are sessions that will inform the Wildlife Effects Management Program (WEMP) and/or Aquatic Effects Monitoring Program (AEMP). De Beers commits to work with the leadership of Aboriginal communities to determine the appropriate approach and level of involvement in the opportunities that the company is providing, and to discuss how best to engage Traditional Knowledge holders.</p>	<p>2010 EIS Section 5 (December 2010)</p> <p>1st Round Information Request Responses (April 2012) DFO&EC 2, 3, and 10</p> <p>Technical Sessions (May 2012)</p> <p>2nd Round Information Request Responses (September 2012) TG 1 YKDFN 2.3-2</p> <p>Technical Report Responses (November 2012) TG 4</p> <p>Dettah Community Hearing – November 30, 2012</p>
<p>Risk Management, Emergency Response and Waste Management</p>	
<p>Management of risks, including preparation for the unexpected (emergency response and contingency planning) is integral to De Beers' Sustainable Development Policy. De Beers will ensure that management systems are in place to minimize the risk of accidents affecting people, the environment, and the facilities. Risks will be managed for the Project through the following means:</p> <ul style="list-style-type: none"> • prevention of accidents and malfunctions through engineering design, construction and operations training, awareness, education, and equipment maintenance; • assessment of risks of accidents and malfunctions throughout the Project phases; • employment of adaptive management to ensure continual appraisal of risks; • design and implementation of effective emergency response and contingency plans; and • implementation of a site environmental management plan. 	<p>2012 EIS Supplement Section 3 (April 2012)</p>

Commitment Description	Documents/Public Hearings
<p>Standard operating procedures are a key part of accident prevention and emergency response; Project-specific procedures will be developed before construction of the Project begins. The Snap Lake Mine currently has an International Organization for Standardization (ISO) -14001 certified environmental management system (EMS). This system will be extended to the Gahcho Kué Project before operations start.</p>	<p>2012 EIS Supplement Section 3 (April 2012)</p> <p>Public Hearing - December 5, 2012</p>
<p>The Emergency Response and Spill Contingency Plan was developed to establish a guidance document for emergency responses at the Gahcho Kué Project (Project) site.</p> <p>The plan provides:</p> <ul style="list-style-type: none"> • a clear chain of command for all emergency activities; • accountability for the performance of the spill response; • well-defined task and operational hazards/risk; and • reporting and record keeping requirements to track program progress. <p>The plan will be a “living” document and will be updated on a regular basis to address operational changes, as new information comes to light or procedures, permits, and authorizations change.</p> <p>Mitigation identified in the Emergency Response and Spill Contingency Plan, and other environmental design features (e.g., containment dykes, liners, proper storage conditions) will be in place to minimize the frequency and extent of spills that result from Project activities</p>	<p>2012 EIS Supplement Section 3 (April 2012)</p>
<p>De Beers is committed to the implementation and adaptive management of Waste Management Plans as listed below. De Beers has developed Air Quality and Emissions Monitoring and Management Plan (AQEMMP) and Incinerator Management Plan (IMP) which were submitted to the Mackenzie Valley Environmental Impact Review Board (MVEIRB) Public Registry in October 2012. De Beers commits to the development of other management plans in support of the Water Licence and Land Use Permit applications for the Project.</p> <p>De Beers is developing a memorandum of understanding (MOU) with Environment Canada and Environment and Natural Recourses (ENR) on the implementation of the AQEMMP and IMP and the responsibility of Environment Canada and ENR in providing a review of monitoring data and participating in adaptive management. Having already developed the Project’s AQEMMP and IMP in sufficient detail, and considering the MOU, a specific follow-up measure from the Panel may not be required in this case.</p> <ul style="list-style-type: none"> • Air Quality and Emissions Monitoring and Management Plan - Provided to Environment Canada and GNWT in September 2012. Revised and submitted to the Panel in October 2012. The AQEMMP will be revised as necessary in consultation with Environment Canada. MOU being developed. The document will form part of the Mackenzie Valley Land and Water Board (MVLWB) application. • Incinerator Management Plan - Provided to Environment Canada and GNWT in September 2012. Revised and submitted to the Panel in October 2012. The AQEMMP will be revised as necessary in consultation with Environment Canada. MOU being developed. The plan will form part of the MVLWB application. • Wildlife and Wildlife Habitat Protection Plan - Submitted to the Panel in September 2012 following input received by the wildlife working group parties. Will be revised as necessary in consultation with ENR. MOU being developed. The plan will form part of the MVLWB application. • Sediment and Erosion Management Plan - MVWLB application • Mine Rock Management Plan - MVLWB application • Effluent and Surface Water Management Plan - MVWLB application • Explosives Management Plan - MVWLB application • Hazardous Materials Management Plan - MVWLB application • Landfill Management Plan - MVWLB application • Landfarm Management Plan - MVWLB application <p>The specific plans listed above may be combined into more general plans (e.g., Waste Management Plan) as the regulatory process advances.</p>	<p>2010 EIS Sections 7 and 11 (December 2010)</p> <p>2012 EIS Supplement Section 3 (April 2012)</p> <p>1st Round Information Request Responses (April 2012)</p> <p>DFO&EC 52b, 53</p> <p>EC 9, 13</p> <p>EC&GNWT 3</p> <p>GNWT 3-1, 5</p> <p>Technical Sessions (May 2012)</p> <p>Responses to Technical Reports (November 2012)</p> <p>AANDC 7</p> <p>DFO 5</p> <p>EC 5.1</p> <p>GNWT 1, 2, and 7</p> <p>NRCAN 3 and 4</p> <p>YKDFN 10</p> <p>Public Hearings - December 5, 2012</p>

