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# Technical Report

## De Beers Snap Lake Diamond Project

Submission to the  
Mackenzie Valley Environmental Impact Review Board  
Yellowknife, NT

Prepared by  
**Government of the Northwest Territories**  
Department of Resources, Wildlife & Economic Development  
Department of Education, Culture and Employment  
Department of Health and Social Services

February 2003



## OVERVIEW SUMMARY

The Government of the Northwest Territories (GNWT) technical comments and recommendations on the De Beers Canada Mining Incorporated (De Beers) environmental impact assessment for its proposed development of a diamond mine at Snap Lake, NWT are a contribution by experts within several GNWT departments and agencies. The GNWT has identified issues related to the social and economic well being of northern residents and environment concerns.

### Socio-economic Overview

The Mackenzie Valley Resource Management Act, Provision 115(b) stipulates a requirement for *"the protection of the social, cultural and economic well-being of residents and communities in the Mackenzie Valley."* While De Beers has recognized the need to support northerners through employment opportunities, training opportunities and social programs to reduce impacts, De Beers has not recognized other issues that will assist with the long term development of a sustainable northern economy such as hydroelectric development, housing or support of a northern diamond manufacturing industry. These and other issues are discussed along with recommendations for their resolution. De Beers has not discussed a specific instrument through which their commitments and contributions to mitigate social impacts or improve social conditions for employers and northern residents could be formalized. The GNWT believes that commitment to a Socio-Economic Agreement with the GNWT provides an effective mechanism to ensure mitigation measures are developed and monitored over the life of the mine. Such formal mechanisms will improve the northern economy and enhance the lifestyles of northerners through beneficial partnerships between industry, government and affected communities throughout the NWT.

### Environmental Overview

In general, the De Beers Snap Lake Environmental Assessment was considered to be adequate given the scope and nature of the project. As a small scale, small footprint, underground mine with appropriate mitigation and management, the Snap Lake Project should result in minimum impacts to wildlife and wildlife habitat. Not of the wildlife or environmental impacts can be adequately stated at this time as, in some cases, the environmental assessment relied on qualitative rather than quantitative methods to determine residual impacts when both baseline data and quantitative methods were available. Greater use of information resulting from the BHP Billiton and Diavik mining operations to improve baseline information, mitigation details and impact predictions. De Beers did not use wildlife impact models such as those developed for BHP Billiton and Diavik; this could have improved the assessment. Collection of additional baseline data and monitoring should result in less uncertainty in impact predictions for wildlife, air quality and reclamation. Finally, the lack of detail provided in the proposed environmental management plans did not provide a level of confidence that residual impacts will be minimized. These and other issues are discussed along with recommendations for their resolution. Monitoring programs are needed to address the predicted impacts and the uncertainty associated with them. Development of an Environmental Agreement will assist in establishing cooperative monitoring arrangements and solution of environmental concerns over the life of the mine.

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## Glossary of Terms

ambient air	outside air (i.e. not inside a building or underground)
biological remediation	a method of using natural bacteria to speed up degradation of contaminants
dispersion model	method of using emissions and weather information to calculate/predict how they will affect outside air concentrations
fine particulate	airborne tiny solid and liquid particles small enough to be breathed into lungs
emissions	gases or particles released to the air (usually from a human-made source)
inert solids	wastes that do not contain active chemicals that could impact water, soil, or air

## List of Abbreviations

BHP B - BHP Billiton Diamonds Inc.

DHSS - Department of Health and Social Services

Diavik - Diavik Diamond Mines Inc.

DIAND – Department of Indian Affairs and Northern Development

DTC – Diamond Technical Committee

EAR – Environmental Assessment Report

ECE - Department of Education, Culture and Employment

EFAP - Employee and Family Assistance Program

ELC - Ecological Land Classification

GNWT – Government of the Northwest Territories

HSSA - Health and Social Service Authorities

MMAC - Mine Management Advisory Committee

NWTPC - North West Territories Power Corporation

RSA - Regional Study Area

RWED – Department of Resources, Wildlife and Economic Development

SGP – Slave Geologic Province





## INTRODUCTION

The Government of the Northwest Territories (GNWT) is pleased to offer the following technical comments on the De Beers Canada Mining Incorporated (De Beers) environmental impact assessment for its proposed development of a diamond mine at Snap Lake, Northwest Territories (NWT).

These comments and recommendations are a contribution by experts within several GNWT departments and agencies including:

Department of Education, Culture and Employment (ECE)

Department of Health and Social Services (DHSS)

Department of Resources, Wildlife and Economic Development (RWED)

Environmental Protection

Wildlife and Fisheries

Energy Secretariat

Diamond Projects

Industrial Initiatives

The GNWT submission is organized into two major sections: Socio-economic and Environmental. Each section contains a summary of all issues discussed and a summary of recommendations or mitigations, followed by a detailed discussion of each issue. These issues are organized by expert department or agency. Where no comments have been offered, we have no major concerns at this time. This does not include potential issues outside the areas of our collective expertise. The GNWT relies on experts from federal departments and has not offered comments on these areas.

## **Part One – Social-Economic Technical Submission**

### **Summary of Socio-Economic Issues**

#### **Medical Services at the Mine Site**

De Beers proposes that medical services be available 24-hours per day by Physician Assistants on contract; however, Physician Assistants are not recognized in NWT health legislation and, therefore, cannot provide medical services at the mine site. The Department of Health and Social Services has stated that medical services on site must be available from either physicians or nurses licensed and registered in the NWT.

#### **Employee and Family Assistance Program**

De Beers proposes to offer an Employee and Family Assistance Program to help employees and families deal with personal problems; however, De Beers does not describe the service that would be available and how it would link to other counseling programs. Without this information, the Department of Health and Social Services cannot determine how De Beers intends to develop and maintain its program.

#### **Partnerships to Reduce Negative Impacts**

De Beers proposes to reduce the mine's negative impacts in partnership with others; however, De Beers does not provide any information as to what it will bring to these partnerships, such as dollars, people and facilities. Also, De Beers does not state what it expects will be the contributions by the other community and government partners. Without this information, the Department of Health and Social Services cannot assess whether the proposed measures will reduce the negative impacts.

#### **Impacts on Health and Social Services Infrastructure**

De Beers states that it could not predict what the impacts on health and social services infrastructure would be as a result of only the Snap Lake mine. While it may be difficult to assess cumulative impacts on infrastructure, it is not, as De Beers suggests, impossible to do so. The Department of Health and Social Services does not accept De Beers' statement and concludes that De Beers has failed to properly assess the impact on health and social service infrastructure.

#### **Spatial Areas**

De Beers has not provided an adequate rationale for choosing the spatial areas for the Snap Lake Diamond project. The only reasoning provided is "due to their proximity to the project site and expected contribution to the project workforce." Quantitative and investigative analyses of the spatial areas was not provided to substantiate any rationale for the spatial areas. Communities not noted as being a "primary" community by De Beers, but which might be affected by the

development of the mine, may be excluded from the community-based mitigation measures proposed by De Beers for the Primary communities.

### **Direct Flights**

Not all of the communities listed as catchment communities as defined in the EA are included as communities that will be part of mitigation efforts including the use of direct flights. Additionally employee flights from southern locations might be allowed direct access to the mine site, providing no benefit to the northern economy. It is the conclusion of the GNWT that, although De Beers is committed to hiring northerners, they are not willing to make a commitment to transport northerners outside of the primary communities to and from the worksite. De Beers has also made no note about additional flights that may be arriving from outside the NWT arriving at the Snap Lake Diamond Project.

### **Community Consultation (Mine Management Advisory Committee)**

De Beers currently has representatives on the MMAC composed of members of the primary communities and the North Slave Métis Alliance. The MMAC does not include members that will fully represent the people of the NWT. The GNWT represents the entire population of the NWT and should have up to three GNWT representatives from various departments on the MMAC. In addition, Yellowknife is not included as having a community representative, even though it is a likely source of goods and services, and workers.

### **Hiring Commitments**

For the Snap Lake Diamond Project, De Beers has not set quantitative hiring targets. They have committed to hiring as many Aboriginals and northerners as possible as a first priority. They have also set a target to hire as many qualified Aboriginal people as possible in all phases of the project. As De Beers does not have quantitative targets, it is not possible to understand the extent of the impact that De Beers will have on the North. It is the conclusion of the GNWT that if De Beers did a complete analysis of the current labour market conditions, they would be able to make a commitment to quantitative targets for employment of northerners.

### **Energy Sources**

De Beers has concluded that diesel fuel is the most appropriate energy for power generation at the Snap Lake mine. The largest local energy source is hydroelectric power. Under MVRMA 115(b) the lack of support for hydroelectric energy and transmission capacity has significant socio-economic impacts on future energy supplies of NWT communities and impacts NWT obligations under the Kyoto Accord. The GNWT demonstrates there are valid options for the use of hydroelectric power for mine development.

### **Housing Needs and Development in the NWT**

Housing, its supply and cost, is an issue in most NWT communities. The GNWT recommends that De Beers secure the services of a major cooperative housing association to develop a business plan for an employee cooperative housing development in the NWT.

### **Options for Sorting and Marketing Diamonds From the Mine**

De Beers committed to make NWT mined rough diamonds available to NWT manufacturers during Technical Sessions. A subsequent press release indicated two alternative agreement approaches to accomplish this; neither of which exists. The GNWT recommends a Memorandum of Understanding to clarify the specifics regarding support to the northern diamond manufacturing industry.

### **Impact Management Measures and Socio-Economic Agreements**

De Beers has acknowledged that there will be impacts in the areas of employment levels; provision of training programs; expansion of the wage economy in the communities; and, behavioural and lifestyle changes, by individuals, families, and communities as a whole. De Beers has not discussed a specific instrument through which their commitments and contributions to mitigate social impacts or improve social conditions for employers and northern residents could be formalized. The GNWT recommends a Socio-Economic Agreement as the vehicle for addressing such issues over the long term.

## Summary of Socio-economic Recommendations

The GNWT recommends that De Beers be required to:

1. Hire or contract with only NWT-licensed physicians and/or NWT-registered nurses in sufficient numbers to provide 24-hour, 7-day per week medical services at the mine site.
2. Take the lead in establishing and maintaining a 'family services center' through which its employees, and the employees of its contractors and subcontractors could access counseling and other assistance programs. To ensure minimal duplication, the GNWT suggests that De Beers lead a partnership initiative that would encourage the pooling of resources with BHP Billiton Diamonds Inc. and Diavik Diamond Mines Inc. to provide an integrated employee and family assistance program for employees of all three companies, and employees of their contractors and subcontractors.
3. Contribute annually to a community development fund to support local social development initiatives in the primary communities.
4. Describe the following elements of its proposed partnerships to enhance substance abuse prevention and treatment and to enhance family support services in its efforts to mitigate the negative impacts of its activities:
  - Goals and objectives
  - Scope of activities
  - Clients served
  - Anticipated outcomes and results
  - Evaluation methodology
  - Participating partners
  - Resources committed
5. Set aside a contingency fund that would provide for increased health and social service infrastructure arising from increased demands for health and social services by De Beers' and its contractors' employees and families.
6. Re-examine the catchment communities defined and adjust them to meet the current and future NWT labour market conditions. Transportation should not be a barrier to hiring northerners. De Beers should expand the catchment area to include all NWT communities and implement measures such as covering all transportation costs of all northern employees including employees of De Beers, contractors, and subcontractors. With the expansion of spatial areas proposed, community/ individual socio-economic mitigation measures also be expanded such as direct flights to and from the mine site, to ensure that all northerners have equivalent or greater opportunities to work on the Snap Lake Diamond Project as southern hirers.

7. Provide direct flights at no cost to employees, contractor employees, and subcontractor employees to and from the mine site from all NWT communities to encourage employment for northerners. Make a commitment not to not allow southern employee flights to land at the Snap Lake Diamond Project airstrip without stopping in the NWT first to pick up Northerners.
8. Develop a benefits package that compensates employees and encourages them to remain in the north. These commitments will ensure that all northerners have equivalent or greater opportunities to work on the Snap Lake Diamond Project as southern hires. The vehicle for these commitments is through a Socio-Economic Agreement with the GNWT.
9. Establish a Mine Management Advisory Committee, that includes representatives from the GNWT to represent the views of the remaining NWT population, and representatives of affected parties. It is also recommended that the "high level" input with De Beers include meeting with the president of De Beers Canada at least once a year. The MMAC could be composed of the following membership:
  - representation from the Government of the Northwest Territories
    - Resources, Wildlife and Economic Development
    - Education, Culture and Employment
    - Health and Social Services
  - representation from Dogrib Treaty 11 Aboriginal Government
  - representation from the Yellowknives Dene Band or Aboriginal Government
  - representation from the Lutsel k'e Dene Band
  - representation from the North Slave Métis Alliance
10. Confirm that they will take all reasonable steps for itself, and its contractors and sub-contractors, acting in good faith, to work towards ensuring that:
  - Employment of northerners, resident in the NWT, will be at least 40% of the total employment throughout the Construction Phase of the Project; and of that 40%, at least 50% of those hired will be indigenous Aboriginal residing in the NWT;
  - Employment of indigenous Aboriginal persons, resident in the NWT, including employment by contractors and sub-contractors, will make up at least 40% of the total employment throughout the Operation Phase of the Project. Employment of northerners will collectively be at least 66% of the total employment throughout of the Operations Phase of the Project and 90% by Year 10 of the Operations Phase of the Project.
  - Employ apprentices at a ratio of 1 apprentice to every 2 journey certified trades people.
  - That De Beers for itself, contractors and subcontractors, has a primary hiring office or centre in the NWT and ensures that the first point for advertising for jobs on the Snap Lake project is in all northern newspapers and that Northerners

receive responses to their applications within a reasonable time frame while respecting the employment targets.

- That pre-employment programs are geared to lead towards employment in mining, trades and technologies.
11. Implement training and employment programs for Northerners, such as a promotion of pre-employment, community programs, mine training school including provision of community capital infrastructure and operational and maintenance fund that promotes the training, and hiring, retention and promotion of northern employees. And that De Beers implement corrective measures if training, employment, retention and promotion targets are not met. These may also be negotiated under a Socio- Economic Agreement with the GNWT.
  12. Set mutually agreeable conditions for the future development of hydroelectric supplies for the mine site through a Socioeconomic Agreement with the Government of the NWT.
  13. Secure the services of a major cooperative housing association in southern Canada to develop a feasibility/business plan for a new industry driven cooperative housing development in the NWT.
  14. Establish a Memorandum of Understanding (MOU) with the GNWT on the supply of rough diamonds from the Snap Lake mine. In addition to other areas agreed to by the parties this MOU should clearly identify the following:  
**Supply of Rough Diamonds**
    - De Beers' commitment to select one or more NWT based clients and to enter into written agreements for the supply of rough diamonds entirely from Snap Lake Mine production.
    - Agreement that allocations will be in sizes, shapes, colours and qualities, which can be cut economically in the NWT. Defined parameters of these are a required aspect of the agreement.
    - Agreement on the minimum value to be supplied to De Beers' selected NWT clients in each calendar year as measured at full DTC selling prices and agreement to work constructively to meet both growth in demand and industry requirements for diversified sources of supply.
    - Agreement on a workable means of confirming the pricing of goods for NWT clients and a means of confirming allocations provided are within the parameters agreed to.
    - Agreement on a process for selection, review, assessment and approval of NWT based clients and De Beers' acceptance of the GNWT policy for support to the secondary diamond industry.
    - A means of monitoring and tracking rough diamonds allocated for manufacturing in the NWT to ensure that it originates from the Snap Lake diamond mine and that 100% of the allocated rough diamonds is 100% manufactured in the NWT.
    - An arbitration process to hear appeals from NWT clients of De Beers, or from De Beers, on issues relating to the sales relationships in the areas of, for example but not limited to, prices and assortment.

- Agreement on when the parties will finalize agreements set out in the MOU and that arrangements flowing from the MOU will ensure for as long as De Beers is producing Snap Lake Diamonds.

#### **Sorting and Valuation Facility**

- De Beers' commitment to set up a sorting and valuing facility in an NWT community, which will, prior to export and sale, sort the production of Snap Lake rough diamonds and any other mining projects in the NWT over which De Beers has partial or full marketing rights.
- Agreement on what level of sorting and to maximize the level of sorting that will be carried out at such a facility.
- Agreement on how De Beers will provide training and employment opportunities for northerners, their intentions regarding importing of skilled personnel from the DTC and numbers of NWT residents employed.

#### **Exchange of information**

- Agreement that De Beers will establish a framework and mechanisms for ongoing communication regarding information, issues and decisions relevant to the GNWT/De Beers relationship including annual GNWT/DTC meetings.

15. Enter into Impact Benefit Agreements with the Primary Impacted Communities;
16. Enter into a Socio-Economic Agreement with the Government of the Northwest Territories and Aboriginal Authorities of the Primary Impacted Communities. Further,
  - That, consistent with the Diavik Socio-Economic Monitoring Agreement, the Snap Lake Socio-Economic Monitoring Agreement should address the elements of community wellness, training, employment and business opportunities, and secondary industry issues;
  - In addition, it should address the issue of hydroelectric energy;
  - That the Socio-Economic Agreement also establish a Communities Advisory Board (or Mine Management Advisory Committee) as per the recommendations by the ECE. This is a mechanism to ensure that primary communities and other impacted Northerners are meaningfully engaged in the planning, monitoring and mitigation process; and,
  - Establish an annual community development fund (as per DHSS's recommendations) and that the disposition of that funding be administered by the Communities Advisory Board.



## **Part 1 Health and Social Services**

The mandate of the Department of Health and Social Services (DHSS) is to protect, promote and provide for the health and well being of the people of the NWT. Health and social programs in the NWT are managed and delivered by regional Health and Social Service Authorities (HSSA) who report to the Minister responsible for health and social services.

There are six regional HSSAs, providing programs and services to the Inuvik, Deh Cho, and Dogrib regions, and to the communities of Yellowknife, Hay River and Fort Smith. Each HSSA is responsible for providing the following core services to the people within its catchment area:

- ☐ Health promotion and disease prevention programs
- ☐ Protective services
- ☐ Diagnostic and curative services
- ☐ Continuing care
- ☐ Rehabilitative services
- ☐ Mental health and addiction services

Not all services may be available locally. In some instances, people access services in regional centers (e.g., at the Inuvik regional hospital) or at Territorial facilities (e.g., at Stanton Territorial hospital). Occasionally, specialized services are only available outside the NWT. Medical travel is provided for medically necessary services that are not available at the local, regional or territorial level.

The DHSS has reviewed the Snap Lake Diamond Project Environment Assessment Report (EAR) in the following general areas:

- Socio-Economic Impact (EAR Section 5)
- Air Quality (EAR Section 7)
- Water Quality (EAR Section 9.4)
- Environmental Health (EAR Section 11)

The DHSS administers health service and social programs legislation in the NWT and, therefore, serves in this assessment as both an expert advisor and as a regulator in the protection of the health and well being of the people in the NWT.

### **Specific Comments**

Specific issues are discussed below:

**Issue Identification:** Medical Services Available at the Mine Site (ToR Line 200, EAR Sections 3.7.1 and 5.3.3.5).

**Developer's Conclusion:** De Beers proposes a 350 person permanent camp with employees working a two weeks on / two weeks off schedule during the operations phase. When asked about the availability of medical services on site (GLL IR 1.28), De Beers responded that medical services would be available 24-hours per day, and would be provided by Physician Assistants on contract and/or Registered Nurses employed by De Beers (R1.34b).

**GNWT Conclusion:** Physician Assistants are not recognized in NWT health legislation and, therefore, cannot provide medical services at the proposed mine site. Medical services on site must be available from either physicians or nurses licensed and registered in the NWT.

**GNWT Rationale:** NWT legislation requires that medical services be provided only by physicians and/or registered nurses who are licensed to practice in the NWT.

**GNWT Recommendation:** The GNWT recommends that De Beers hire or contract only with NWT-licensed physicians and/or NWT-registered nurses in sufficient numbers to provide 24-hour, 7-day per week medical services at the mine site.

**Issue Identification:** Employee Assistance Programs (Reference ToR Line 172-176, EAR Sections 5.3.4 and 5.3.4.3)

**Developer's Conclusion:** De Beers indicated that it intends to maintain an Employee and Family Assistance Program (EFAP) to help employees and their families deal with personal problems (see IR #2, Response 2.5.52); however, De Beers was unable to specify the level of service that would be available through the EFAP, and did not describe how, if at all, the EFAP would depend on, use, or link to existing counseling programs. Further, De Beers indicated that contractors and subcontractors would be responsible for developing and maintaining their own employee and family assistance programs.

**GNWT Conclusion:** There is no doubt that an EFAP will be essential during the life of the Snap Lake project to assist employees and their families; however, the level of detail provided by De Beers in its response to the information request was insufficient to assess the suitability and adequacy of the proposed EFAP as an effective and efficient mitigating measure.

As the proposal stands, there is a very real risk that the De Beers EFAP will duplicate existing programs, creating unnecessary competition and demand for limited resources. Further, there is no guarantee that contractors and subcontractors will have either the inclination or the capacity to create their own assistance programs. This could create additional demand on existing community resources and programs.

**GNWT Rationale:** Without knowing the details of the proposal, the GNWT could not determine how De Beers intended to develop and maintain its EFAP. There are only a limited number of individuals and firms in the NWT with the knowledge and expertise required to deliver employee assistance programs. If De Beers plans to use these individuals and firms, by direct hire or by contract, then this could create unnecessary competition with other business and industry requiring similar programs. On the other hand, hiring individuals or firms from outside the NWT could lead to the provision of inferior services if the individual and/or firms did not have knowledge and experience in providing services to northerners in northern settings.

Contractors and subcontractors are not bound by De Beers to create employee assistance programs. Consequently, there is no guarantee that their employees will receive these necessary benefits. Further, contractors and subcontractors who might wish to provide these benefits may not have the resources to do so.

**GNWT Recommendation:** The GNWT recommends that De Beers take the lead in establishing and maintaining a 'family services center' through which its employees, and the employees of its contractors and subcontractors could access counseling and other assistance programs. To ensure minimal duplication, the GNWT suggests that De Beers lead a partnership initiative that would encourage the pooling of resources with BHP Billiton Diamonds Inc. and Diavik Diamond Mines Inc. to provide integrated employee and family assistance program for employees of all three companies, and employees of their contractors and subcontractors.

**Issue Identification: Partnerships to Mitigate Negative Impacts** (EAR 5.3.4)

**Developer's Conclusion:** De Beers has outlined a number of impact management measures that are proposed to offset anticipated negative social impacts. These include:

- Sustainable social development (EAR p. 5-145)
- Substance abuse prevention and treatment (EAR Section 5.3.4.3.1)
- Family support services (EAR Section 5.3.4.3.3)

De Beers has placed a great deal of emphasis on the concept of developing these mitigation measures in *partnership* with others – primarily communities and governments; however, De Beers does not provide any details about what it will bring to these partnerships in terms of material resources – dollars, people and facilities – nor does De Beers state explicitly what it expects the contributions by the other community and government partners will be.

**GNWT Conclusion:** While the GNWT fully supports the idea of developing mitigating measures through the creation of partnerships, De Beers has not provided sufficient detail about its contributions nor its expectations of the contributions of others, for an adequate assessment to be made of the partnership proposals.

The success of these partnerships will depend, among other things, on how well they are resourced and on how well they are managed. In the absence of these details, DHSS cannot evaluate whether the proposed mitigation measures will be sufficiently effective as to offset the expected negative impacts.

**GNWT Rationale:** Pages 5-153 and 5-154 provide examples of the lack of detail in the De Beers proposal. While expressing the recognition “*that health and wellness of individuals and families is fundamental to social, economic and cultural sustainability...*” and acknowledging that their proposed project “*... may exacerbate existing social dysfunctional conditions...*”, De Beers nevertheless identifies very little by way of specific mitigating actions.

Speaking to the mitigation of substance abuse, De Beers simply says that it is “*committed to working with others to take a proactive and long-term approach to addressing substance abuse ...*” De Beers also states that it will “*seek partnerships with communities, the GNWT and the government of Canada to ensure that effective and recognized substance abuse programs are made available...*”, and that it will “*work in partnership with government and community agencies in terms of awareness and prevention*” (EAR Section 5.3.4.3.1). At no point does De Beers state what it intends to bring to the partnerships, nor does De Beers describe how, when or where these partnerships would become operational.

A similar lack of detail was noted in reference to De Beers' proposals for family support services.

**GNWT Recommendations:** The GNWT recommends that De Beers contribute annually to a community development fund to support local social development initiatives in the primary communities.

The GNWT also recommends that De Beers describe the following elements of its proposed partnerships to enhance substance abuse prevention and treatment and to enhance family support services in its efforts to mitigate the negative impacts of its activities:

- Goals and objectives
- Scope of activities
- Clients served
- Anticipated outcomes and results
- Evaluation methodology
- Participating partners
- Resources committed

**Issue Identification:** Impacts on Health and Social Services Infrastructure (Reference: ToR Lines 507-510)

**Developer's Conclusion:** In response to the Information Request #1.12.2 to complete an analysis of the anticipated cumulative impacts on health and social services infrastructure, De Beers indicated that it would respond to this issue in its response to Non-conformity Item 9 (see Response 2.5.55e, p. 361, IR#2).

In the De Beers Conformity Responses, De Beers stated "*It is not possible to predict in any meaningful way where the physical community growth and potential associated infrastructure will occur in isolation of other sources of growth and economic opportunity.*" (August 22, 2002 letter to the Review Board, p.44). No analysis was provided from which to estimate the anticipated impacts on health and social services infrastructure.

**GNWT Conclusion:** The environmental assessment process is intended to assess the impacts of proposed resource development activities, including **cumulative** impacts. In its response, De Beers appears to be saying that it is not possible to assess cumulative impacts on health and social service infrastructure. The GNWT does not accept this proposition, and concludes that De Beers has failed to properly assess the impact on health and social service infrastructure.

**GNWT Rationale:** While it may be difficult to assess cumulative impacts on infrastructure, it is not, as De Beers proposes, impossible to do so. Cumulative impacts may be estimated by making assumptions about anticipated utilization rates associated with the increased need to access health and social services infrastructure resulting from the development of the Snap Lake mine.

**GNWT Recommendation:** The GNWT recommends that De Beers set aside a contingency fund that would provide for increased health and social service infrastructure arising from increased demands for health and social services by De Beers' and its contractor's employees and families.

## **Part 2 Education, Culture and Employment**

The mandate of the Department of Education, Culture and Employment (ECE), as described in the department's establishment policy, is to provide residents of the Northwest Territories with access to quality programs, services and supports to assist them in making informed and productive choices for themselves and their families with regard to education, training, careers, employment, child development, languages, culture, and heritage.

ECE has reviewed the Snap Lake Diamond Project Environment Assessment Report (EAR) in the following general areas:

- Spatial Areas
- Direct Flights
- Community Consultation (Mine Management Advisory Committee)
- Hiring Commitments

The ECE serves in this assessment as an expert advisor. The comments included here are offered in our departmental capacity as an expert advisor except where it is specifically indicated otherwise.

### **Specific Comments**

Specific comments follow.

**Issue Identification: Spatial Areas** (EAR 5.1.4, IR 1.20(a), 2.5.6, 4.11.7)

**Developer's Conclusion:** In IR 4.11.7 De Beers states, "Section 5.1.4 of the Environmental Assessment Report (EAR) explains how the study area for the socio-economic impact assessment was determined."

In Section 5.1.4 De Beers states, "*because the socio-economic study focuses on people, the primary study area consists of primary communities and not a defined area of land. Instead of using the local and regional study areas as defined in other sections of the EA, the SELA consists of primary study communities and employment catchment communities.*"

*The primary study communities consist of Lutsel K'e, N'Dilo, Dettah, Gameti, Wha Ti, Rae Edzo, Wekweti and Yellowknife (including the North Slave Métis Alliance population). These are the communities that De Beers has determined are likely to experience the greatest impacts, due to their proximity to the project site and expected contribution to the project workforce.*

*The employment catchment communities are Fort Resolution, Hay River, Hay River Reserve, Fort Smith, Fort Providence and Enterprise, which are located further away from the project site. The northern workforce may be drawn in part from any or all of these communities."*

In IR response 2.5.6, De Beers stated, "*These zones of influence do not require reanalysis*", when referring to the spatial boundaries laid out in the EAR and IR.

In IR response 1.20(a) and appendix, the developer has concluded that the number and proportion of the Aboriginal and northern population of the region who could currently expect to meet the employment standards of the mine was 1,507 persons from the project labour area (primary communities and catchment communities) at the time of the 1999 Labour Force Survey. This included 1,000 people from the primary communities and 507 from the catchment communities. The criteria De Beers used to come to this conclusion were: those not working and wanting a job; those willing to do rotational work; and those with greater than a grade 9 education level.

De Beers has also stated that "*At the Snap Lake Diamond Project, there is a commitment to hire those living in the North, especially Northern Aboriginal people.*"<sup>1</sup>

**GNWT Conclusion:** De Beers has failed to adequately explain its rationale for choosing its spatial boundaries. Communities not noted as being a "primary" community by De Beers, but which might be affected by the development of the mine, may be excluded from the community based mitigation measures proposed by De Beers for the Primary communities.

De Beers has not provided an adequate rationale for choosing the spatial areas for the Snap Lake Diamond project. The only reasoning provided is "*due to their proximity to the project site and expected contribution to the project workforce.*" Quantitative and investigative analysis of the spatial areas was not provided to substantiate any rationale for the spatial areas.