Commitment Description	Documents/Public Hearings
De Beers commitment to monitoring and adaptive management of the water management pond, fine and coarse processed kimberlite mine rock piles and other project components throughout operations as defined in monitoring and management plans.	
Potentially Acid Generating Rock	
<p>Less than 6% of the mine rock that will be excavated through open-pit mining will have to be managed as being potentially acid generating (PAG). This rock will be managed appropriately to avoid the generation of acidic leachate and limit the release of the metals and other elements. The management strategy will involve sequestering any PAG mine rock, as well as any barren kimberlite, within the interior (typically 2 m) of the mine rock piles. Till from on-going pit stripping will be used to cover PAG rock placed within the interior of the structure to keep water from penetrating into that portion of the repository. Further, the PAG rock will be enclosed within enough non-acid generating (non-AG) rock, such that the active zone will not extend into the enclosed material, and water runoff will occur on the non-AG rock cover areas.</p> <p>De Beers will monitor for the effects of climate change on the Project. Thermistors will be installed to monitor temperatures within the Mine Rock Piles, the Coarse PK Pile and the Fine PKC Facility. The resulting information will be used to track the development and possible regression of permafrost within these structures. De Beers will also monitor the quality and quantity of the water passing through the operational water management system to verify the conclusions of the analysis outlined herein. Finally, De Beers will periodically review its operating procedures during the life of the Project, and adjust them, if and as required, to account for the influence of climate change.</p> <p>De Beers will use only non-reactive mine rock for mine site construction (roads, airstrips, dykes, berms, etc.).</p>	<p>2010 EIS Sections 5, 7, and 11 (December 2010) 2011 EIS Update Section 8 (July 2011)</p> <p>1st Round Information Request Responses (April 2012) AANDC 5, 11, 14, and 16, Responses 2 DFO&EC 43a and 53b DKFN 23 EC 8 and 13 NRCan 1-4, 1-5, and 1-8 TG 12</p> <p>Technical Sessions (May 2012)</p>
Aquatic Effects Monitoring Program	
If monitoring or follow-up detects effects that are different from predicted effects, or the need for improved or modified design features, then adaptive management will be implemented. This may include increased monitoring, changes in monitoring plans, or additional mitigation. These will be incorporated into monitoring plans such as an AEMP as part of a Class A water licence.	<p>2010 EIS Section 11 (December 2010)</p> <p>1st Round Information Request Responses (April 2012) AANDC 12</p>
<p>Effects monitoring programs will include a Surveillance Network Program (SNP) that focuses primarily on Project site operations as well as a more broadly focused Aquatic Effects Monitoring Program (AEMP). De Beers will develop the scope of the SNP and AEMP in consultation with regulators and aboriginal groups.</p> <p>De Beers will consider the following documents in the development of an AEMP and related management response framework for the Project:</p> <ul style="list-style-type: none"> • <i>Guidelines for Designing and Implementing Aquatic Effects Monitoring Programs for Development Projects in the Northwest Territories: Recommended Procedures for Developing Detailed Designs for Aquatic Effects Monitoring Programs</i> (Zajdlik et al. 2009); • <i>Draft Guidelines for Adaptive Management – a Response Framework for Aquatics Effects Monitoring</i> (Wek'ezhii Land and Water Board 2011); and other related AEMP documentation publicly available from existing northern mines, as applicable. 	<p>2011 EIS Update Sections 8, 9, and 10 (July 2011)</p> <p>1st Round Information Request Responses (April 2012) DFO&EC 2c, DKFN 21, 22, 23</p> <p>2nd Round Information Request Responses (September 2012) AANDC 2-2</p> <p>Technical Report Responses (November 2012) AANDC 6</p>
The AEMP will incorporate the key components of the measurements endpoints presented in the EIS in its development. The AEMP will have an overall study design that will be developed according to currently accepted statistical design principles and regulatory guidance and will include hydrology, water quality (effluent and receiving water) and sediment quality components, components focused on lower trophic communities (i.e., plankton, periphyton, and benthic invertebrates), and fish and fish habitat. A groundwater monitoring program and habitat compensation monitoring will also be included as components of the overall aquatic ecosystem monitoring. The development of the AEMP will involve regulatory and aboriginal input, as well as consideration of available TK, and allow for adaptive management.	<p>1st Round Information Request Responses (April 2012) DFO&EC 3 Response c)</p> <p>2nd Round Information Request Responses (September 2012) DKFN 6</p>

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The recommended methodology with respect to the collection of sediment quality and benthic invertebrates data will be considered during the development of the AEMP.	1 st Round Information Request Responses (April 2012) DFO&EC 23
Baseline information for the downstream lakes in the L and M watersheds has been collected and is presented in 2010 EIS Section 8 and Section 9 Appendices. Supplemental monitoring information was collected in 2011, and is presented in the 2011 Supplemental Monitoring Reports (Golder 2012 a,b,c,d). These lakes will be assessed for inclusion in the AEMP. De Beers is committed to ongoing monitoring, with focussed work in 2012 including monitoring at five screened reference lakes during under-ice and open water conditions, and in the D-E-N lakes during open water conditions.	1 st Round Information Request Responses (April 2012) DFO&EC 18b YKDFN 2.31 and 2.26
Monitoring of fish populations will be conducted through the use of standardized, repeatable methods (e.g., a random, stratified, standard fish community monitoring program), which will be ratified according to currently accepted statistical design principles and regulatory and community guidance and review. The same rigor will be applied to chemical analyses. The data collected (e.g., presence, relative abundance, and population statistics of selected fish species) would be compared to metrics or benchmarks developed for the AEMP, associated with pre-construction conditions and to predicted effects of the Project during operations and closure. The AEMP will also incorporate a response framework, so that adaptive management, additional mitigation and/or monitoring can be applied, where necessary. Furthermore, in a post-closure perspective, the presence, relative abundance, and population data from Kennady Lake would be used to track fish species re-establishment in Kennady Lake.	1 st Round Information Request Responses (April 2012) DFO&EC 3b and 4c Technical Report Responses (November 2012) DFO 14
Lake 410 will be a focal point for the AEMP and sampled on a scheduled basis- based on modelling predictions	1 st Round Information Request Responses (April 2012) DFO&EC 18a
The criteria that will be used to evaluate sediment quality in the water management pond (WMP; Areas 3 and 5) and its acceptability to allow the reconnection of the refilled Kennady Lake to downstream waters will be developed during the detailed design phase of the AEMP. The monitoring program would also include other areas of Kennady Lake and receiving waterbodies throughout operations and during the refilling period.	1 st Round Information Request Responses (April 2012) DFO&EC 51
For the AEMP, the assessment endpoints for fish presented in the EIS are being further refined to more specifically reflect abundance and distribution, without the use of terms “desired” or “persistence”.	Technical Report Responses (November 2012) DFO 14
Monitoring stations will be selected during the detailed design phase of the AEMP, and will consider the type and magnitude of predicted effects and sensitivity of the affected habitat. Results of the AEMP will be used to evaluate the necessity for mitigation as part of adaptive management.	1 st Round Information Request Responses (April 2012) DKFN 22
The AEMP will allow for adaptive management, so that any unexpected adverse impacts to the aquatic ecosystem identified through the AEMP could be addressed (i.e., implementation of additional mitigation or compensation, as required). The AEMP will be developed with regulatory and aboriginal input.	1 st Round Information Request Responses (April 2012) DFO&EC 44a
Effects monitoring will involve programs focused on the receiving environment, with the objectives of verifying the conclusions of the EIS, evaluating the short-term and long-term effects on the physical, chemical and biological components of the aquatic ecosystem of Kennady Lake, estimating the spatial extent of effects, and providing the necessary input to adaptive management.	2011 EIS Update Sections 8, 9, and 10 (July 2011) 1 st Round Information Request Responses (April 2012) AANDC 12
Aquatic Health	
De Beers commits to monitoring of mercury concentrations in edible fish tissue in the raised D-E-N lakes prior to and following raising the lake and during operations using non-invasive techniques, to determine whether there is a potential issue. As per the response to Round 1 Information Request DKFN_37 and to Round 2 Information Request DFO 2-1, specific management response actions to any upward trend of mercury concentrations (adjusted for fish	1 st Round Information Request Responses (April 2012) DFO&EC 32b DKFN 25 and 37