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<sup>1</sup> De Beers. Developing Human Resources for the Snap Lake Diamond Project 2002, p. 9.



The statistical information used to determine the potential labour force from the primary and catchment communities from the 1999 NWT Labour Force Survey may not be applicable to today's labour climate. The spatial areas defined by De Beers also do not incorporate the current labour market conditions and need to be reexamined to determine the maximum zones of influence on the NWT labour supply.

**GNWT Rationale:** At the time of the 1999 NWT Labour Force Survey the unemployment rate for the NWT was at 13.7%. From labour force statistics the unemployment rate for the NWT was 5.8% for 2002; changing the initial unemployed population from 3,170 in 1999 to 1,300 in 2002. These drastic changes may be due to the changes in development over the past 3 years.

Currently, unemployment data is unable to categorize NWT residents into the criteria defined by De Beers (i.e., those not working and wanting a job, those willing to do rotational work, those with greater than a grade 9 education level and community). The only available community data are Employment Insurance data. This is the current number of people in the NWT who are currently on Employment Insurance who have lost their job and want to return to work.

Region	Number of Employment Insurance Clients
Primary Communities	787
Catchment Communities	474
Other NWT Communities	737
<b>Total<sup>2</sup></b>	<b>1998</b>

This number is slightly higher than the current unemployment figures for 2002. It is important to note that the number of EI clients is collected differently and has slightly different criteria than the unemployment figures, for these reasons it is expected that these numbers will differ slightly.

The EI numbers provided could also be broken down into the last type of job the client worked. Under the category of EI clients who have worked in Trades, Transport and Equipment Operators and Related Occupations, the following data were uncovered.

Region/Community	# of EI clients With Trades, Transport and Equipment Operators and/or Related Occupations Experience
Primary Communities (not including Yellowknife)	86
Yellowknife	236
Catchment Communities	209
Other NWT Communities	345
<b>Total</b>	<b>876*</b>

\*This does not include EI clients currently on Apprenticeship Training <sup>3</sup>

<sup>2</sup> Human Resources Development Canada, December 2002 Employment Insurance Data

<sup>3</sup> Ibid

The EI data provided gives us a total of 531 northern residents who might have the qualifications or are willing to do rotational work at the mine site from the primary and catchment communities. By expanding the catchment area to include the entire NWT, De Beers could have a potential labour pool of 876 northerners who have worked in trades, transport and equipment operators and related occupations. As well, there are an additional 1,081 northern residents who have worked in other occupations that may be qualified to work on the Snap Lake Diamond Project. This potential labour pool may allow De Beers to meet their commitment to hire those living in the north. In expanding the spatial areas and mitigation measures De Beers will fully recognize this potential to employ northern labour.

*“The anticipated staff and contractor personnel requirements during the construction phase will average 450 people”<sup>4</sup> and “approximately 500 full-time positions during mine production.”<sup>5</sup> and will meet its commitment to Northern Aboriginal people and other Northern residents. In Technical Sessions De Beers assumed that 60% of this workforce will be northern; with 30% of this 60% migrating from the south. From these assumptions, De Beers feels that, during construction phase, only 189 employees of the total 450 employees and, during the operations phase, only 221 employees of the total 525 employees will be current NWT residents. De Beers has “a policy that is aimed at recruiting and hiring as many Northern Aboriginal people and other Northern residents as possible”.<sup>6</sup> In order to fulfill its commitment, given current labour statistics, De Beers must expand its spatial area. This expansion is to ensure that “De Beers’ philosophy of maximizing benefits to the people and communities in areas nearest their mine site”<sup>7</sup>*

From reviewing the current EI data, it is speculation that the NWT has sufficient residents to work on the Snap Lake Diamond Project without the need of in-migration and the transport of southern hires. It is the commitment of De Beers to hire those living in the North. From preliminary analysis in order for De Beers to accomplish this goal, the spatial areas defined need to be expanded to provide the workforce required at the mine. Citing the drastic changes in the labour market conditions since 1999, and the lack of detailed labour market statistics such as persons willing to do rotational work, those not working and wanting a job and the level of education of persons in the NWT, the following is recommended.

**GNWT Recommendation:** To ensure northerners receive full benefits of the mine, GNWT recommends that the catchment communities defined by De Beers be re-examined and adjusted to meet the current and future NWT labour market conditions. Transportation should not be a barrier to hiring northerners. De Beers should expand the catchment area to include all NWT communities and implement measures such as covering all transportation costs of all Northern employees including employees of De Beers, contractors, and subcontractors. With the expansion of spatial areas proposed, community/ individual socio-economic mitigation measures also be expanded such as direct flights to and from the mine site, to ensure that all northerners have equivalent or greater opportunities to work on the Snap Lake Diamond Project as southern hirers.

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<sup>4</sup> De Beers; Developing Human Resources for the Snap Lake Diamond Project 2002 p. 12

<sup>5</sup> Ibid, P. 32

<sup>6</sup> Ibid, P. 40

<sup>7</sup> Ibid, P. 40

**Issue Identification: Direct Flights** (Table 5.3-7, IR 2.5.47)

**Developers Conclusion:** De Beers has stated that “*At the Snap Lake Diamond Project, there is a commitment to hire those living in the North, especially Northern Aboriginal people.*”<sup>8</sup>

In Table 5.3-7 of the EAR, employment involvement in the wage, economy and increased employment level is listed as a direct impact for individuals, communities and regions.

In IR 2.5.47 De Beers states “*for the primary communities other than Yellowknife, Rae-Edzo, Dettah & N’Dilo, De Beers will provide flights to and from the mine site that do not pass through Yellowknife.*”

On Day 10 of the MVEIRB Technical Sessions for De Beers Snap Lake Diamond Project when responding to the question if De Beers would consider an access site south of the lake De Beers replied, “*Yes we would. Hay River is an obvious location with a major airport. We won’t make a commitment, but it makes logical sense. We are committed to maximize the number of northerners and providing transport could be key. However the emphasis will focus on the primary communities.*”

**GNWT Conclusion:** Not all of the communities listed as catchment communities as defined in the EA are included as communities that will be part of mitigation efforts including the use of direct flights. Additionally, employee flights from southern locations might be allowed direct access to the mine site, providing no benefit to the northern economy. It is the conclusion of the GNWT that, although De Beers is committed to hiring northerners, they are not willing to make a commitment to transport northerners outside of the primary communities to and from the worksite. De Beers has also made no note about additional flights from outside the NWT arriving at the Snap Lake Diamond Project.

**GNWT Rational:** As listed in Table 5.3-7, one major benefit to the development of the Snap Lake Diamond project is employment; which in turn creates further indirect impacts for individuals, families, communities and regions. Not providing direct flights for NWT residents outside the primary communities De Beers is limiting this positive impact. De Beers has stated that providing an access site south of the lake makes logical sense.

Following is a list of approximate costs (January 2003 quotes from airlines) for a round trip per person flight from various communities to Yellowknife (a primary community).

**Round Trip flight cost per person to Yellowknife (January 2003)**

Community (Region)	Approximate Costs
Fort Smith (South Slave)	\$510.00
Hay River (South Slave)	\$268.00
Norman Wells (Sahtu)	\$541.00
Fort Simpson (Deh Cho)	\$507.00
Inuvik (Beaufort Delta)	\$785.00
Tuktoyaktuk (Beaufort Delta)	\$904.00
Edmonton (Alberta)	\$624.00

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<sup>8</sup> De Beers: Developing Human Resources for the Snap Lake Diamond Project

From the list above, the difference in cost, aside from the cost of flying from Hay River to Yellowknife, between various northern communities and the cost of a flight from Edmonton is quite similar. It is also noted that if southern employees chose to drive to the closest fly-in community, the cost is relatively low.

All communities in the NWT have a much higher price index range than Edmonton. In other words it costs more to live in the North. Looking at living cost differentials chart (below) between northern communities and Edmonton, we are able to understand why mine employees might want to relocate to Edmonton.

#### Community Differentials (1997)\*

Community (Region)	Price Index Range
Fort Smith (South Slave)	130-135
Hay River (South Slave)	125-130
Norman Wells (Sahtu)	155-160
Fort Simpson (Deh Cho)	140-145
Inuvik (Beaufort Delta)	155-160
Tuktoyaktuk (Beaufort Delta)	170-175
Yellowknife (North Slave)	120-125
Edmonton (Alberta)	100

\*The Community Differentials chart states only the cost for a personal food basket and does not state the total cost of living in the north. For example it does not include housing, utilities etc.

Without any additional northern benefits such as the payment by De Beers of direct flights for their employees, contractors and subcontractor's employees from the north to and from the mine site, plus other mitigation measures such as northern benefits that offset the cost of living in the north, there is a potential for northerners to move to a southern location; giving little or no benefit to the North.

**GNWT Recommendation:** The GNWT recommends that De Beers provide direct flights at no cost to employees, contractor employees, and subcontractor employees to and from the mine site from all NWT communities to encourage employment for northerners. It is also recommended that De Beers make a commitment not to not allow southern employee flights to land at the Snap Lake Diamond Project airstrip without stopping in the NWT first to pick up Northerners.

It is further recommended that De Beers develop a benefits package that compensates employees and encourages them to remain in the north. These commitments will ensure that all northerners have equivalent or greater opportunities to work on the Snap Lake Diamond Project as southern hires. The vehicle for these commitments is through a Socio-Economic Agreement with the GNWT.

**Issue Identification: Community Consultation (Mine Management Advisory Committee)**  
(EAR Section 3.9.1.1, IR Response 2.5.9)

**Developers Conclusion:** De Beers will set up a mine management advisory committee (MMAC). The MMAC's make-up will be determined through consultation, but ideally will be composed of De Beers personnel and representatives of each of the directly affected communities.

The MMAC will have 'high-level' input into the management of the mine through regular reviews of mine performance and policy, and through community consultation. The MMAC will meet with mine management at least quarterly and have access to production, safety, environmental, employment and training data. (EAR Section 3.9.1.1)

The MMAC will be made up of De Beers representatives and one representative from each of the primary communities. The primary communities consist of Lutsel K'e, N'dilo, Dettah, Gameti, Wha Ti, Rae/ Edzo, Wekweti, and the membership of the North Slave Métis Alliance. The MMAC will allow a direct communication between these communities and senior representatives of De Beers (IR Response 2.5.9).

**GNWT Conclusion:** De Beers currently has representatives on the MMAC composed of members of the primary communities and the North Slave Métis Alliance. The MMAC does not include members that will fully represent the people of the NWT. The GNWT represents the entire population of the NWT and should have up to three GNWT representatives from various departments on the MMAC. In addition, Yellowknife is not included as having a community representative even though it is a likely source of goods and services and workers.

It is noted that the MMAC "*ideally will be composed of De Beers personnel and representatives of each of the directly affected communities.*" It is also noted that De Beers has listed the primary communities of Lutsel K'e, N'dilo, Dettah, Gameti, Wha Ti, Rae/Edzo, Wekweti as having community representatives along with the North Slave Métis Alliance. It is our conclusion that the MMAC will not fully represent the entire population of the primary communities and affected communities.

**GNWT Rationale:** Out of the primary communities, Yellowknife contains 84% of the total population. Aside from the representation of the North Slave Métis Alliance, no consideration has been given for the remaining population of Yellowknife as well as the other NWT communities that are not represented by the North Slave Métis Alliance and, therefore, will have no representation on the MMAC but who will be affected by the mine as part of the primary communities and catchment communities and NWT as a whole.

The Mine Management Advisory Committee should have representation from government to allow government to participate in decisions that may affect government programs in respect to the effect of the Snap Lake project.

**GNWT Recommendation:** The GNWT recommends that, along with knowledgeable representatives from De Beers, the MMAC include representatives from the GNWT to represent

the views of the remaining NWT population, and representatives of affected parties. The MMAC could be composed of the following membership:

- representation from the Government of the Northwest Territories
  - Resources, Wildlife and Economic Development
  - Education, Culture and Employment
  - Health and Social Services
- representation from Dogrib Treaty 11 Aboriginal Government
- representation from the Yellowknives Dene Band or Aboriginal Government
- representation from the Lutsel k'e Dene Band
- representation from the North Slave Métis Alliance

It is also recommended that the “high level” input with De Beers include meeting with the president of De Beers Canada at least once a year.

**Issue Identification: Hiring Commitments** (EAR 14.3)

**Developer's Conclusion:** In Section 14.3 De Beers has made a commitment to "*hiring as many Aboriginals and northerners as possible as a first priority.*"

In De Beer's response for issue during the technical sessions, De Beers has concluded that they have stated targets; "*specifically, to employ as many qualified aboriginal people as possible in all phases of the project.*" They also note "*This target is not quantitative as we expect an increase over time due to the implementation of the Impact Management Measures.*"

During the Technical Sessions, De Beers stated that they "*predicted that the market could take in the entire labour force.*"

During technical sessions, when asked for the number of people\* on site De Beers was expecting to be trades people, De Beers stated that they "*had that number – but will have to get back to you later today.*" (Please note that De Beers has not provided this information to the GNWT)

**GNWT Conclusion:** For the Snap Lake Diamond Project, De Beers has not set quantitative hiring targets. They have committed to hiring as many Aboriginals and northerners as possible as a first priority. They have also set a target to hire as many qualified Aboriginal people as possible in all phases of the project. As De Beers has not set quantitative targets, it is not possible to understand the extent of the impact that De Beers will have on the North. It is the conclusion of the GNWT that if De Beers did a complete analysis of the current labour market conditions they would be able to make a commitment to quantitative targets for employment of northerners.

**GNWT Rationale:** De Beers has made predictions on the labour market from the initial research they conducted, but their position for the Snap Lake Diamond project is that the market could not take in the entire labour force. De Beers has not provided relevant analysis as to why they are unable to take the same position as was predicted by the initial research.

At the time of the 1999 Labour Force Survey, the unemployment rate for the NWT was at 13.7%. From labour force statistics the unemployment rate for the NWT is 5.8% for 2002, changing the initial unemployed population from 3,170 in 1999 to 1,300 in 2002. These drastic changes may be due to the changes in development over the past 3 years.

Currently unemployment data is unable to categorize NWT residents into the criteria defined by De Beers (i.e., those not working and wanting a job, those willing to do rotational work, those with greater than a grade 9 education level and community). The only available community data is Employment Insurance data. This is the number of people in the NWT who are currently on Employment Insurance who have lost their jobs and want to return to work.

Region	Number of Employment Insurance Clients
Primary Communities	787
Catchment Communities	474
Other NWT Communities	737
<b>Total</b>	<b>1,998<sup>9</sup></b>

This number is slightly higher than the current unemployment figures for 2002. It is important to note that the number of EI clients is collected differently and has slightly different criteria than the unemployment figures. For these reasons it is expected that these numbers will differ slightly.

As discussed earlier, (under the issue of Spatial Areas), the EI data provided a total of 531 northern residents who might have the qualifications or are willing to do rotational work at the mine site from the primary and catchment communities. By expanding the catchment area to include the entire NWT, De Beers could have a potential labour pool of 876<sup>10</sup> northerners who have worked in trades, transport and equipment operators and related occupations with an additional 1,081 northerner residents who have worked in other occupations, that may be qualified to work on the Snap Lake Diamond Project. This potential labour pool may allow De Beers to meet their commitment to hire those living in the north.

It is also noted that De Beers has not provided the requested data on the number of trades people who will be on site, due to this the GNWT is unable to determine if 10 apprentices on site is a relevant number for this project. The Apprenticeship Act and Regulations allows for a ratio of 1 certified tradesperson to 1 apprentice.

In past Socio-Economic Agreements with Diavik and BHP Billiton, both companies set hiring targets. BHPB, with a total of 2,610 employees, has been able to achieve 59.3% northern employment for 2001. This is slightly lower than their target of 62% for the Operations Phase of the mine. Diavik, with a total of 1,328 employees, has been able to achieve 45% northern employment, exceeding their target of 40% for the Construction Phase. The predicted Snap Lake workforce of 450 employees during the Construction Phase and 525 employees during the Operations Phase of the project is much smaller than both Diavik and BHP Billiton Diamond Mines.

**GNWT Recommendation:** The GNWT recommends that De Beers confirm that they will take all reasonable steps for itself, and its contractors and sub-contractors, acting in good faith, to work towards ensuring that:

- Employment of northerners, resident in the NWT, will be at least 40% of the total employment throughout the Construction Phase of the Project; and of that 40%, at least 50% of those hired will be indigenous Aboriginal residing in the NWT;

<sup>9</sup> Human Resource Development Canada, December EI figures.

<sup>10</sup> Ibid.



- Employment of indigenous Aboriginal persons, resident in the NWT, including employment by contractors and sub-contractors, will make up at least 40% of the total employment throughout the Operation Phase of the Project. Employment of northerners will collectively be at least 66% of the total employment throughout of the Operations Phase of the Project and 90% by Year 10 of the Operations Phase of the Project.
- Employ apprentices at a ratio of 1 apprentice to every 2 journey certified trades people.
- That De Beers for itself, contractors and subcontractors, has a primary hiring office or centre in the NWT and ensures that the first point for advertising for jobs on the Snap Lake project is in all northern newspapers and that Northerners receive responses to their applications within a reasonable time frame while respecting the employment targets.
- That pre-employment programs are geared to lead towards employment in mining, trades and technologies.

Further, it is recommended De Beers, its contractors and subcontractors implement training and employment programs for Northerners, such as a promotion of pre-employment, community programs, mine training school including provision of community capital infrastructure and operational and maintenance fund that promotes the training, and hiring, retention and promotion of Northern Employees. That De Beers implement corrective measures if training, employment, retention and promotion targets are not met. These may also be negotiated under a Socio- Economic Agreement with the GNWT.

## Part 3 Energy Secretariat

### Introduction

The Energy Secretariat, within the Department of Resources, Wildlife and Economic Development, has been tasked by the Executive Council of the GNWT<sup>1</sup> to coordinate the efforts in the development of an NWT Energy Strategy. Further to this mandate are directions to identify energy management options to maximize benefits to the NWT. This process is ongoing from August 2001, and will conclude in 2003.

The Energy Secretariat has reviewed the Snap Lake Diamond Project Environment Assessment Report (EAR) in the following general areas:

- ❑ Energy Sources (EAR Section 2.8)
- ❑ Tibbet-Contwoyto Winter Road (EAR Section 6.6)
- ❑ Fuel (EAR Section 3.7.2.1)

The following section outlines the context of existing energy use in the mining industry in the socio-economic region encompassed by the Snap Lake Report. It comments on the plans that the proponent has outlined for energy use on its project.

The comments in this technical report are in our departmental capacity as an expert advisor, except as specifically indicated. Considerations on energy use will be placed in context of the guiding principles of the Mackenzie Valley Resource Management Act, Provision 115(b) *the protection of the social, cultural and economic well-being of residents and communities in the Mackenzie Valley.*

### Specific Comments

Specific comments follow.

## **Issue Identification: Energy Sources (EAR 2.8)**

**Developer's Conclusion:** The proponent has utilized the following factors in evaluating the energy supply options addressed in the report: prior experience, suitability, cost, and environmental impact. The conclusion is that diesel fuel is the most appropriate energy form.

**GNWT Conclusion:** The Energy Secretariat disagrees with the use of an imported fossil fuel as the primary and only source of energy proposed for the mine site. While a number of other energy sources (wind, solar, and propane) were considered in the EAR, the report raises concerns with these energy sources as to their financial and technical viability at the mine site. Wind power appears to have some limited possibilities, and in the proponent's response to the information request in Round #2, they indicate that they had not considered all the possible configurations of turbines at the site.

The largest domestic energy source currently utilized in the NWT is hydroelectric power; however, in the Snap Lake EAR, there is only a cursory reference to hydroelectric energy supply to the mine site. Hydroelectric energy has not been ruled out on technical grounds. The EAR presents no analysis of this type of energy. De Beers has responded with little detail to GNWT information requests on the subject.

The evaluation in the EAR, in regard to energy sources, is limited in scope and does not include other value considerations that are triggered by the MVMRA under 115(b). The GNWT document adopted by the Legislative Assembly entitled "*Towards a Better Tomorrow*" outlines the range of values that are appropriate to decision making on development in the NWT.

This has importance under MVRMA 115(b), as the failure to utilize industrial expansion (e.g., mining) to support development of hydroelectric energy and transmission capacity in the NWT may have significant socioeconomic impacts on the future energy supplies of NWT communities. Secondly, future development of mineral resources in the NWT may be significantly hindered by the failure to invest in sustainable energy infrastructures. This may impact on the long term position of mining development in community economics. In addition, the impact of this proposed large addition of fossil fuel generation in the NWT economy on the obligations that will accord to the GNWT, under the ratified Kyoto Accord, may be significant.

**GNWT Rationale:** The GNWT can demonstrate that there are valid options in the NWT for the use of hydroelectric power for mining industry development. De Beers has proposed the development of a new diamond mine at Snap Lake in the Slave Geological Province, NWT. This mine, if approved for development, will become the third operating diamond mine in the region. As well, there is a gold mine (Echo Bay's Lupin mine), currently operating near the NWT border in Nunavut.

## **Energy System Used At Current Mines**

Energy systems for all mines in the Slave Province are currently based upon the supply of diesel fuel from Alberta or British Columbia refineries. The product is trucked from the refinery or shipped by rail to Hay River and trucked from that point. Trucking occurs in the winter months

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between the end of January and the beginning of April on a winter road system that is operated under a Licence of Occupation by Echo Bay's Lupin mine in cooperation with BHP Billiton and Diavik. These and other mining companies participating in the use of the winter road system pay a percentage of the costs of building and operating the system each year. Fuel shipments make up a very large percentage of all truck movements on the road. Total truck movements peaked at over 8000 in 2001/02 (EAR Fig. 6.6-2).

Energy use at the mining sites in the Slave Province can be categorized as: motive diesel for all mobile equipment use; diesel fuel for electrical generation; and heating fuel. Each category is taxed at a different rate by both the GNWT and by the Government of Canada (GC). Motive diesel is taxed at \$0.09 by the GNWT. Diesel for electrical generation is taxed at \$0.03 by the GNWT and is exempted by the GC. Heating fuel is exempted by the GNWT and is taxed at \$0.04 by the GC.

De Beers is proposing in its EAR a similar energy system at the proposed Snap Lake mine. Volumes of fuel for each use category are: motive diesel – 4 million litres; diesel for electrical generation – 28 million litres; and heating fuel – 8 million litres. Fuel supply will be conducted on the same winter road system.

### Hydro Electric Background

Most hydro development has taken place on the Snare and Taltson systems as a result of mining demands for large scale amounts of electricity (see details below). Some of the later projects on the Snare were influenced by the expansion of Yellowknife. The existing Snare River and Taltson River hydro systems in the North and South Great Slave Regions have potential for expansion to meet new mining industry demand and growing community demand. In addition, the La Martre River in the North Slave has potential for development. Any development will rely to a great extent on providing significant amounts of electrical energy to industrial consumers in the respective regions.

Hydroelectric development proceeded prior to the 80's with little participation or support of Territorial, public government or aboriginal claims groups. The Federal government through its crown corporation made those decisions, in conjunction with industry.

In 1988, Pine Point Mines shut down and the demand for Taltson hydro power was reduced by over 80%. Fortunately the capital cost of the installation had been paid down to a level that the communities on the system had only moderate increases in the utility rates. A transmission line was extended to Hay River from Pine Point by Northlands Utilities. Over the ensuing 2 years approximately 20% of the Taltson production was used by the domestic market in Hay River. However, over the past 14 years 100 million kWh/year of electrical energy has been wasted.

In the 90's, the GNWT, through its crown corporation North West Territories Power Corporation (NWTPC), entered into an agreement with the Dogrib Power Inc. to open up a small additional development on the Snare River, called the Snare Cascades. In the early to mid 1990's, the North Slave river system experienced extremely low water conditions. In the late 90's, Giant Mine decreased production levels, closed its old mill and began transporting the ore

to the Con Mine for milling. Despite the Giant Mine slowdown, over 50% of the system yearly load was diesel generated during this period. This reduced electrical demand in Yellowknife. This was not a burden to the ratepayers as the Yellowknife load at the time had a large expensive diesel component.

In 1996, the Ekati mine was given approval by the Federal Government with diesel generation as the prime energy source for a 25 year life span. In 1999, the Diavik Mine was approved with similar energy source requirements.

In late 1999, the GNWT released the **Robertson Report** that indicated that the rising costs of electrical energy in the rest of North America could open up the prospects for bulk electrical sales to the southern market from the Taltson system. In 2001, the GNWT Financial Management Board Secretariat (FMBS) hydro strategy suggested that a much larger supply of energy for bulk sales could come from developments on the Mackenzie, Great Bear and the Lockhart Rivers. The Lutsel K'e Band came out against any development on the Lockhart and the impoundment of the Mackenzie was not well received, especially in the Deh Cho. As well, market predictions for electrical energy pricing were revised downward through that year as conservation measures and a stagnant North American economy reduced demand to capacity levels. In 2001, discussions between NWTPC, Dogrib Power and Ekati Mines on the provision of electrical energy to the mine site demonstrated a renewed interest in hydro electric energy source alternatives, by mining interests.

#### Load Projections and Potential Energy Markets in the Great Slave

The average energy production over a 20 year period for the existing Snare system is estimated between 160 and 170 GWH/ year (GWH is 1 million kWh). The generation from Bluefish hydro amounts to an additional 40 to 50 GWH/year. The electrical production requirements (with system losses) in the North Slave and South Slave regions for all non-mining customers are in excess of 180 GWH at this point in time. These include:

- Con/Giant mines - energy requirements are 80 GWH
- South Slave - electrical requirements are in the range of 60 GWH
- Ekati Mine - present electrical demand is 90 GWH but is projected to rise to 175 GWH by 2007
- Diavik Mine - electrical demand will require 70 –80 GWH when it commences operations in 2003
- Snap Lake Mine (if approved ) - electrical demand is projected 80 – 90 GWH and could be required by 2005.
- North Slave - space heating energy requirements are in excess of 50,000,000 litres of fuel oil. At \$0.40/litre space heating costs approx. \$20,000,000 per year. Electrical equivalent of this energy is 357 GWH (cost equivalent is \$0.056/kWh).
- South Slave - space heating energy requirements are in excess of 12,000,000 litres of fuel oil per year. At \$0.40/litre this is \$4,800,000 per year. Electrical equivalent of this energy is 90 GWH (cost equivalent is \$0.056/ kWh).

**Summary of Demand Potential (Gigawatt hours) For 2003 - 2020**

<b>Demand Center</b>	<b>Present to 2007</b>	<b>2007- 2013</b>	<b>2013 to 2020</b>
North Slave Communities	180	- 200	- 230
Con/Giant	- 80	- --	- --
Ekati	- 90	- 175	- --
Diavik	- 70	- 110	- 110
Snap Lake	- 80	- 100	- 100
Interruptible energy sales - NS	- --	- 50	- 150
South Slave	- 65	- 70	- 80
Interruptible energy sales – South Slave	- --	- 20	- 50
<b>Total Demand</b>	<b>- 565</b>	<b>- 725</b>	<b>- 720</b>
<b>Potential revenue/ year</b>	<b>Rising to 63 million</b>	<b>81 million</b>	<b>66.5 million</b>

Assumptions –

1. Wholesale hydroelectric price at mines \$.15/ kWh.
2. Con/Giant supply bulk of their own energy from Bluefish.
3. North Slave communities wholesale electrical cost \$.10/kWh.
4. South Slave wholesale electrical cost \$.05/kWh.
5. Interruptible energy wholesale cost \$.04/kWh.
6. Population expansion in the region will have a minimal impact on increased electrical energy use in the immediate future with advanced conservation and efficiency practices.
7. Greater electrical production will result in lower unit costs to consumers.
8. Development of heat pump technology may allow for a higher return on electrical use for heating. Electrical heating loads can be developed as interruptible electrical energy loads.
9. A limited market for electrolytic hydrogen for transportation fuel may be in place by 2010.
10. Electrical/hydrogen conversion to provide equivalent cost per mile from standard ICE vehicle to hydrogen fuel cell vehicle is ???/kWh.

**Hydroelectric Potential and Transmission options**

**Snare River-** Four new sites on the Snare River (Site 4, 7,8,9) can produce up to 213 GWH of electricity. The addition of 350 km of transmission line to deliver the energy to the Ekati, Diavik & Snap Lake mine sites would total the project at an estimated 1993 cost of 226 million. By fully developing the La Marte River, a further 160 GWH could be brought into production at an additional estimated 1988 cost of \$150 million.

**Taltson River -** The existing surplus energy and the expansion of the Twin Gorges site to two turbines and the development of the adjacent Elsie Falls can provide 270 GWH of electrical energy. The addition of a 280 km transmission line to Yellowknife and a transmission line from the Snare system into the mine sites would put the cost of this scenario at an estimated \$250 million.

**Snare and Taltson** - Expanding to Site 7 on the Snare, expanding Twin Gorges to two turbines will make available 260 GWH. The addition of the Taltson – Yellowknife transmission line and the connection to the mines from Snare would put the costs of this scenario at \$210 million.

**Recommendations** – The GNWT recommends that De Beers, through a Socioeconomic Agreement with the Government of the NWT, work to set mutually agreeable conditions for the future development of hydroelectric supplies for the mine site.