Commitment Description	Documents/Public Hearings
<p>age, which is a major modifying factor) following water level increases would be determined, if and when necessary, through engagement with regulatory agencies, including EC, and Aboriginal communities.</p>	<p>2nd Round Information Request Responses (September 2012) DFO 2-1</p> <p>Technical Report Responses (November 2012) Environment Canada 3 and 4</p>
<p>Downstream Flow Mitigation</p>	
<p>De Beers commits to developing and implementing a downstream flow mitigation plan. One aspect of follow-up monitoring required in the downstream waterbodies is to define an appropriate mitigation flow regime to augment flows downstream of Kennady Lake during operations and refilling. The key aspects of this monitoring will be to better define an appropriate spring spawning flow for Arctic grayling, including determining the flow at which barriers to fish migration no longer exist, and defining a suitable flow for Arctic grayling rearing. The mine plan, does not contemplate the construction of excavated diversion channels from the raised lakes to the N watershed. However, as described in Section 8.10.3.3 of the EIS Update, the new stream channels will be evaluated to make sure that they provide spring spawning and rearing habitat for Arctic grayling and allow the seasonal passage of fish between lakes that approximates natural conditions. These streams will be temporary as Dykes E, F, and G will be removed at the end of the operations period, and the flows returned to Kennady Lake through the original stream channels.</p>	<p>2011 EIS Update Sections 8 and 9 (July 2011)</p> <p>1st Round Information Request Responses (April 2012) DFO&EC 55i, 55a, and 40</p> <p>2nd Round Information Request Responses (September 2012) DFO 2-1 and 2-2</p> <p>Downstream Flow Mitigation Plan June 29, 2012- Downstream Flow Mitigation: Field report October 12, 2012</p>
<p>Downstream Connections and Flow Monitoring</p>	
<p>De Beers commits to work with the Water Survey of Canada to conduct hydrological monitoring of downstream water bodies including perceived connections to the Hoarfrost River.</p>	<p>Water Survey of Canada- Monitoring Water downstream of Gahcho Kue- November 13, 2012 Public Hearing - December 5, 2012</p>
<p>Water Quality</p>	
<p>Committed to not allowing changes to water quality that could adversely affect the drinkability of the water, the fish communities (lake trout, northern pike, Arctic grayling), or the ability to eat the fish in Lake N11 and Area 8 during operations, closure and post-closure, and in Kennady Lake in post-closure.</p>	<p>2nd Round Information Request Responses (September 2012) AANDC 2-2</p> <p>Technical Report Responses (November 2012) AANDC 7 LKDFN 3.2</p>
<p>It is planned that an initial iteration of proposed water quality benchmarks for Lake N11 during operations and Kennady Lake in post-closure and rationale will be prepared as a technical memorandum to the MVEIRB in 2012, which will form the basis for detailed consultation with government agencies and communities.</p>	<p>1st Round Information Request Responses (April 2012) YKDFN 2.20 AANDC 1 and 2 DKFN 19</p> <p>2nd Round Information Request Responses (September 2012) LK 04</p>
<p>Seepage water quality and thermal conditions in the waste storage facilities will be monitored throughout all stages of the Project. DBCI is committed to the development of a Mine Waste</p>	<p>1st Round Information Request Responses (April 2012)</p>

Commitment Description	Documents/Public Hearings
<p>Management Plan</p> <p>De Beers is committed to the development of a monitoring program to verify the water quality predictions and the effectiveness of mitigation.</p>	<p>AANDC 16, Response 1 and 3</p>
<p>If it is identified that the quality of runoff or seepage is worse than predictions, adaptive management strategies will be triggered to address the problem.</p>	<p>1st Round Information Request Responses (April 2012) EC 13</p>
<p>Prior to, and during the refilling process, De Beers will track the water quality within Kennady Lake and use adaptive management to make decisions with respect to dyke removal, in consultation with regulatory agencies. If monitoring indicates that water quality is not acceptable in Kennady Lake, De Beers have the option to defer the removal of the dykes, or restore the dykes, to identify the issue and determine appropriate mitigation to address the problem.</p>	<p>1st Round Information Request Responses (April 2012) DFO&EC 50</p>
<p>Despite the predicted exceedances of the chronic effects benchmark (CEB), the potential for copper to cause adverse effects to aquatic life in Kennady Lake and Area 8 is considered to be low. The CEB for copper is based on the CCME guideline, which is intended to be conservative and protective of the most sensitive species. Follow-up monitoring will be undertaken to confirm this evaluation.</p> <p>As the biotic ligand model (BLM) is most sensitive to pH and the amount and quality of DOC, it is important that these parameters be measured during monitoring, and included in new BLM-derived CEB predictions. Monitoring of water quality will be carried out to verify model inputs, and predictions will be adjusted accordingly. The BLM model will be used update BLM-derived CEBs when monitoring data are available.</p>	<p>2011 EIS Update Section 8 (July 2011)</p> <p>1st Round Information Request Responses (April 2012) IR AANDC 9 IR DKFN 9</p>
<p>It is anticipated that water quality in the controlled area (e.g., water management pond) and receiving waters will be monitored during operations to compare to EIS predictions</p>	<p>1st Round Information Request Responses (April 2012) YKDFN 2.20</p>
<p>The inclusion of a monitoring program that will include a range of applicable monitoring parameters at representative lakes in the local study area (LSA) so that potential changes to light attenuation and TSS concentrations as a result of the Project have a high likelihood of being identified</p>	<p>1st Round Information Request Responses (April 2012) DFO&EC 5b</p>
<p>De Beers is committed to monitor the site water quality in Areas 3 and 5 during operations, which will receive the loading from the Fine PKC Facility during closure (i.e. the refilling period) and post-closure</p>	<p>1st Round Information Request Responses (April 2012) DKFN 29 DFO&EC 43b</p>
<p>During construction and operations, pumped discharge from Kennady Lake will only occur while regulatory requirements, including total suspended solids (TSS) concentrations, in the discharge are met. Discharge will be sampled regularly to monitor for compliance with TSS discharge limits to be specified by the Mackenzie Valley Land and Water Board in the water license, which will be required before the Project can operate.</p>	<p>1st Round Information Request Responses (April 2012) YKDFN 2.30</p>
<p>Water quality will be closely monitored during operations and the refilling process, and adaptive management will be implemented as required to ensure that the final water quality is sufficient to support a viable and self-sustaining ecosystem that is compatible with the regional watershed and maintains traditional use of the area prior to reconnecting the WMP to the downstream watersheds</p>	<p>Technical Report Responses (November 2012) AANDC 7 Environment Canada 3.3</p> <p>Public Hearing - December 5, 2012</p>
<p>Further front-end design will be done on a comprehensive AEMP, with monitoring to be conducted during construction, operation and closure phases of the project.</p> <p>Monitoring data will be compared to predictions and periodically used to update and re-run models predicting future water quality (Environment Canada suggests every 3 to 5 years would be appropriate).</p> <p>At closure, modeling predictions for lake quality will be supplemented with bioassay testing (chronic and acute) prior to reconnection of Kennady Lake with Area 8</p>	<p>Technical Report Responses (November 2012) Environment Canada 3.1</p>