## Part 4 Resources Wildlife and Economic Development

### Introduction

Industrial Initiatives, within the Department of Resources, Wildlife and Economic Development, has been tasked by the Executive Council of the GNWT to coordinate the efforts in the development of Socio-Economic Agreements. Further to this mandate are directions to identify options to maximize benefits to the NWT.

Industrial Initiatives, with support from Diamond Projects, has reviewed the Snap Lake Diamond Project Environment Assessment Report (EAR) in the following general areas:

- ❑ Housing (EAR Section 5.2.2.5)
- ❑ Marketing Diamonds (TOR lines 198-199, 468-469, 473, and 478, GNWT IR 2.5.56)
- ❑ Impact Measures (EAR Section 5.3.2)

The following section outlines project.

The comments in this technical report are in our departmental capacity as an expert advisor, except as specifically indicated. Considerations on energy use will be placed in context of the guiding principles of the Mackenzie Valley Resource Management Act; Provision 115(b) *the protection of the social, cultural and economic well-being of residents and communities in the Mackenzie Valley.*

### Specific Comments

Specific comments follow.



**Issue Identification: Housing Needs and Development in the NWT** (Reference: EAR 5.2.2.5)

**Developer's Conclusion:** De Beers reviewed the housing situation in each community. However, De Beers did not analyse this issue although a housing shortage was consistent in most communities.

**GNWT Conclusion:** Housing, its supply and cost, is an issue in most NWT communities. With the likely development of the proposed Snap Lake diamond mine, and the possible development of the NWT's oil and gas reserves within the near future, it is likely the issue of available and affordable housing will increase.

**GNWT Rationale:** The table below projects cumulative housing needs in the NWT based on projected resident population changes in the NWT (from the Bureau of Statistics). The projected needs do not include any estimate for temporary construction employment.

	<i>Resident Population</i>	<i>Construction Employment</i>	<i>New Homes Each Year (3.5 people/house)</i>	<i>Cummulative Total</i>
<b>2002</b>	41,403			
<b>2003</b>	42,263	624	246	246
<b>2004</b>	42,711	1,071	128	374
<b>2005</b>	43,584	1,502	249	623
<b>2006</b>	43,976	6,485	112	735
<b>2007</b>	44,414	10,218	125	860
<b>2008</b>	46,542	6,853	608	1,468

As shown, the NWT will conservatively require approximately 1,500 new housing units by 2008 (5 years). This does not include the replacement of existing housing stock.

#### Ingredients for Success

As outlined in the **Economic Framework** for the NWT, the housing sector needs the following 6 broad elements:

**Human Resources** – developers face a labour shortage in all skill levels, but especially true of trades. According to one building estimator in Yellowknife, building costs have increased by 25% over last year simply because the demand for builders exceeds supply.

**Investment Dollars** – people wishing to build a home or developers, especially outside of Yellowknife, need significant down payment to offset the perceived risk by bankers and CMHC. Underwriting some of the risk associated with CMHC can address the risk factor and encourage the additional flow of investment dollars into communities outside of Yellowknife.

**Infrastructure** – Access to service lots for development is an issue in some communities. Long delays and high costs are also associated with trade inspections.

Markets – Markets are critical to successful housing development. It is not sufficient, however, to have someone with a need for housing. The potential customer has to be willing and able to pay market rents for the property.

The Canadian Home Builders Association (CHBA) recommended, among other measures, that federal and provincial governments need to take a lead role in “assessing reforms of building regulations undertaken in other jurisdictions (in particular, Australia) to assess their potential applicability to Canada”.

RWED is working with Arctic Federated Cooperatives to examine business opportunities in smaller communities. One of these is using cooperatives housing as a vehicle to provide staff housing. This model is well suited to non-market communities.

### Background on Cooperative Housing

Cooperative housing can provide a cost effective means of providing additional accommodation, especially in non-market communities, for lower income working families and for workers involved with the resource industry. RWED is discussing options for expanding cooperative housing in the NWT with the Cooperative Housing Federation of Canada.

#### Cooperative Housing in Canada

Housing co-ops have grown to more than 2,000 co-ops; housing about 90,000 households and 250,000 people in all parts of Canada. Co-ops range from less than ten to more than 200 units, but typically contain between 50 and 80 households. More than half the households living in co-operatives receive rent-geared-to-income assistance from some level of government. People living in these units own them. When they leave, their share capital (principle) is returned.

A major issue in communities is the lack of any housing or rental market. When units are available, rent maybe as high as \$2,000 or month rent or more. Cooperative housing organized by an employer provides an option. Staff buying into an employer managed unit pays a set share fee. When they leave, this is returned, along with their accumulated principle.

Co-operative housing has been identified in independent evaluations as the most cost effective form of government assisted housing in Canada (See Canada Mortgage and Housing Corporation, Evaluation of the Federal Co-operative Housing Program, CMHC, 1990). Savings are derived from high volunteer participation levels by co-op members, and through the co-op sector's federations and resource groups that serve Canadian co-ops at a relatively low cost.

Within Canada there is a network of technical "resource groups" – prepared to help people who wish to build and operate a housing co-op. Resource groups provide expert consulting and technical services, to help developing co-ops tap government programs, select professional advisors (e.g. architects), evaluate potential sites and choose among competing builders.

### Benefits to De Beers and the GNWT

1. Cooperative housing could:

- a. Provide a cost effective option for staff housing. Staff would pay for their own units and the cooperative would be responsible for upkeep and management;
  - b. The cooperative model provides a viable “ownership” option for smaller communities, where there is no housing market.
  - c. Depending on contributions from other agencies (e.g: lower land costs), it could provide affordable housing in high impact development communities; and,
  - d. Expand the available of housing (reducing turnover).
2. De Beers would be sponsoring the cooperative on behalf of its employees, it would not own it. This could enable the “cooperative” to better negotiate reductions in taxes, reduced land costs or other benefits that would not likely be offered a company like De Beers. These benefits would translate into lower building costs and rents.
  3. Cooperative housing would be financed through CMHC, bringing new federal money into the NWT. De Beers could provide a “rental cushion”, thereby reducing risk.
  4. Initial discussions with cooperative housing associations in Canada indicate there would not be a problem establishing a cooperative housing project designed to accommodate the needs of a mining company like De Beers. A number of units could be set aside for the company’s staff. (De Beers would have to assume rental costs if staff were not occupying these units)
  5. Every cooperative housing project has a set number of units set aside for social housing. The full rent on these units is covered by NWTHC. Lower income renters pay a reduced rent with the difference being covered by NWTHC.

**GNWT Recommendation:** The GNWT recommends that De Beers secure the services of a major cooperative housing association in southern Canada to develop a feasibility/business plan for a new industry driven cooperative housing development in the NWT.

**Issue Identification: Options for Sorting and Marketing Diamonds From the Mine**

Reference: TOR lines 198-199, 468-469, 473, and 478, GNWT IR 2.5.56, De Beers' MVEIRB Conformity Response, pages 37 –41, Technical Hearing – Day 10, De Beers' December 9, 2002 Press Release, *De Beers to maximize local employment and begin discussion on the provision of rough diamonds to the NWT.*

**Developer's Conclusion:** De Beers' has stated in its MVEIRB Conformity Response that it would contribute to the GNWT's objective of promoting diamond manufacturing and seeking a reliable supply of rough diamonds for this purpose. It would do so by setting up a sorting and valuation facility and supplying rough to support the secondary industry.

During Technical Hearings De Beers' clarified that it would, as part of an agreement with the GNWT, make available to manufacturers in the NWT, NWT mined rough from the Snap Lake mine, should it go into production.

In their December 9, 2002, press release De Beers state, "We see two possible avenues for the supply of Snap Lake rough diamond to the NWT; one means is through the socioeconomic agreement which is under negotiation with GNWT, and the other is through Aboriginal equity participation in the project which would be covered by the Impact Benefit Agreements (IBAs) currently being negotiated with the affected Aboriginal groups."

**GNWT Conclusion:** De Beers' statements in their press release are a significant step back from commitments made in Technical Hearings. The GNWT must have assurance that De Beers will follow through on commitments to support the secondary diamond industry in the NWT.

**GNWT Rationale:** De Beers has stated clearly in Technical Hearings that it would make rough diamond supply from the Snap Lake mine available to NWT based manufactures as part a socioeconomic agreement with the GNWT. In their December 9, 2002, press release De Beers states they see this as one of two possible avenues for the supply of Snap Lake rough diamonds to the NWT.

**GNWT Recommendation:** Based on De Beers' commitments in Technical Hearings, the GNWT recommends that De Beers sign a Memorandum of Understanding (MOU) with the GNWT on the supply of rough from the Snap Lake mine. In addition to other areas agreed to by the parties this MOU should clearly identify the following:

**Supply of Rough**

De Beers' commitment to select one or more NWT based clients and to enter into written agreements for the supply of rough diamonds entirely from Snap Lake Mine production.

Agreement that allocations will be in sizes, shapes, colours and qualities, which can be economically cut in the NWT. Defined parameters of these are a required aspect of the agreement.

Agreement on the minimum value to be supplied to De Beers' selected NWT clients in each calendar year as measured at full DTC selling prices and agreement to work constructively to meet both growth in demand and industry requirements for diversified sources of supply.

Agreement on a workable means of confirming the pricing of goods for NWT clients and a means of confirming allocations provided are within the parameters agreed to.

Agreement on a process for selection, review, assessment and approval of NWT based clients and De Beers' acceptance of the GNWT policy for support to the secondary diamond industry.

A means of monitoring and tracking rough allocated for manufacturing in the NWT to ensure that it originates from the Snap Lake diamond mine and that 100% of the allocated rough is 100% manufactured in the NWT.

An arbitration process to hear appeals from NWT clients of De Beers, or from De Beers, on issues relating to the sales relationships in the areas of, for example but not limited to, prices and assortment.

Agreement on when the parties will finalize agreements set out in the MOU and that arrangements flowing from the MOU will ensure for as long as De Beers is producing Snap Lake Diamonds.

### **Sorting and Valuation Facility**

De Beers commitment to set up a sorting and valuing facility in a NWT community, which will prior to export and sale, assort the production of Snap Lake rough and any other mining projects in the NWT over which De Beers has partial or full marketing rights.

Agreement on what level of sorting and to maximize the level of sorting that will be carried out at such a facility.

Agreement on how De Beers will provide training and employment opportunities for northerners, their intentions regarding importing of skilled personnel from the DTC and numbers of NWT residents employed.

### **Exchange of information**

Agreement that De Beers will establish a framework and mechanisms for ongoing communication regarding information, issues and decisions relevant to the GNWT/De Beers relationship including annual GNWT/DTC meetings.

**Issue Identification:** *Impact Management Measures and Socio-Economic Agreement (EAR)*

**Developer's Conclusion:** De Beers has acknowledged that there will be impacts in the following broad areas<sup>11</sup>:

- Increased employment levels;
- Provision of training programs;
- Expansion of the wage economy in the communities; and,
- Behavioural and lifestyle changes, by individuals, families, and communities as a whole.

De Beers' indicates that "commitments and contributions from the federal and territorial governments, and cooperation from communities, Aboriginal organizations, and other mining companies are required to maximize the benefits of the proposed measures."<sup>12</sup>

De Beers has not made reference to a specific instrument through which these commitments and contributions could be formalized. De Beers indicated during the Technical Sessions (December 5<sup>th</sup> and 6<sup>th</sup>, 2002) that it has entered into negotiations with the GNWT with respect to the development of a Socio-Economic Agreement, but made no firm commitment to seeing those negotiations through to a successful conclusion. Since this was not a firm commitment on the part of De Beers, it was not noted in the MVEIRB's list of commitments.

DIAND has indicated that De Beers will be required to enter into an Environmental Agreement (EA) to mitigate biophysical impacts (Day 1 Technical Sessions). Just as an EMA to monitor and mitigate biophysical impacts, a Socio-Economic Agreement with GNWT would provide for monitoring and mitigating of socio-economic impacts. In other words, the two agreements would complement one another. If De Beers is required to enter into an Environmental (i.e., biophysical) Monitoring Agreement, they should be required to enter into a Socio-Economic Monitoring Agreement. However, the GNWT does not have the legislative authority to require such an agreement.

**GNWT Conclusion:** The issue is the absence of an instrument for monitoring and mitigating socio-economic impacts, such as Impact Benefit Agreements (IBAs) and a Socio-Economic Agreement (SEA). As indicated by DHSS, proposed partnerships do not provide certainty nor are they binding on De Beers. Although currently in negotiations with Primary Communities with respect to entering into Impact Benefit Agreements (IBAs), De Beers has not made a firm commitment. Likewise, De Beers is currently in negotiations with the GNWT with respect to a Socio-Economic Agreement, however, De Beers has not made a firm commitment.

The GNWT views Impact Benefits Agreements (for the Primary Communities) and socio-economic agreements (for northerners) as tools for planning, monitoring and mitigating socio-economic impacts of the project. In the absence of regulatory instruments, IBAs and an SEA will provide legal instruments for the planning, monitoring and mitigating of socio-economic impacts of the project.

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<sup>11</sup> De Beers Environmental Assessment Report, Section 5.3.3.2, p. 5-124.

<sup>12</sup> De Beers Environmental Assessment Report, Section 5.3.4.1, p. 5-143.

Legal instruments such as IBAs and SEAs provide certainty for northerners with respect to the monitoring and mitigation of socio-economic impacts of large-scale development projects such as the Snap Lake diamond mine. The Socio-Economic Agreements entered into between BHP Billiton, and among Diavik Diamond Mines Inc., the GNWT and Aboriginal Authorities establish commitments on the part of the Parties that could not be formalized in legal or regulatory requirements. These agreements have clear procedural orientation, providing a framework for ongoing cooperation on socio-economic matters amongst the Parties.

The Diavik Diamonds Project Comprehensive Study Report (CSR) noted that *“A socio-economic monitoring agreement will provide a formal mechanism to ensure the mitigative measures outlined in Diavik’s submission (including its commitments document) and in the RAs conclusions of the comprehensive study report are appropriately implemented and monitored. The monitoring program is necessary to verify the impact of the project, verify whether commitments are being fulfilled, establish or confirm thresholds or “early warning” signs of change to trigger adjustment of mitigative measures or other actions where necessary.”*<sup>13</sup>

In addition, Responsible Authorities have noted that *“the development of the program to monitor and mitigate socio-economic and cumulative socio-economic impacts and the process for the establishment of the monitoring program must be identified in a socio-economic agreement...”*<sup>14</sup>

**GNWT Recommendation:** The GNWT recommends that De Beers enter into Impact Benefit Agreements with the Primary Impacted Communities.