Commitment Description	Documents/Public Hearings
De Beers commits to continue to evaluate AEMP water quality benchmarks applied to parameters that have a natural upper range of concentrations that are above their respective CCME guidelines for the protection of aquatic life. Proposed water quality benchmarks presented in the technical memorandum titled, " <i>Water Quality Objectives (WQO) and Sediment Quality Objectives (SQO) for the Proposed Gahcho Kue Project – Recommendation</i> ", dated September 14, 2012, served to inform discussions on the development of details being considered in the preliminary design of an AEMP for the Project, which will be resolved during the regulatory process . W	Technical Report Responses (November 2012) Environment Canada 3.2 Water Quality Objectives (WQO) and Sediment Quality Objectives (SQO) for the Proposed Gahcho Kue Project- September 14, 2012
De Beers will include uranium, thorium, and possibly radium 226, in the suite of monitoring parameters, developed for the groundwater quality monitoring program.	Technical Report Responses (November 2012) NRCan 5
Fish and Fish Habitat	
Sediment and Erosion Control	
De Beers commits to develop and implement a sediment and erosion plan for dyke construction to control sediment release. This plan will include details of the sediment and erosion control measures for each dyke to be constructed, along with contingency plans. The Sediment and Erosion Plan will be submitted to the MVLWB as a component of the Water Licence Application.	2 nd Round Information Request Responses (September 2012) NRCan 2-1 Technical Report Responses (November 2012) DFO 5 Public Hearing – December 5, 2012
<p>Release of sediment during construction of dykes in the A, B, D and E watersheds may change water and sediment quality, and affect fish habitat and fish:</p> <p>Changes to permafrost conditions in the flooded shoreline zone of the raised lakes due to increased water levels may lead to erosion and affect fish habitat:</p> <p>Alteration of water levels in Lakes A3, D2, D3, and E1 may result in shoreline erosion, re-suspension of sediment and sedimentation, and affect water and sediment quality, fish habitat and fish:</p> <p>Alteration of the A, B, D and E watershed areas and flow paths may change flows, water levels, and channel/bank stability in the Kennady Lake watershed, and affect water and sediment quality, fish habitat and fish:</p> <ul style="list-style-type: none"> • all mine rock used to construct the dykes will be Non-acid generating (NAG) • construction of dykes will raise the water level in various areas and subsequently create new fish habitat • cobble and boulder placement to reduce erosion potential • silt curtains will be placed upstream and downstream of the construction area to control the release of suspended sediments • implementation of a quality assurance program during construction of each of the dykes so that construction-sensitive features of the design are achieved; the specific requirements and testing frequencies for the quality assurance process will be set out in the Construction Specifications prepared during final designs • monitoring of the performance of the dykes throughout their construction and operating life; instrumentation including piezometers, thermistors, and survey monitoring markers together with systematic visual inspection will provide early warning of many conditions that can contribute to dyke failures and incidents • active monitoring and maintenance plan for the new shorelines associated with the raised lakes <p>Diversion outlet structures will be designed and managed to provide an outflow rating curve that approximates the natural outflow rating curve, to the extent possible, during construction and</p>	<p>2011 EIS Update Section 8 (July 2011)</p> <p>1st Round Information Request Responses (April 2012) DFO&EC 36</p> <p>Technical Report Responses (November 2012) DFO 5</p>

Commitment Description	Documents/Public Hearings
<p>operations. The channels will be evaluated and mitigation applied as necessary to prevent erosion and to maintain stability in permafrost, and to provide fish passage and spawning habitat between the re-aligned lakes. Furthermore, a monitoring and mitigation program for the raised lakes will be incorporated in an adaptive management plan for shoreline erosion. For water quality, preparation of the areas to be flooded will be undertaken, where necessary, to limit the potential for long-term nutrient and metals releases to the lakes and mercury methylation.</p>	
<p>Erosion of lake-bottom sediments in Lake N11 and Area 8 from pumped discharge may change water quality and fish habitat in downstream waterbodies, and affect fish habitat and fish:</p> <ul style="list-style-type: none"> • pumped discharge to Lake N11 and Area 8 will be directed through properly designed outfalls/diffusers to prevent erosion <p>The end-of-pipe discharge points for the lake dewatering operations will be placed at relatively deep water locations in Lake N11 and Area 8 so as to minimize the potential impact to lake bottom sediments.</p>	<p>2011 EIS Update Section 9 (July 2011)</p> <p>1st Round Information Request Responses (April 2012) DFO&EC 35a</p>
<p>Release of sediment to Area 8 during the construction of Dyke A may change water and sediment quality, and affect fish habitat and fish:</p> <ul style="list-style-type: none"> • silt curtains will be placed upstream and downstream of the construction area to control the release of sediment to Area 8 <p>Some general considerations in the use of turbidity barriers in dyke construction are presented in Page 8-128 of 2011 EIS Update (De Beers 2011). In the event that TSS concentrations approach monitoring thresholds, construction activities will be temporarily curtailed and additional measures would be implemented to meet the water quality requirements in Area 8. These contingency measures would include 1) installing additional rows of the turbidity barriers, 2) constructing a temporary filter berm to retain the excess suspended solids and allow the clean water to pass through, or 3) pumping the water with excess TSS to a temporary polishing pond.</p>	<p>2011 EIS Update Section 8 (July 2011)</p> <p>1st Round Information Request Responses (April 2012) DFO&EC 26 YKDFN 2.30</p>
<p>De Beers commits to develop and implement minimum water level thresholds in Area 8 during construction and operation, as well as Lake N11 during closure. In Area 8, winter water withdrawals from Area 8 for potable water will meet the Fisheries and Oceans Canada (DFO) <i>Protocol for Winter Water Withdrawal from Ice-Covered Waterbodies in the Northwest Territories and Nunavut</i>. In Lake N11, planned pumping rates during open water conditions will be set accordingly to ensure that the total annual discharge from Lake N11 does not drop below the 1-in-5 year dry condition.</p> <p>Hydrological monitoring will be conducted as part of the project, both for operational decision-making with respect to the water management plan, and also as part of the AEMP. Staff gauges will be installed to monitor water levels to protect littoral habitat; this was identified in the response to Round 1 Information Request DFO&EC_61 for Area 8. If changes to water levels are greater than predicted (e.g., water levels approach benchmarks developed as part of the AEMP), then adaptive management will be applied, as appropriate.</p>	<p>2011 EIS Update Section 8 (July 2011)</p> <p>1st Round Information Request Responses (April 2012) DFO&EC 35a</p> <p>Technical Report Responses (November 2012) DFO 6</p>

Commitment Description	Documents/Public Hearings
No-Net-Loss Plan	
<p>Fish habitat compensation to account for harmful alteration, disruption or destruction (HADD) of fish habitat associated with the Project will be developed in consultation with regulatory agencies and aboriginal groups</p> <p>De Beers is committed to continuing to work with DFO, Environment Canada and Aboriginal communities on the finalization of options, as part of the development of the detailed fish habitat compensation plan to achieve No-Net-Loss of fish habitat.</p> <p>Monitoring will also be conducted to evaluate the effectiveness of habitat compensation, and will include evaluation of both physical and biological characteristics.</p>	<p>2011 EIS Update Sections 8 and 10 (July 2011); 2012 EIS Supplement Section 3 (April 2012)</p> <p>1st Round Information Request Responses (April 2012) DFO&EC 56, 57, and 58 DKFN 25 and 39, GKP 14</p> <p>2nd Round Information Request Responses (September 2012) DFO 2-3, LK 01</p> <p>2012 Draft No-Net-Loss Plan- November 13, 2012 (Section 8.0)</p> <p>Public Hearing – December 5, 2012</p>
Fish-out Plan	
<p>A fish out will be conducted from Areas 2 through 7 of Kennady Lake to remove fish before and during dewatering. This will be undertaken as part of a DFO <i>Fisheries Authorization</i> in a manner that involves aboriginal communities, minimizes spoilage of fish and maximizes the potential to collect valuable scientific data on northern fishes. Where possible, the timing of the fish out will coincide with important aboriginal cultural events.</p>	<p>1st Round Information Request Responses (April 2012) DFO&EC 65 Draft Fish Out Plan - October 4, 2012.</p>
Water Management	
<p>The performance of the dykes will be monitored throughout their construction and operating life; instrumentation monitoring together with systematic visual inspection will provide early warning of many conditions that can contribute to dyke failures and incidents. Additional mitigation will be applied, if required.</p> <p>In the unlikely event that degradation of the foundation conditions over the relatively short life of the structure has an impact on a dyke's stability, contingency measures will be applied. Contingency measures may include foundation grouting, downstream or upstream till blankets, ground freezing for temporary situations, cut off walls or dyke reconstruction. The measured ground temperatures and the results from regular site inspection and monitoring activities will be collected, analyzed and reported. The information from monitoring programs will be used to determine if contingency measures are required and will be implemented accordingly.</p>	<p>2010 EIS Sections 5, 7, and 11 (December 2010)</p> <p>1st Round Information Request Responses (April 2012) NRCan 1-12iii</p>
<p>The suggested 0.002 mg/L method detection limit (MDL) for total phosphorus (TP) will be utilized as a maximum MDL for all future analyses</p>	<p>1st Round Information Request Responses (April 2012) DFO&EC 11a</p>
<p>De Beers is committed to complete monitoring and testing using standard field and laboratory procedures during the Project operation to evaluate groundwater quantity and quality. Where necessary, the water quality and quantity input profiles assigned to the loadings for groundwater will be revised and Project effects will be re-assessed, as appropriate. Where required, adaptive management strategies will be adopted</p>	<p>2011 EIS Update Section 8 (July 2011) 1st Round Information Request Responses (April 2012) AANDC 12</p>
<p>It is anticipated that water column profiles in Kennady Lake will be monitored during closure and following reconnection with Area 8 to compare to EIS predictions. If it is identified that water column dissolved oxygen (DO) concentrations, particularly in the surface 6 metre depth zone, are worse than predictions, adaptive management strategies will be triggered to address the problem.</p>	<p>1st Round Information Request Responses (April 2012) DKFN 45</p>