The GNWT recommends that De Beers enter into a Socio-Economic Agreement with the GNWT and Aboriginal Authorities of the Primary Impacted Communities. Further,

- That, consistent with the Diavik Socio-Economic Monitoring Agreement, the Snap Lake Socio-Economic Monitoring Agreement should address the elements of community wellness, training, employment and business opportunities, and secondary industry issues. In addition, it should address the issue of hydroelectric energy.
- That the Socio-Economic Agreement also establish a Communities Advisory Board (or Mine Management Advisory Committee) as per the recommendations by the DECE. This is a mechanism to ensure that primary communities and other impacted northerners are meaningfully engaged in the planning, monitoring and mitigation process; and,
- That De Beers be required to establish a Community Development Fund (as per DHSS’s recommendations) and that the disposition of that funding be overseen by the Communities Advisory Board. This CDF will be based on a formula to be negotiated in the SEA.

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<sup>13</sup> Diavik Diamonds Project Comprehensive Study Report, Canadian Environmental Assessment Agency, June 1999, p. 237.

<sup>14</sup> Responsible Authorities’ Response to Public Comments on the Diavik Diamonds Project Comprehensive Study Report, September 1999.

## **Part Two – Environmental Technical Submission**

### **Summary of Environmental Issues**

#### **Solid Waste Management and Landfill**

De Beers has proposed the integration of solid waste management and landfills occur within the North Pile. The GNWT prefers a dedicated engineered landfill site in a secure and separate location from the North Pile.

#### **Landfarm Site in the North Pile**

De Beers has proposed to landfarm hydrocarbon contaminated soils within the North Pile. The GNWT experience with other diamond mines indicates biological remediation in Arctic conditions has not been successful. Storage of contaminated soils until the soils can be moved to a disposal facility is recommended.

#### **Emission Estimates, Dispersion Modelling and Air Quality Prediction**

The GNWT is satisfied with the work done by De Beers in estimating the impacts of emissions from the mine on air quality, but remains concerned regarding the follow-up monitoring of emissions and air quality once the mine is operational. Ongoing tracking of emissions and monitoring of air quality is essential to ensure that over time, impacts to the environment remain acceptable. The GNWT recommends that De Beers develop an Air Quality Management Plan – a document that provides details on how they propose to ensure air quality is protected such as how emissions will be tracked and what type of air quality monitoring will be done.

#### **Reclamation/Closure Planning and Revegetation**

De Beers has postponed detailed revegetation planning until the regulatory phase has been completed. The GNWT believes that abandonment and reclamation standards are critical criteria for a healthy environment and a sustainable mining industry. A task force is recommended to develop measurable environmental performance standards and indicators.

#### **Inadequacies of caribou baseline data**

De Beers concluded that only a few caribou migrate through the Snap Lake area. They also believe that there is a moderate to high level of confidence in their prediction that residual impacts to caribou will be low. The GNWT believes that caribou abundance should be rated as “relatively abundant” based on survey data of caribou migration and that the confidence rating for residual impacts should be changed to “moderate”.

De Beers states that caribou tend to avoid the Snap Lake area because of boulder fields in the area. However, De Beers did not analyse the available baseline data to reach this conclusion.



There is also traditional knowledge that indicates that many caribou use the area. De Beers needs to analyse the baseline data to determine if this conclusion is correct.

### **Predicted residual impacts for caribou**

De Beers concluded that the residual impacts to caribou movement and behavior from blasting, vehicle and air traffic, winter and esker roads is “low”. They also conclude that impacts to caribou abundance will be low for interactions with the mine site (for example, interactions with people, vehicle/aircraft collisions, etc.) The GNWT believes that these impact ratings should be changed to “moderate” because the impact analysis was inadequate and details of mitigation were not provided.

### **Impact assessment for grizzly bears and wolverines**

De Beers predicts that impacts to grizzly bears and wolverines, including habitat loss, movements, behavior and abundance will be “low”. The GNWT does not believe there is sufficient baseline data and analyses carried out to reach this conclusion. Without adequate analysis, the impact ratings and level of uncertainty should be increased.

### **Will wildlife be attracted to the mine site?**

De Beers plans to minimize the attractiveness of the mine site to wildlife. The company will develop a waste management plan to achieve this goal. However, the GNWT is concerned that the plan does not exist and is not part of the environmental assessment report. Without details of the mitigation measures, there is uncertainty that wildlife impacts from the mine will be low as predicted.

### **Impacts on feeding and denning habits of grizzly bears**

De Beers is conducting studies at the mine site to determine the possibility of the mine disturbing feeding and denning activities of grizzly bears. These studies should provide an index of grizzly bear abundance in the regional study area. The GNWT believes that additional research is needed to determine whether this approach is sensitive enough to distinguish between residual impacts and natural variation.

### **What impact will the Snap Lake Project have on grizzly bear and wolverine movements and behavior?**

De Beers predicts that mining activities from the Snap Lake Project will have a low level of impact on grizzly bear movement and behavior. The GNWT does not believe that De Beers has adequately assessed the potential impacts to grizzly bears and wolverines resulting mine noise, truck and aircraft traffic, and other human activities in the area.

### **Cumulative impact of grizzly bear and wolverine mortality**

De Beers' analysis of cumulative mortality of grizzly bears in the regional study area is inaccurate. The proponent only considered mortality associated with Diavik, Ekati, Snap Lake and the Contwoyto winter road. Estimates of mortality for grizzly bears and wolverines need to consider all forms of human caused death in the region.

De Beers also needs to consider other forms of mitigation for the ventilation raises to prevent possible wolverine deaths at this site. Chain link fencing may not be adequate to prevent wolverines from entering the raises.

### **Impact assessment for Species of "Special Concern"**

De Beers provided little evidence that additional baseline research, analysis or effort was dedicated to grizzly bear or wolverine. Under the Terms of Reference, De Beers was asked to give special consideration to these species (i.e., grizzly bear and wolverine).

### **Follow-up Monitoring Programs**

De Beers is presently developing an Environmental Management System (EMS) for the Snap Lake Project. Included in the EMS will be a monitoring program that will address regulatory compliance, project-related environmental effects, effectiveness of mitigation, and cumulative effects. The GNWT does not believe that the proponent has provided sufficient detail about the approach, objectives and methodologies that will be used in any of the monitoring programs. The GNWT recommends that a comprehensive and detailed environmental effects monitoring program be formalized in an Environmental Agreement.

### **Reclamation of Land Classification Units**

De Beers concludes that some land classification units disturbed during mining operations may take as long as 100 years to be reclaimed. The company also claims that many of these landscape units will return to an equivalent capability. The GNWT believes that there is a high level of uncertainty that revegetation and restoration of disturbed areas will be reclaimed to provide equivalent capability for wildlife. Loss of land classification units needs to be monitored annually. Research on revegetation and restoration is needed.

## Summary of Environmental Recommendations

The GNWT recommends that De Beers:

1. Design a dedicated engineered landfill using a planned surface disturbance (e.g. quarry) that will function for the life of the mine.
2. Develop a hydrocarbon contaminated soil storage facility until proven technology capable of bioremediating landfarms in Arctic environments is proven or until an agreement is finalized to transfer all hydrocarbon contaminated soil to an approved disposal facility. It is further recommended that the storage capacity be designed for a minimum timeframe of 3 years to achieve this guideline.
3. Develop and implement an air quality management plan. The plan should include a comprehensive emission and air quality monitoring strategy to ensure that emissions are tracked and contaminants of potential concern are monitored over the life of the project.
4. Revisit their conclusion that “relatively few caribou migrate through the Snap Lake Diamond Project area”.
5. Provide an analysis to determine the scale of likely annual variation in caribou seasonal distribution relative to the Snap Lake site. De Beers could use the analysis to determine the timing for monitoring and a contingency to detect unexpected events (such as a shift in wintering distribution).
6. Present both the number of caribou counted and estimated when describing caribou abundance at Snap Lake site.
7. Provide a spatial analysis using the caribou locations (aerial surveys, satellite collars) and ‘historic’ trails worn in the tundra relative to habitat type including the boulder fields.
8. Either De Beers should re-examine the residual impact assessment to provide qualitative assessments and use the experience of other mines to provide details on caribou mitigation or De Beers should recognize the uncertainties and change the rating for environmental consequences from low to moderate.
9. Develop and implement a comprehensive Waste Management Strategy. Details, including goals, objectives and specific mitigative measures need to be included. All environmental management plans including waste management plans, mitigation plans and wildlife deterrent plans need to be formalized in an environmental agreement.
10. Ensure that additional mitigative measures and staff training are implemented during the construction phase, when additional personnel (i.e. subcontractors) will be on site.

11. Take advantage of the grizzly bear research and findings sponsored by the West Kitikmeot Slave Study Society to reassess the potential impacts of the Snap Lake project on grizzly bears. Some of the analyses and approaches taken by BHP and Diavik may prove useful.
12. Address how sensory disturbance might potentially affect grizzly bear or wolverine habitat use within the Regional Study Area (RSA).
13. Use a hypothetical zone of influence for grizzly bears, in order to model potential impacts and refine impact predictions.
14. Provide a quantitative analysis of mortality, including all forms of human caused mortality, and determine what impact an increased level of direct wildlife mortality might have on regional grizzly bear and wolverine populations. Given the uncertainties identified in the assessment and our lack of knowledge about this species, monitoring is needed to test impact predictions made by the proponent.
15. Consider further mitigation options (other than chain-link fencing) to minimize the potential risk to wolverines posed by ventilation raises.
16. Make a strong commitment, within an Environmental Agreement, to collaborate with RWED, BHP and Diavik, to maximize efforts to undertake research and monitoring initiatives to improve our ecological understanding of grizzly bears and wolverines and the impacts associated with diamond mining on the central barrens.
17. Develop a comprehensive and detailed environmental effects monitoring program (including wildlife) be developed and implemented as a part of an Environmental Agreement with:
  - a) Research efforts pertaining to reclamation of disturbed Ecological Land Classification (ELC) units are required to test the impact predictions made in the environmental assessment report. BHP has begun work in this regard. De Beers should be encouraged to work cooperatively with other mining companies to address this issue.
  - b) De Beers should initiate a monitoring program similar to BHP's and Diavik's to annually assess the direct loss (and reclamation) of ELC units. Using similar monitoring protocols will allow a regional assessment of cumulative direct habitat loss in this region of the Slave Geological Province.

## **Part 1 Environmental Protection**

### **Introduction**

Environmental Protection Service (EPS) is responsible for initiatives that control the discharge of contaminants and their impact on the natural environment. EPS is responsible for ensuring that environmentally acceptable management procedures, emission levels and disposal methods are maintained.

Environmental Protection has reviewed the Snap Lake Diamond Project Environmental Assessment Report (EAR) in the following areas:

- ❑ Solid waste management and landfill (EAR 3.5.3, 3.5.6, T&R: 114)
- ❑ Development of a mobile or temporary landfills/landfarms within the North pile
- ❑ Air Quality Monitoring
- ❑ Reclamation /Closure Planning and Revegetation

The Environmental Protection Service, Department of Resources, Wildlife and Economic Development serves in this assessment as an expert advisor. The technical review comments and recommendations are presented based on past practices at operating diamond mines in the NWT and, therefore, with an understanding of the potential for long-term risks.

### **Specific Comments**

Specific comments follow.

**Issue Identification:** Solid Waste Management and Landfill (EAR Sections 3.5.3 Solid Waste Management 3.5.6, Landfill site, ToR 114)

**Developer's Conclusion:** De Beers concludes that separate dedicated sites outside the North Pile would require additional logistics to manage and additional runoff collection systems would be required which would result in more ditches, sumps, access roads, and overall greater land disturbances. De Beers indicated a number of times in the EAR and during presentations at the Technical Session (Day 8) that the area disturbed will be small in relationship to the complete project because of proactive initiatives of recycling and shipping offsite.

**GNWT Conclusion:** The GNWT does not agree a totally integrated system of North Pile paste and its infrastructure with mobile landfill and landfarms sites can be achieved based on the performance to date from other diamond companies operating in similar environmental conditions in the NWT.

**GNWT Rationale:** De Beers plans to optimize a number of activities in one location without experience with a kimberlite paste process in Arctic conditions and assurances that contamination or environment risks from effluent leachate can be mitigated. The GNWT does not support these two proposed options for several reasons. The management of the North pile paste system with an integrated landfill and landfarm facility is logistically very difficult and cumbersome to manage efficiently and effectively if the locations are continuously mobile.

Dedicated areas where the residuals from the waste stream management process can be secured from wildlife, birds and the eco-system is considered more environmentally sound and reduces the environmental risk until the final disposal process is identified (i.e. disposal in a secured landfill or at an approved disposal facility offsite). As the proponent has projected quarries that could be designed and planned for in the site footprint that would minimize ecological risks, an engineered single landfill utilizing a required quarry site would have less risk for the environment.

**GNWT Recommendation:** The GNWT recommends that De Beers design a dedicated engineered landfill using a planned surface disturbance (e.g. quarry) that will function for the life of the mine.

**Issue Identification:** Landfarm Site in the North Pile (EAR Section 3.5.3.4, ToR Line: 84-90, IR Response 3.5.7)

**Developer's Conclusion:** De Beers concluded that alternate sites were considered but rejected in favour of the North Pile site for the reasons outlined in Information Request Response 3.5.6. De Beers states the efficacy of remediation will be determined through on-site monitoring and maintenance as outlined in Appendix III.3 of the EAR. Once remediated, soils from the landfarm (which are considered inert solids) will be transferred to the landfill. Should remediated soil be of a quality suitable for reclamation purposes, the soil may be stockpiled for future use.

**GNWT Conclusion:** The future for successful biological remediation of hydrocarbon contaminated soils in an arctic environment is questionable. While the approach by De Beers to incorporate a landfarm in a mobile North Pile that is constantly changing seems positive and encouraging, the GNWT cannot support this concept without a detailed plan for operations, monitoring and management of such a landfarm.

**GNWT Rationale:** EPS has been monitoring the landfarm performance at BHP Billiton's Ekati Diamond Mine. The landfarm has been operating for over 5 years at the Ekati mine site, has not successfully produced any remediated soils for reclamation. De Beers plans to optimize a number of activities in one location a combined landfill/landfarm with their kimberlite paste process at their North Pile. Given the perceived failure of landfarming at other sites under arctic environmental conditions, the GNWT has no assurance the proponent has the necessary experience and required technical design to ensure risks to the environment will not occur.

**GNWT Recommendation:** The GNWT recommends De Beers develop a hydrocarbon contaminated soil storage facility until proven technology capable of bioremediating landfarms in Arctic environments is proven or until an agreement is finalized to transfer all hydrocarbon contaminated soil to an approved disposal facility. It is further recommended that the storage capacity be designed for a minimum timeframe of three (3) years to achieve this guideline.

**Issue Identification: Emission Estimates, Dispersion Modelling and Air Quality Prediction** (EAR Section 7 Air Quality, specifically sub-Section 7.3 Impact Assessment)

**Developer's Conclusion:** De Beers concluded that the emissions estimates used in the dispersion modeling were sufficiently conservative such that the probability of under predicting the ambient concentrations was low. The predicted ambient concentrations for the identified contaminants did not exceed the appropriate air quality guidelines/standards.