Commitment Description	Documents/Public Hearings
Ongoing monitoring of water quality in the LSA will include reporting of the TSI index.	1 st Round Information Request Responses (April 2012) YKDFN 2.29
<p>During operations, Project activities associated with the water management plan will be designed to discharge site water to downstream waterbodies only when specific water quality criteria are met. During operations, water for use in the processing plant will be sourced from the WMP and recycled to the greatest extent possible.</p> <p>Parameters for discharge, mixing zones and monitoring points will be determined and regulated as part of the water licensing process.</p>	<p>2011 EIS Update Section 9 (July 2011)</p> <p>1st Round Information Request Responses (April 2012) DFO&EC 66</p> <p>2nd Round Information Request Responses (September 2012) AANDC 2-1</p>
<p>Dewatering of Kennady Lake to Lake N11 and Area 8 may change flows, water levels, and channel/bank stability in downstream waterbodies, and affect water quality, fish habitat and fish:</p> <ul style="list-style-type: none"> • pumped discharge to Lake N11 and Area 8 will only occur while water quality discharge criteria are met • discharge from Area 7 to Area 8 is proposed to cease after Year 2, when water levels in Area 7 drop to a level that turbidity levels exceed discharge criteria • pumped discharge will be directed to the lake environment in Lake N11 and Area 8, and not directly to outlets, to attenuate flow changes 	2011 EIS Update Section 9 (July 2011)
To manage water that has higher levels of TSS, flocculants may be added through an in-line treatment process; for example, water that can no longer be pumped from Area 7 to Area 8 will be pumped to Areas 3 and 5 through a pumped system with in-line flocculation to minimize TSS in Areas 3 and 5 to allow for dewatering of this area to the maximum extent possible.	<p>2011 EIS Update Section 8 (July 2011)</p> <p>2012 EIS Supplement Section 3 (April 2012)</p> <p>1st Round Information Request Responses (April 2012) AANDC 4, Response 6</p>
<p>Follow-up monitoring will consist of programs designed to verify key inputs to the effects analysis, such as the quality of the water pumped from the WMP to Lake N11. Results of follow-up monitoring will be used to reduce the level of uncertainty related to impact predictions.</p> <p>Future monitoring programs will apply the lowest available MDL to collected lake and stream samples.</p>	<p>2011 EIS Update Section 9 (July 2011)</p> <p>1st Round Information Request Responses (April 2012) DFO&EC 11c</p>
Wildlife Mitigation	
De Beers will implement the Wildlife and Wildlife Habitat Protection Plan as submitted to the Panel on October 4, 2012. The Wildlife and Wildlife Habitat Protection Plan will be refined prior to construction to address the recommendations made by GNWT and Environment Canada in their technical reports. The Wildlife and Wildlife Habitat Protection Plan will be adaptively managed by De Beers during the Project life with input from GNWT, Environment Canada, and Ni Hadi Yati.	Wildlife and Wildlife Habitat Protection Plan, October 2012
Downward directional and low impact lighting will be used to reduce light pollution	Wildlife and Wildlife Habitat Protection Plan, next iteration
Low profile roads will be used so that they do not act as a barrier to movement for wildlife	Wildlife and Wildlife Habitat Protection Plan, next iteration
Winter road snow berms will be removed so that they do not act as a barrier to movement for wildlife	Wildlife and Wildlife Habitat Protection Plan, next iteration

Commitment Description	Documents/Public Hearings
De Beers will implement the Wildlife Effects Monitoring Program as submitted to the Panel on October 4, 2012. The Wildlife Effects Monitoring Program will be refined prior to construction to address the recommendations made by GNWT and EC in their technical reports. The Wildlife Effects Monitoring Program will be adaptively managed during the Project life by De Beers with input from GNWT, Environment Canada, and Ni Hadi Yati.	Wildlife Effects Monitoring Program, October 2012
Soils and Vegetation Monitoring	
De Beers will submit a Soil and Vegetation Monitoring Plan to the MVLWB as part of the Land Use Permit application. The Soil and Vegetation Monitoring Plan will include a targeted study examining the correlation between dust fall and caribou Zone of Influence.	2010 EIS Section 11 (December 2010)
<p>The monitoring activities associated with Project construction, operations, and closure, are described below, and are designed to work in conjunction with other programs.</p> <ul style="list-style-type: none"> • Identification of areas where vegetation is intact. A general site survey to identify areas where healthy vegetation is maintained and where vegetation is showing signs of degradation will be carried out on a regular basis. Estimates of the extent of intact (undisturbed) and degraded vegetation will be recorded. • Identification of areas where re-vegetation is required. Disturbed areas will be identified from the general site survey identified above, as well as from surveys conducted as part of the monitoring program associated with the closure and reclamation plan (Section 10). Disturbance estimates will include descriptions of areas that have been re-vegetated and an indication of treatment effectiveness. Test plots will be established at longer-term monitoring stations to evaluate treatment effectiveness as well. • Implementation of re-vegetation efforts. Areas identified as requiring re-vegetation (e.g., from the general site survey and/or closure and reclamation monitoring) will be assigned an appropriate treatment. Vegetative material (seed or otherwise) will be composed of non-invasive species. The long-term re-vegetation goal is to facilitate and encourage the re-establishment of native vegetation. Treatments will be designed such that they optimize success (e.g., timing will coincide with favourable weather events). • Survey timing. The timing of the surveys will be planned according to when the areas were re-vegetated and the potential for soil erosion. For example, areas with a high potential for soil erosion will likely be surveyed more frequently following treatment. Test plots will be established at longer-term monitoring stations. 	2010 EIS Section 11 (December 2010)
Additional surveys for plant species considered to be “at risk” within the Project footprint will be carried out in conjunction with other vegetation monitoring programs (e.g., those specified in the vegetation management plan, Kennady Lake dewatering, and dust monitoring program), as the compilation of a plant species list is included as a component.	2010 EIS Section 11 (December 2010)
Air Quality Management	
De Beers will implement the AQEMMP as submitted to the Panel on October 18, 2012. The AQEMMP will be refined prior to construction in consultation with Environment Canada and GNWT. The AQEMMP will be adaptively managed during the Project life by De Beers with input from GNWT, Environment Canada, and Ni Hadi Yati.	Air Quality and Emissions Monitoring and Management Plan, October 2012
De Beers will implement the Incinerator Management Plan as submitted to the Panel on October 18, 2012. The Incinerator Management Plan will be refined prior to construction in consultation with Environment Canada and GNWT. The Incinerator Management Plan will be adaptively managed during the Project life by De Beers with input from GNWT, Environment Canada, and Ni Hadi Yati.	Incinerator Management Plan, October 2012
De Beers will continue to evaluate alternative energy sources that will reduce the Project’s dependency on fossil fuel as part of adaptive management and De Beers’ sustainable development policy.	2010 EIS Section 11 (December 2010)
De Beers is committed to continuously evaluate ways to improve energy efficiency that are both technically and economically feasible.	2010 EIS Section 11 (December 2010)

Commitment Description	Documents/Public Hearings
Archaeology	
Protection of permafrost — all activities that affect permafrost around the site will be carefully planned so that areas not directly affected by the mine and plant site will be preserved	2010 EIS Section 11 (December 2010)
Proposed Park	
De Beers recognizes that connections with the land exist, and it will work with Łutselk'e and Parks Canada, once the Park is established, on initiatives that might be identified as essential to keep the story on the land alive.	2010 EIS Section 12 (December 2010)
Reclamation and Closure	
<p>Experience gained from closures of the Ekati and Diavik mines will be used at the Project site to develop a re-vegetation management plan to support the successful restoration of the site.</p> <p>Reclamation activities will include:</p> <ul style="list-style-type: none"> • Implement monitoring and mitigation programs and adaptively manage to achieve closure objectives • Removal and disposal of site infrastructure and materials; • To the extent practical, the total amount of area disturbed by Project activities at any one time will be reduced through the use of progressive reclamation; • An evaluation will consider the physical aspects of re-vegetation, such as re-contouring, erosion control techniques, seedbed preparation, surface roughening, and the use of soil amendments, which collectively promote natural secondary succession; • Removal or breaching of dykes; • Evaluate opportunities to restore Area 7 earlier in the mine plan; • Refilling Kennady Lake; • Breaching of Dyke A that separates Kennady Lake from the Downstream will only occur once the water quality is at an acceptable quality as defined in the water licences discharge criteria; • Restoration of navigation • Reclamation plans will be developed iteratively during the Project in consultation with Regulators and Aboriginal Authorities; and • Traditional knowledge will be considered in reclamation and closure plans. 	<p>2010 EIS Sections 4, 5, 7, 11, and 12 (December 2010)</p> <p>2011 EIS Update Sections 8 and 10 (July 2011)</p> <p>2012 EIS Supplement Section 3 (April 2012)</p> <p>1st Round Information Request Responses (April 2012)</p> <p>DFO&EC 29a, 39, 53b, and 57</p> <p>DKFN 4</p> <p>EC 11 and 12</p> <p>GKP 6 and 14</p> <p>NRCan 1-8</p> <p>TC 3</p> <p>YKDFN 4-40</p> <p>Technical Sessions (May 2012)</p> <p>2nd Round Information Request Responses (September 2012)</p> <p>EC 2</p> <p>Technical Report Responses (November 2012)</p> <p>AANDC 7</p> <p>DFO 6 and 4</p> <p>EC 3.1 and 3.3</p> <p>LKDFN 3.2</p> <p>NSMA 1</p> <p>YKDFN 12</p> <p>Public Hearing – December 5, 2012</p>

Table C-9: List of additional commitments

Commitment Description	Document/Public Registry Reference
Water Quality	
De Beers is committed to undertaking regular monitoring and follow-up testing of water quality and aquatic health during the Project. Sub-lethal toxicity testing will be undertaken during operations to assess predictions in the 2011 EIS Update that effects from water quality to aquatic communities will be negligible. Toxicity testing with sensitive, native organisms will be conducted.	Information request response to AANDC (PR#168 p.7-3)
De Beers will develop closure and reclamation objectives for the Project that are consistent with the draft <i>Guidelines for the Closure and Reclamation of Advanced Mineral Exploration and Mine Sites in the Northwest Territories</i> prepared by AANDC and the Mackenzie Valley Land and Water Boards, which builds upon the <i>Mine Site Reclamation Guidelines for the Northwest Territories</i> . Objectives for Areas 2 to 7, which include the Water Management Pond (WMP), will be developed as part of the Closure and Reclamation Plan process. De Beers understands that the development of a Closure and Reclamation Plan for the Project requires engagement with Aboriginal groups, interested parties and regulators.	Technical report response to AANDC (PR#347 p. 7)
De Beers commits to monitoring the basins of Kennady Lake during closure (i.e., refilling of Kennady Lake), including mine pits.	Technical report response to EC (PR#348 p. 3)
De Beers will be monitoring the water quality during the mine operations to verify the water quality modelling projections presented in the 2012 EIS Supplement and commits to continue to develop contingency plans for the operational and closure stages of the Project such that they can be implemented as needed.	Technical report response to EC (PR#348 p. 4)
DeBeers will meet with Lutsel K'e Dene First Nation to review monitoring locations and discuss potential new monitoring locations as part of the Aquatic Effects Monitoring Program (AEMP) development process.	Undertakings and Commitments from Technical Meeting (PR#216 p.2)
De Beers commits to consider the traditional uses of the region by Aboriginal people in the process to develop the proposed water quality benchmarks and Site Specific Water Quality Objectives (SSWQOs) through the Water License permitting process.	Technical report response to TG (PR#342 p. 2)
Fisheries	
De Beers will continue to seek input on additional off-site fish habitat compensation options as part of the permitting phase.	Technical report response to TG (PR#342 p. 3)
De Beers commits to continue to develop a detailed No-Net-Loss Plan (NNLP) that will describe habitat compensation plans to offset losses to fish habitat. A draft NNLP was submitted to the public registry in November 2012 (PR#355, 356,357, 358). This draft is expected to continue to evolve and be further refined as additional community and regulatory input is received during the permitting phase.	Technical report response to DFO (PR#352 p. 7)
Ice thickness will be routinely measured and included in the database [of information pertaining to fish overwintering habitat] , along with other relevant data parameters as part of on-going winter water quality data monitoring programs, including the AEMP once implemented .	Technical report response to DFO (PR#352 p. 3)
Watershed Management	
De Beers commits to develop and implement an operational Flow Mitigation Plan.	Technical report response to DFO (PR#352 p. 6)
The operational monitoring [Flow Mitigation] plan will include details regarding scenarios about consecutive dry or wet years to develop operational protocols that De Beers will follow to provide protection to the downstream fish populations. These protocols will be developed in consultation with regulators.	Information request response to DFO (PR#285 p. 2-1-2)
De Beers commits to utilizing <i>in situ</i> flocculation and other applicable best management practices to minimize the risk of sediment-laden water affecting downstream habitats.	Technical report response to DFO (PR#352 p. 6)
Dyke and Containment Facility Design, Construction, and Monitoring	
A geotechnical investigation program (planned for February/March 2013) will obtain additional information on all the planned dyke alignments. Ground thermal conditions will be collected as part of this program.	Technical report response to NRCan (PR#340 p. 2)