**GNWT Conclusion:** The greatest concern with the EAR sections on emissions and air quality was the need for more detail regarding the estimates of emissions from the various sources and clarification of the actual values used in the dispersion modelling to ensure ambient concentrations were not under estimated. Information supplied in the De Beers responses to IR#2 and the subsequent Technical Session (Day 8), held in December 2002 addressed this concern and the GNWT is satisfied that De Beers dispersion modelling was conservative.

However, the EAR sections on emissions and air quality represent an 'assumed' set of operational conditions for the project. As development progresses, these assumptions may not continue to represent actual operating conditions and associated environmental impacts. Similarly, despite the best efforts of De Beers to ensure the emissions data were conservative, there are always uncertainties associated with emission estimates and the dispersion modelling itself is theoretical. Therefore, complete reliance for protection of air quality should not be placed on dispersion modelling alone - there needs to be some 'ground truthing' through ambient air quality monitoring and adequate tracking of the 'assumed' conditions on which the modelling was based (e.g. emissions, fuel use, fuel sulphur content, etc).

In summary, the unresolved issue relates not to the EAR itself, but rather the subsequent monitoring program for emissions and ambient air quality that will be implemented. To date, De Beers remains vague regarding commitments to adequately track emissions and conduct ambient air quality monitoring. This is cause for concern.

**GNWT Rationale:** The comfort afforded by the modelling predictions that air quality standards will not be exceeded only remains so long as the emissions remain within the limits used in the modelling. Therefore, it is critical that emissions and fuel use be tracked over the life of the mine as any changes would may negate the usefulness of the dispersion modelling predictions.

The GNWT notes that the dispersion modelling predicted significant increases for several air quality parameters, notably particulate. Although the dispersion modelling indicates that air quality standards will be met, emissions from the project will undoubtedly have some impact on air quality in the area. The Canadian Council of Ministers of the Environment (CCME) have agreed that 'polluting up to a limit' is not acceptable and that the emphasis should be on minimising emissions. The CCME concepts of 'Continual Improvement' and 'Keeping Clean Areas Clean' have been endorsed by all jurisdictions including the NWT and should be adhered to. Simply meeting the appropriate air quality standards should not be viewed as the acceptable goal. There is, therefore, a need to determine the degree or magnitude of impact to air quality and trends over time through ambient air quality monitoring to ensure the focus remains on minimising impacts to the environment.



**GNWT Recommendation:** The GNWT recommends that De Beers develop and implement an air quality management plan. The plan should include a comprehensive emission and air quality monitoring strategy to ensure that emissions are tracked and contaminants of potential concern are monitored over the life of the project.

**Issue Identification:** Reclamation/Closure Planning and Revegetation (EAR 5.0, 5.1, 5.2)

**Developer's Conclusion:** De Beers concluded that the level of detail regarding revegetation planning provided in the EAR is appropriate to this stage of the permitting process. Beyond this, De Beers indicated that further detail will be provided according to regulatory requirements at the pertinent regulatory phase.

**GNWT Conclusion:** Abandonment and reclamation standards are critical criteria for a healthy environment and a sustainable mining industry. The GNWT does not support the position that details for the Abandonment and Restoration of the De Beers Snap Lake Diamond Project be delayed until the regulatory phase.

**GNWT Rationale:** The proposed reclamation/closure plans and animated production presented do not provide confidence or a complete assessment of the site closure criteria for the Snap Lake project. Numerous issues are outstanding:

- i. Progressive Reclamation Criteria
- ii. Esker Reclamation and Revegetation
- iii. Mitigation and Contingency plans
- iv. Monitoring Progress and Parameters.
- v. Details of the North Pile Cover and Revegetation
- vi. Cleanup of Fugitive Dust and Air Borne Contaminants.

The alternative is to establish an extremely large security requirement and conditions that reflect the unknown liabilities to the ecosystem.

**GNWT Recommendation:** The GNWT recommends the establishment of a Committee of all stakeholders to review existing environmental baseline conditions and develop standards for mitigation. The following indicators should be considered for:

- a. Air
- b. Water
- c. Lands
- d. Protected Species
- e. A&R Plans

## Part 2 Wildlife and Wildlife Habitat

### Introduction

The Northwest Territories *Wildlife Act* provides the Department of Resources, Wildlife and Economic Development (RWED) with the legislative mandate to manage wildlife and wildlife habitat within the NWT.

The Wildlife and Fisheries Division's mandate, as it pertains to the proposed Snap Lake Diamond Project, is to ensure that viable populations of wildlife species exist in their natural habitat.

Wildlife and Fisheries Division has undertaken a review of the Snap Lake Diamond Project Environmental Assessment Report (EAR). The issues that are discussed below remain outstanding following the public Technical Sessions conducted in December 2002.

The subject areas include:

- ☐ Caribou – baseline data and predicted residual impacts
- ☐ Carnivores – impact assessment, predicted residual impacts, and habitat loss for grizzly bears and wolverine
- ☐ Management plans and follow-up monitoring programs
- ☐ Residual impacts of ecological land classification units

Wildlife and Fisheries Division utilized a team of Wildlife Biologists to carry out the review and provide the comments that follow.

### Specific comments

Issue-based comments on the Snap Lake Environmental Assessment Report are provided below, organized according to subject.

**Issue Identification: Inadequacies of Baseline Data and Caribou Abundance Conclusions** (ToR Table 12.1.2)

**Developer's Conclusion:** Executive summary (Page xviii) concludes “... *that relatively few caribou migrate through the Snap Lake Diamond Project area*”.

De Beers rated a moderate to high level of confidence in their prediction of low environmental consequence (residual impacts) based on their “*Assuming that the number and distribution of caribou moving through the Snap Lake area approximates long-term variation*”. (Page 10–177).

**GNWT Conclusion:** De Beers was required to provide “*sufficient base for the prediction of positive and negative effects*”. Inadequacies in baseline data are an issue because not only does baseline information reveal what is present at the project site, but baseline data are essential to assessing residual impacts. For example, ‘magnitude’ of impacts depends on whether changes exceed baseline and range of natural conditions.

The GNWT concludes that caribou abundance should be rated as ‘Relatively abundant’ given that, even with De Beer’s limited baseline data, there were about 24,000 caribou during two of the four migrations described in 1999 and 2000.

The GNWT concludes that the confidence rating for environmental consequence (i.e., residual impacts) should be ‘Moderate’ as the assumption “*that the number and distribution of caribou moving through the Snap Lake area approximates long-term variation*”. (Page 10–177) is questionable based on two (2) years of baseline data.

**GNWT Rationale:** Describing caribou abundance as ‘relatively few’ is problematic for a number of reasons:

1. The number of years for which caribou abundance was estimated was not scaled to capture the variability in annual caribou migrations (although the EAR notes the variability of annual migrations). Two years is not an adequate sample of long-term variation in caribou abundance or environmental variation.
2. Information from other mine projects was not analyzed to describe the scale of caribou migrations. For example, the BHP Billiton Ekati Mine in a 5 year period estimated between <2,000 and up to 300,000 caribou in their study area but in a single 2-year period, the peak of 300,000 would not have been captured. The thousands of caribou from the Alaskan Western Arctic herd pass Cominco’s Red Dog mine during post-calving migration relative to radio-collar distribution but this experience was not included. Implications of the known seasonal distribution for the Bathurst caribou herd were not described or analyzed to predict the likelihood that caribou would migrate through the site. Winter distribution (and spring migration) is more variable than summer distribution, for example.
3. The likelihood of unexpected caribou abundance was not addressed. For example, shifts in winter distribution of caribou herds are characteristic but this eventuality was not

acknowledged. Subsequent events have also revealed that caribou from the neighbouring Ahiak herd wintered in the vicinity of Snap Lake in 2001/02.

4. Timing of aerial surveys – the EAR stated that surveys were timed to peak with peak movement of caribou based on RWED collars and pilot observations (but does not mention that only cows were collared). The collared cows did not migrate until mid-April or later but the surveys in 1999 were 20 March, 2 April (5 caribou counted) – in comparison BHP Billiton estimated 4,000 caribou in May 1999. Both the satellite collars and the logbook of camp sightings suggested caribou were within 10 km of the mine during September 2000 even though no surveys were flown (in 2001, a single survey on 2 Oct).
5. The presentation of information is misleading. The EAR Page 10–129 and Table 10.4–1 give the numbers of caribou counted. But the number observed is a sample of the number of the caribou in the survey area (survey coverage is 25%). It is more informative to provide both the count and its companion estimate (for example, southern migration 1999 is an estimated 27,804 from a count of 6,951 caribou) and it is conventional to indicate the amount of statistical precision for the estimate.

**GNWT Recommendations:**

1. a) De Beers revisit their conclusion that “*relatively few caribou migrate through the Snap Lake Diamond Project area*”.

b) De Beers provide an analysis to determine the scale of likely annual variation in caribou seasonal distribution relative to the Snap Lake site.

c) De Beers use the above analyses to determine the timing for monitoring and a contingency to detect unexpected events (such as a shift in wintering distribution).

d) De Beers present both the number of caribou counted and estimated when describing caribou abundance at the Snap Lake site.

**Issue Identification:** Inadequacies in Baseline Data and Caribou Spatial Analysis (ToR Table 12.1.2).

**Developer's Conclusion:** The Executive Summary (page xviii) concludes “... *Caribou tend to avoid the [Snap Lake Diamond Project] area because of the boulder-strewn terrain particularly east of the site. Therefore the project will have a limited effect on caribou.*”

**GNWT Conclusion:** It is difficult to agree or disagree with the De Beers' conclusions about caribou tending to avoid the site because baseline data were not analyzed. The orientation of the lakes and eskers and recorded tracks suggest that caribou will encounter the mine site despite the assessment's assertion that the boulder fields east of Snap Lake divert the caribou away from the mine site.

**GNWT Rationale:** De Beers is required to provide “*sufficient base for the prediction of positive and negative effects*”. De Beers mapped historic trails, vegetation classes (including boulder fields) and had a limited amount of caribou survey data but did not analyze the information to support their assertion that caribou “*tend to avoid the site*”. A spatial analysis looking at proportions of trails by habitat type and proportions of the habitat types would support or refute the assertion.

The use of quotes from aboriginal traditional knowledge is awkward as some quotes suggest an absence of caribou around Snap Lake because of the rocky areas (but not all quotes - see p.54 4.8.3 Appendix IV3). De Beers (Page 10–128) states that on-site observations and the traditional knowledge of Lutsel K'e elders indicated that relatively few caribou migrate through the Snap Lake area but the quote on page 129 refers to “*Lots of caribou may pass through here, but in smaller groups*”.

**GNWT Recommendations:** De Beers should provide a spatial analysis using the caribou locations (aerial surveys, satellite collars) and ‘historic’ trails worn in the tundra relative to habitat type, including the boulder fields.

**Issue Identification:** Predicted Residual Impacts on Caribou (ToR 2.5)

**Developer's Conclusion:** De Beers concluded that the environmental consequences of 'residual impacts' are 'low' for caribou movement and behaviour from blasting, vehicle and aircraft traffic, winter and esker access roads (Table 10.4–12). De Beers also concluded that the 'environmental consequences' are 'low' for caribou abundance from wildlife attraction to the project, wildlife–human interactions, vehicle/aircraft–wildlife collisions, toxic spills and increased access for hunting and trapping (Table 10.4–14).

**GNWT Conclusion:** The GNWT concludes that it is difficult to accept De Beer's residual impacts rating of 'low' for caribou because firstly the rating of the residual impacts depends on mitigation but the details of mitigation in the EAR are minimal. Secondly, analysis of project impacts was inadequate. The GNWT also concludes that the 'environmental consequences' should be rated as 'moderate' given the uncertainties.

**GNWT Rationale:** De Beers shall *demonstrate* the extent by which negative impacts may be mitigated and positive impacts augmented by planning, development design, construction techniques, operational practices and reclamation techniques [reviewer's italics].

1. The mitigation measures (EAR 10.4.2.3.2, EAR 10.4.2.4.2) do not meet the requirement “*to demonstrate the extent by which negative impacts may be mitigated*” (ToR 2.5). The mitigation measures are only outlined, are not specific to caribou, do not, for example, refer to the experiences and practices of other mines on caribou ranges, and do not indicate how they would be scaled to caribou abundance (what to do if 10 compared to 10,000 or 100,000 caribou are at Snap Lake).
2. The uniformity in the residual impact ratings from creatures as diverse as small birds and grizzly bears (EAR Tables) raises questions about the analyses. How likely is it that impacts on all wildlife and their mitigation would reach the same rating for blasting, traffic, roads and habitat fragmentation (except for four wildlife groups having magnitude as ‘negligible’ compared to ‘low’ magnitude for the other four groups)?
3. The EAR states that to determine residual impacts it will *analyze* (De Beers Page 10.5) the linkage between project activities and environmental effects; then mitigate to minimize impacts and then *analyze* residual impacts *as quantitatively (statistics, GIS, etc) as possible* [reviewer's italics]; however, the residual impact classification was based more on assertions rather than analyses where they would have been possible. For example, during the environmental assessment for Diavik Diamond Mine, Diavik undertook an analysis of the range of consequences for pregnancy rates if cows spent less time foraging near the mine site under a range of environmental conditions (e.g., severity of insect harassment).
4. Only some baseline information was collected on movements and abundance. No data were collected to establish the baseline on caribou behaviour at Snap Lake. Thus, the rating of residual impacts for behavioural responses is limited (‘magnitude’ of impact is based on whether it exceeds baseline and range of natural conditions). Using surrogate information from elsewhere is applicable but was not done – for example how much time did caribou

spend foraging near the Ekati mine, how did it vary annually and how did foraging time change with exposure to trucks, etc? A combination of data analyses and modeling would have given De Beers more quantitative predictions of impacts and a sampling design for monitoring to determine the credibility of their predicted impacts.

5. The basis for assigning confidence to the ratings is not given – for example, the EAR Page 10–177 states that there is “a moderate to high level of confidence” [that the overall effect on caribou movements and behaviour will be ‘low’]– but the confidence rating is supported by two contrasting quotes - in 1 year caribou foraged less near Ekati mine and then in the next year, there was no apparent effect (although the environmental conditions were not described).

**GNWT Recommendations:** The GNWT recommends that De Beers re-examine the residual impact assessment to provide more quantitative assessments and use the experience of other mines to provide details on mitigation or should recognize the uncertainties and change the rating for environmental consequences from low to moderate.



**Issue Identification:** Impact Assessment for Grizzly Bear and Wolverine (TofR (Table 10.1-1) Page 10-2 ToR Section 2.6.6 - Wildlife and Wildlife Habitat)

**Developer's Conclusion:** The project's predicted impact on grizzly bears and wolverines, in terms of habitat loss, movements and behaviour, and abundance, is predicted to have an environmental consequence rating of 'low'.