Commitment Description	Document/Public Registry Reference
Upon completion of the geotechnical program mentioned above, De Beers will develop detailed designs for the planned dykes. The detailed design will be undertaken in accordance with the Canadian Dam Association Guidelines. None of the dykes planned rely on permafrost conditions for long-term containment although and thermal analysis will be carried out for dykes that will be constructed on permafrost foundations. The detailed design for each dyke will consider all input parameters as well as a review of potential effects of changing climate conditions.	Technical report response to NRCan (PR#340 p. 2)
De Beers will develop monitoring plans to monitor the thermal performance and stability of dyke foundations to determine mitigations as required.	Technical report response to NRCan (PR#340 p. 3)
De Beers will develop a monitoring plan for the processed kimberlite facility to assess the condition and stability of the pile and to determine the need for mitigation should there be instability or deformation of the cover affecting the performance.	Technical report response to NRCan (PR#340 p. 3)
Wildlife	
DeBeers is committed to using a collaborative approach – with communities and regulators – in developing the Wildlife Effects Monitoring Plan (WEMP).	Undertakings and Commitments from Technical Meeting (PR#216 p.3)
De Beers will provide Environment Canada with results of the 2013 field investigation to determine the species and density of nesting birds in the area that will be flooded and to identify potential areas for targeted shrub removal outside of the nesting season and provide an updated assessment of the feasibility of shrub removal and use of deterrents to reduce attractiveness of the area for nesting birds.	Technical report response to EC (PR#348 p. 7)
De Beers commits to providing Environment Canada with a plan to avoid the incidental take of nest and eggs from flooding of terrestrial habitat.	Technical report response to EC (PR#348 p. 7)
De Beers commits to including surveys of water bird use of collection ponds and the water management pond (WMP) as part of the Wildlife Surveillance Monitoring. De Beers commits to reporting the results of this survey annually. De Beers commits to notifying Environment Canada of any injuries or mortalities to migratory birds.	Technical report response to EC (PR#348 p. 8)
De Beers has committed to implementing an upland bird monitoring program as outlined in the Wildlife Effects Monitoring Program.	Technical report response to EC (PR#348 p. 8)
De Beers agrees that if species at risk or their nests and eggs are encountered during project activities or monitoring programs, the primary mitigation measure for each species should be avoidance. The species-specific nest setback distances recommended by Environment Canada will be used to determine zones of avoidance. Monitoring will be undertaken to ensure that mitigation measures are successful and the results of monitoring will be provided to the relevant agency and DeBeers will ensure that mitigation and monitoring strategies are consistent with any applicable status reports, recovery strategies, action plans and management plans that may become available during the duration of the project and should consult with GNWT and Environment Canada on adaptive management strategies should they be required. In instances where an at risk avian species nests within the established Project footprint and the setback distances specified cannot be met, nest-specific guidelines and procedures will be developed in consultation with Environment Canada to protect the nest.	Technical report response to EC (PR#348 p. 9)
Flight paths other than take-offs, landings and specific monitoring studies will be above 650 m. Normal flight operations will discourage excessive hovering or circling below these altitudes and pilots will be informed of the mitigations.	Technical report response to EC (PR#348 p. 10)
De Beers committed to monitoring of the zone of influence (ZOI) in the WEMP submitted to the public registry on October 4, 2012.	Technical report response to GNWT (PR#346 p. 3)
De Beers commits to additional discussions with the GNWT on (a) caribou monitoring program collaboration; and (b) the regional wolf monitoring program and wolf predation study as it relates to the Bathurst herd.	Technical report response to GNWT (PR#346 p. 3)
De Beers will continue to work with GNWT, communities and Aboriginal governments to address potential wildlife mortalities, harvest and other issues that may arise on the Project Winter Access Road.	Technical report response to GNWT (PR#346 p. 4)
De Beers commits to working with GNWT-ENR to develop an MOU for collaborating on the development and operation of check stations along the Project Winter Access Road and the development of public education programs and materials that emphasize respect for caribou and hunter excellence.	Technical report response to GNWT (PR#346 p. 4)

Commitment Description	Document/Public Registry Reference
De Beers commits to discuss opportunities to coordinate the timing for reporting monitoring and adaptive management results with the GNWT and Aboriginal groups.	Technical report response to GNWT (PR#346 p. 4)
De Beers is committed to incorporating the lessons learned at other mines in the design and operation of the Project, which includes the mitigation and management policies and practices at the Snap Lake Mine.	Information request response to GNWT (PR#162 p.2-3)
Socio Economic	
Regardless of the number of NWT resident employees it hires, De Beers is committed to working with all of the affected communities to improve their participation in the employment opportunities throughout the entire life of the Project.	Information request response to TG (PR#175 p.32-7)
De Beers is committed to assisting those working at the mine sites who have a below Grade 12 education to work towards obtaining their GED so that they may further their careers.	Information request response to TG (PR#175 p. 37-4)
De Beers is committed to the continued involvement of Community Monitors for both water and terrestrial monitoring programs. De Beers anticipates that based on community visits, that Community Monitors are available. However, if qualified persons are not identified for future programs, De Beers will consider the need for training.	Information request response to DKFN (PR#167 p.47-1)
De Beers has committed to providing funding to the NWT Mine Training Society (MTS) in partnership with the GNWT and other NWT industry organizations to enable the continued operation of the MTS into 2012 and 2013 and the development of the Northern Minerals Workforce Development Strategy.	Information request response to GNWT (PR#162 p.8-6)
De Beers is committed to establishing a relationship based on mutual respect, trust, good faith, active partnership, commitment and certainty with the NSMA so that training, employment and business opportunities are made available to the NSMA.	Information request response to NSMA (PR#159 p.002-2)
During the life of the Project, De Beers commits to supporting training positions at the Project. These will include apprenticeships, trades training positions and the development of professional occupations. The company will assess where these placements will occur as part of its annual business planning process. De Beers will report annually regarding the number of current and cumulative placements in these training positions by hiring priority.	Technical report response to GNWT (PR#346 p. 6)
De Beers is committed to meet with communities, governments and others to discuss the hiring and retention challenges the company is facing and to identify through collaboration, opportunities to work together to address such challenges, rather than to report on the NWT resident employees who resigned, were laid off, fired or otherwise terminated in the previous year.	Technical report response to GNWT (PR#346 p. 14)
De Beers will report annually on the purchases of goods and services through or from NWT and Aboriginal Businesses. This reporting will be in the same format the company currently reports for the Snap Lake Mine.	Technical report response to GNWT (PR#346 p. 14)
De Beers will publicly report its results [of the socio-economic follow-up program defined by the a socio-economic agreement between GNWT and De Beers] each year, and will distribute the report to the GNWT and to the communities in the Local Study Area.	Technical report response to GNWT (PR#346 p. 15)
De Beers commits to work with the Tlicho Government and with the Tlicho Community Services Agency on adaptively managing opportunities in the area of health, education and social services that enhance the ability of Tlicho citizens to participate successfully in the Project.	Technical report response to TG (PR#342 p. 5)
De Beers remains committed to providing opportunities over the life of the Project for the incorporation of Traditional Knowledge through site visits and workshops, through ongoing community engagement, in monitoring programs, developed with the input of communities, and through Traditional Knowledge Studies undertaken by communities with the support of De Beers.	Technical report response to YKDFN (PR#345 p. 10)
Transport	
De Beers will be seeking a Proclamation of exemption under Section 23 of the <i>Navigable Waters Protection Act</i> . De Beers will notify Transport Canada in writing that it will apply for a Proclamation of exemption, and include all of the necessary information required to support the Proclamation of exemption.	Technical report response to Transport Canada (PR#341 p. 3)
Closure	
De Beers will commit to working together with Aboriginal authorities in the development of the closure plan.	Technical report response to TG (PR#342 p. 7)

Commitment Description	Document/Public Registry Reference
De Beers commits to applying available technologies or management practices (e.g., appropriately sized and designed screens on the intake in Lake N11, consistent with that described in the <i>Freshwater Intake End-of-pipe Fish Screen Guideline</i>), and to following recommended guidelines during closure to limit the potential for fish species and life stages from entering Kennady Lake during refilling until it is demonstrated that the lake can support fish.	Technical report response to DFO (PR#352 p. 7)
De Beers commits to developing a revegetation plan for riparian and aquatic vegetation as part of the interim closure and reclamation plan for Kennady Lake. The details of the plan will be developed in consultation with DFO and would include opportunities for early implementation. Monitoring of the reestablishment of aquatic vegetation in the refilled lake will also be included as part of the AEMP.	Technical report response to DFO (PR#352 p. 8)

Appendix D: Gahcho Kué Panel member biographies



Darryl Bohnet, Panel Chair

Darryl Bohnet was the federal government nominee to the Mackenzie Valley Environmental Impact Review Board from November 2008 to November 2011. The Review Board appointed Mr. Bohnet to the Gahcho Kué Panel in May 2007, and he was appointed Panel Chairperson in September 2010.

Mr. Bohnet is Métis from the South Slave region of the Northwest Territories and is a member of the NWT Métis Nation. He is the former Chairman and current Executive Committee board member of the NWT Métis Development Corporation.

Mr. Bohnet started his career in the environmental sciences field with the federal and territorial governments. He held many senior management positions with the Government of the Northwest Territories including Assistant Regional Director, Territorial Coordinator, Norman Wells Pipeline Project, Executive Director, Equal Employment and Deputy Minister for the Department of Personnel. He has worked and travelled extensively throughout the Northwest Territories and Nunavut.

After retiring from public service, Mr. Bohnet joined the private sector as Vice-president, Community Affairs for Diavik Diamond Mine. He continued to champion aboriginal employment and focused on community contributions, aboriginal relations, community-based training, labour force development and maximizing business opportunities for Northern and Aboriginal companies.

In 2013, Mr. Bohnet received the Queen Elizabeth II Diamond Jubilee Medal in recognition his many years of volunteerism. He has been a member of the Elks Lodge for over 36 years and an Associate Member of the Royal Canadian Legion for 41 years. Darryl resides in Yellowknife with his wife of 47 years, Shirley. They have four grown children and five grandchildren.



Peter Bannon, Panel member

Mr. Bannon has over 30 years of public service experience in the Northwest Territories and Nunavut. He began his career working in federal departments in environmental management and water resource regulation. He finished working in senior management positions with the Government of the Northwest Territories in areas of land claims and self-government policy development and intergovernmental negotiations related to the devolution of lands and resources. He retired from government employment in 2007 and currently works as a part-time consultant.

Mr. Bannon participated in the development and implementation of the Mackenzie Valley Resource Management Act and the Northwest Territories Waters Act. He has 20 years of service as the Technical Advisor to the Northwest Territories Water Board, as a member of the NWT Water Board, a member of the Environmental Impact Review Board for the Inuvialuit Settlement Region and member of the Mackenzie Valley Environmental Impact Review Board.

Mr. Bannon holds a Bachelor in Environmental Studies and a diploma in Environmental Engineering Technology and Water and Air Pollution Control.

Over thirty years with the Public Service (GNWT, Indian and Northern Affairs Canada and Environment Canada), at various locations in the Northwest Territories (and Nunavut), has provided a broad experience base in the fields of resource and environmental management and Aboriginal and Treaty Rights negotiation processes. Specifically, He has been involved in: technical evaluation, impact assessment, regulation, monitoring and enforcement of development projects; and policy matters related to Aboriginal and intergovernmental affairs, particularly with respect to land claims and their implementation and the planning for and negotiation of devolution of federal lands and resources responsibilities to the GNWT. He was at senior management levels in the GNWT and federal regional operations for fifteen years.

Peter Bannon lives in Yellowknife, NWT.



James Wah-Shee, Panel member

A long-time Northern leader, James Wah-shee has been an active participant in the economic and political development of the Northwest Territories for more than forty years.

He has filled many roles during this time, all of them influential, including terms as President of the NWT Indian Brotherhood, Chair of the Federation of Natives North of Sixty, and Member of the Northwest Territories Legislative Assembly where he also served as Deputy Premier. Mr. Wah-shee has executive business experience from his time as President of the Denedeh Development Corporation, and in addition to his Legislative Assembly terms, his experience in governance also comes from serving as the Self-government Negotiator for the Dogrib Treaty 11 Council, now the Tlicho Government.

Mr. Wah-shee is Past-president of the NWT Aboriginal Summit, and past Board member for the Northwest Territories Power Corporation. Residing in Edzo, a community in the Tlicho region, he is a Tlicho citizen and a respected Tlicho elder. He is the Tlicho Government's nominee to the Mackenzie Valley Environmental Impact Review Board in 2010, and was appointed by the Review Board to the Gahcho Kué Panel in 2011.



Richard Mercredi, Panel member

Mr. Richard Mercredi, nominated to the Mackenzie Valley Environmental Impact Review Board by the Government of the Northwest Territories, was appointed by the Review Board to the Gahcho Kué Panel in 2011.

Mr. Mercredi worked for Public Works and Services at the GNWT for 38 years in Fort Smith in positions of increasing responsibility, including electrician, oil burner mechanic, foreman, project officer, property manager, regional maintenance officer and facility manager before eventually becoming Regional Superintendent for Fort Smith in 2000. He filled this position until his retirement in 2008, managing a budget of several million dollars and a staff of 47.

A dedicated community supporter, Mr. Mercredi has served in many volunteer and local community organizations, among them Justice of the Peace, Fort Smith Town Council, Metis Nation of the NWT, Union of Northern Workers shop steward, Fort Smith Hunters and Trapper Association, President of the Fort Smith Ice Fishing Derby, and member of the BQ Caribou Management Board.

Mr. Mercredi is equally dedicated to the environment, and has spent many years trapping and living off the land. His unique combination of experience in government and living off the land served him well as the Metis representative on the Wildlife Act Review Committee in 2009.



Rachel Crapeau, Panel member

Ms. Rachel Crapeau was nominated to the Mackenzie Valley Environmental Impact Review Board in 2010 by the Government of the Northwest Territories and appointed by the Review Board to the Gahcho Kué Panel in 2011.

She has varied and valuable experience from her work in health care, print and broadcast journalism, community resource management and, most recently, environmental monitoring and management.

Ms. Crapeau managed the Yellowknives Dene First Nation Land and Environment Department for nine years. While there, she participated in the development of the Cumulative Effects Assessment and Management Framework, the creation of the Independent Environmental Monitoring Agency for the Slave Geological Province and the Bathurst Caribou Monitoring Board, among many other initiatives. She is very familiar with all of the legislation establishing the framework for environmental assessment and monitoring in the NWT.

From her experiences as a Certified Nursing Assistant and as both a print and broadcast journalist, Ms. Crapeau retains a keen interest in community health and communications matters. She has worked with youth and elders to help them understand the ramifications of resource development. Her abilities in translation in aboriginal languages proved valuable while working as a journalist with the Canadian Broadcasting Corporation, the Native Press and the Native Communications Society.