**GNWT Conclusion:** With insufficient baseline data and analysis conducted for grizzly bears and wolverines, De Beers has not adequately substantiated how the Environmental Consequence of this project for these two species can be categorized as 'low'. Without adequate analysis, one must assume that the magnitude of any project impacts would need to be increased, and any derived predictions would involve a high level of uncertainty.

**GNWT Rationale:** It is stated that the EAR should provide an analysis of the proposed development's impacts (both direct and indirect) on wildlife and wildlife habitats (including migratory birds) giving consideration to and demonstrating linkages between predicted physical and biological changes resulting from the proposed development. De Beers shall also give special consideration to species identified in COSEWIC's listing as "Endangered", "Threatened", and of "Special Concern". The analysis of development should include:

- impact of loss of terrestrial habitat, and the quality of lost habitat for relevant species;
- disturbance of feeding, nesting, denning or breeding habitats;
- wetland habitat alteration or loss;
- physical barriers to wildlife;
- disruption, blockage, impediment and sensory disturbance, of daily or seasonal wildlife movements (e.g. migration, home ranges, etc.);
- rare, vulnerable, threatened or endangered species as specified by COSEWIC, as well as, species of international significance;
- direct wildlife mortality;
- indirect wildlife mortality;
- reduction in wildlife productivity; and
- implications of the proposed development acting as an attractant for particular species.

Across North America, the decline in grizzly bear range can be attributed to three primary factors: 1) loss of bear habitat, 2) avoidance by bears of areas involving human activity and infrastructure, and 3) bears being killed by humans. This last factor is probably the most significant threat currently facing bears on the Central barrens.

In order to undertake any meaningful assessment, adequate baseline data and an understanding of natural conditions are essential to make reliable predictions about residual impacts. As outlined in the following issues relating to carnivores, a number of biological aspects (listed in Table 10-1.1) need to be addressed before impact predictions can be made with any level of confidence.

**GNWT Recommendations:** Specific recommendations are included in the sections that follow.

**Issue Identification: Minimizing the Attraction of Grizzly Bears and Wolverines to the Project**

Key Question W-2: What Impacts will the Snap Lake Diamond Project Have on Wildlife Movements and Behaviour? (EAR 10.4.2.3; Page 10-165)

Key Question W-3: What Impacts Will the Snap Lake Diamond Project Have on Wildlife Abundance? (EAR 10.4.2.4; Page 10-195)

**Developer's Conclusion:** There is a strong intention by De Beers to minimize the “attractiveness” of the Snap Lake Diamond Project to wildlife through rigorous application of a waste management program (EAR 10.4.2.4.2); however, without information to test the efficiency of these mitigation measures, the success of the waste management program is currently uncertain. (EAR Page 10-224)

**GNWT Conclusion:** Although the Developer recognizes the importance of a waste management program, no comprehensive waste management plan was included with the Environmental Assessment Report, or has been submitted for review. In the absence of a comprehensive plan, the level of bear mortality could be significant over the life of the mine. Without specific mitigation measures, there is a high level of uncertainty as to whether the environmental consequence of this mine will be “low”.

**GNWT Rationale:** Inadequate food and odour management strategies often result in conflicts with “problem” grizzly bears and wolverines. For example, eight (8) grizzly bears were killed at Echo Bay's Lupin mine over a 9-year period.

The importance of a comprehensive waste and odour management strategy cannot be overstated. Minimizing the attraction of the mine site to carnivores is probably the most significant issue that De Beers needs to address in terms of reducing mortalities. In addition to specific incinerator, landfill and camp design issues, staff training and strict enforcement will be required. A significant long-term commitment will be required in order to reduce the likelihood of grizzly bears and wolverines being attracted to the mine site.

Low levels of confidence in our knowledge of mitigation effectiveness, residual impacts and the ability to predict acceptable levels of mortality should not preclude the implementation of all reasonable mitigative efforts.

**GNWT Recommendations:** The GNWT recommends that De Beers develop and implement a comprehensive Waste Management Plan. Details, including goals, objectives and specific mitigative measures need to be included. All environmental management plans including waste management plans, mitigation plans and wildlife deterrent plans need to be formalized in an Environmental Agreement. The primary goal should be no bear or wolverine mortality related to mining activities, a goal that is held by all major mining operations in the Slave Geologic Province (SGP). De Beers should ensure that additional mitigative measures and staff training are implemented during the construction phase, when additional personnel (i.e., subcontractors) will be on site.

### **Issue Identification: Impact on Feeding and Denning Habits of Grizzly Bears**

Key Question W-2: What Impacts will the Snap Lake Diamond Project Have on Wildlife Movements and Behaviour? (EAR 10.4.2.3; Page 10-165)

ToR - (Table 10.1-1) Page 10-2II. disturbance of feeding, nesting, denning or breeding habitats;

**Developer's Conclusion:** "Current monitoring studies at the Snap Lake Diamond Mine are investigating more fully the potential influence of mine related disturbance". (EAR Page 10-178, 9)

**GNWT Conclusion:** Annual sampling wetland and riparian habitats should provide an index of relative abundance of grizzly bears within the Regional Study Area (RSA). However, additional research is necessary to determine whether this approach is sensitive enough to distinguish between residual impacts and natural variation in habitat use.

**GNWT Rationale:** In 1999 and 2000, the De Beers directed most of its grizzly bear baseline research efforts at attempting to locate dens. For several reasons, no grizzly bear dens were located. In 2001, the emphasis of the baseline wildlife monitoring shifted to index bear sign within seasonal high quality habitats (sedge wetlands in early summer, and riparian habitat in August). Not surprisingly, this sampling technique "confirmed the presence of grizzly bears". In addition, there were anecdotal bear sightings in 2000 (n=1) and in 2001 (n=3).

Most of the baseline effort to date has been directed at attempting to detect the presence of bears (dens and bear sign). Lack of dens observed to date is not very informative with respect to grizzly bear ecology. Other biological aspects need to be considered in terms of assessing potential impacts on this species. For example, there appears to have been little attempt yet to quantify how many bears might reside in the RSA, or might potentially be impacted by this project. Even extrapolating from other studies would provide a quantitative means of modeling or making some predictions about possible impacts on bears within and beyond the RSA.

#### **Outstanding Information Request Issues:**

RWED's IR 2.5.19 a) essentially encouraged De Beers to take better advantage of existing scientific literature and recent research findings in the Lac de Gras region. The GNWT believes this issue has not been adequately addressed.

**GNWT Recommendations:** The GNWT recommends De Beers take advantage of the grizzly bear research and findings sponsored by the West Kitikmeot Slave Study Society to reassess the potential impacts of the Snap Lake project on grizzly bears. Some of the analyses and approaches taken by BHP and Diavik may prove useful.

**Issue Identification: Indirect Habitat Loss (Displacement) for Grizzly Bears and Wolverines** (ToR 2.7.7, EAR 10.4.2.3; Page 10-165)

**Developer's Conclusion:** There is a moderate level of uncertainty associated with a probability of occurrence of a low environmental consequence from mining activities on grizzly bear movement and behaviour. (EAR Page 10-178)

**GNWT Conclusion:** De Beers does not adequately address how sensory disturbance might potentially affect grizzly bear or wolverine habitat use within the RSA.

**GNWT Rationale:** Without defining a “zone of influence” for grizzly bears, or discussing how many bears are affected, it is difficult to model or assess the potential impacts of the mine’s activities. This type of modeling would serve to predict reductions in grizzly bear habitat suitability and effectiveness within the local and regional study areas.

Female bears with cubs are more security conscious and, therefore, likely to be displaced by human activities. This may force bears to leave habitat they are familiar with. If these adjacent habitats are already occupied, this may result in increased contact, aggression, and mortality. The potential for interactions between displaced and resident bears depends on many factors including the distribution of preferred habitats and concentrated food sources.

Both continuous noise from the mine (surface), and intermittent noise from road and aircraft, would probably be audible to wildlife for a number of kilometres from the source. Assuming an ambient noise level of 23 dBA (EAR Page 8-18), it seems likely that grizzly bears and wolverines would be able to detect the operational noise at a distance of approximately 10 km (Figure 8.3-2). During calm conditions, noise originating from the winter and esker roads may be audible to wolverines at a distance of 10 km (EAR Page 8-32; Figure 8.3-4). Noise originating from larger aircraft would be likely audible to wildlife across a significant portion of the RSA (Figure 8.3-6). Since both grizzly bears and wolverines tend to avoid areas of human activity, it’s uncertain how residual impacts of sensory disturbance (e.g., noise) will potentially affect habitat use within the RSA.

Some bears may become habituated to human activities. Although this may serve to reduce displacement distance, these bears might be emboldened to investigate the mine site; however, close encounters may pose a potential threat to people, increasing the likelihood that habituated bears may be killed.

Monitoring and exploration activities will likely continue within the RSA during the operational life of the mine. This EAR does not address how helicopters, drilling activity, and wildlife monitoring activities may impact carnivores.

**GNWT Recommendations:** The GNWT recommends De Beers address how sensory disturbance might potentially affect grizzly bear or wolverine habitat use within the RSA.

The GNWT also recommends De Beers consider using a hypothetical zone of influence for grizzly bears, in order to model potential impacts and refine impact predictions.

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**Issue Identification: Cumulative Impact of Grizzly Bear and Wolverine Mortality Within the Slave Geologic Province** (EAR Section 10, 12)

**Developer's Conclusion:** Conclusions regarding this matter are found in the following sections:

EAR Table 12.7-11 Page 12-133. The magnitude of change in abundance from applicable projects on grizzly bear and wolverine populations is anticipated to be 'low' to 'moderate'. The environmental consequence for both species is ranked as 'low'.

EAR Page 12-128. "In addition, one grizzly bear cub that became habituated to the landfill site at Misery camp had to be destroyed (BHP 2001). In contrast, there have been no reports of losses for caribou, grizzly bears, wolves or wolverines related to the Echo Bay's Lupin mine or the Tibbit-Contwoyto winter road."

EAR Page 10-195. If the loss of individuals during construction and early phases of operation approaches natural mortality then the impact may be reversible in the long-term; this would not increase the environmental consequence.

EAR Page 10-224. Any change in abundance due to mine-related effects should be compensated by the reproductive potential of the population within the period of construction and operation of the mine.

EAR Page 10-187. Without mitigation, curious animals (e.g., grizzly bears and wolverines) could fall into the ventilation raises, subsequently leading to direct mortality and/or injury. However, these ventilation raises will be completely enclosed with chain-link fencing, which is anticipated to fully mitigate potential negative effects.

**GNWT Conclusions:** De Beers' analysis of cumulative mortality of grizzly bears only addressed mortality associated with Diavik, Ekati, Snap Lake and the Contwoyto winter road. As well, the estimates of bear mortality associated with these specific sites is inaccurate. A regional assessment of grizzly bear mortality should include all known forms of human caused grizzly bear mortality. Ventilation raises will require more than chain-link fencing to mitigate potential wolverine mortality.

**GNWT Rationale:** An analysis of grizzly bear mortality across the Slave Geological Province (SGP) needs to consider all forms of human caused mortality, including quota and problem kills across the SGP. Mortality data associated with the mining industry only provides a portion of the human caused mortality in the SGP. In order to assess the potential impacts of these levels of mortality, analysis should consider estimates of population densities as well as demographic parameters (McLoughlin, et al., 2003a and 2003b)<sup>15</sup>

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<sup>5</sup> McLoughlin, P.D., M.K. Taylor, H.D. Cluff, R.J. Gau, R. Mulders, R.L. Case, S. Boutin, and F. Messier. 2003a. Demography of barren-ground grizzly bears. *Canadian Journal of Zoology*: in prep.  
McLoughlin, P.D., M.K. Taylor, H.D. Cluff, R.J. Gau, R. Mulders, R.L. Case, S. Boutin, and F. Messier. 2003b. Population viability for barren-ground grizzly bears in Nunavut and the Northwest Territories, Canada. *Arctic*: in press.

- The statement that there have been no reports of losses at Lupin is incorrect. Over a nine year period (1986-95), Lupin was responsible for the death of 8 grizzly bears, due primarily to inadequate food management and fish cleaning practises. In May 1999, Kennecott's exploration crew, working on behalf of Diavik, killed a "problem" bear at Lac de Gras, due to poor garbage handling practises. In addition, a number of caribou and wolverines have been killed along the Contwoyto winter road.

De Beers makes the assumption that any mining related grizzly bear mortalities would be compensated for by the broader population. It is exactly this perception and the increasing human presence in the SGP that needs to be addressed. In fact, grizzly bears have low reproductive rates, and are very sensitive to adult female mortalities. Hunting quotas in Nunavut, and problem kills associated with mining and outfitting industries already contribute to at least 14 bear mortalities per year across the SGP. Although this grizzly bear population is currently believed to be stable, an increased level of mortality may not be sustainable over the long-term (McLoughlin et. al., 2003a and 2003b).

De Beers assumes that, with chain-link fences, there will be no direct wolverine mortality associated with the presence of ventilation raises. Since wolverines have been observed to easily climb over chain-link fences at Diavik and Misery Camp, De Beers should consider other mitigation options to minimize this potential risk.

**GNWT Recommendation:** The GNWT recommends De Beers provide a quantitative analysis of mortality, including all forms of human caused mortality, and determine what impact an increased level of direct wildlife mortality might have on regional grizzly bear and wolverine populations. Given the uncertainties identified in the assessment and our lack of knowledge about this species, monitoring is needed to test impact predictions made by the proponent.

De Beers should consider further mitigation options (other than chain-link fencing) to minimize the potential risk to wolverines posed by ventilation raises.

**Issue Identification:** Impact Assessment for Species of “Special Concern” (Grizzly Bear and Wolverine) (EAR 10.4.2; Page 10-2)

**Developer’s Conclusion:** Species listed by the Committee On the Status of Endangered Wildlife in Canada (COSEWIC 2001) as “Endangered”, “Threatened”, or of “Special Concern” were given consideration throughout the EAR for wildlife and wildlife habitat.

**GNWT Conclusion:** This assessment offers little evidence that any additional baseline research, analysis, or effort was dedicated to grizzly bear or wolverine. Under the Terms of Reference (2.6.6, on page 10-2), De Beers was asked to give special consideration to these species.

**GNWT Rationale:** Limited baseline data were obtained for grizzly bears and wolverines. This is particularly disappointing since these two species require additional attention. As mentioned above, across North America, their decline in abundance and range can be attributed to three primary factors: 1) loss of habitat; 2) avoidance of areas involving human activity and infrastructure; and 3) human-caused mortality. Increasing development on the central barrens poses similar threats.

**Recommendation:** The GNWT recommends that De Beers work with RWED, BHP Billiton and Diavik to optimize research and monitoring initiatives to improve the ecological understanding of grizzly bears and wolverines, and the impacts associated with these species and diamond mining on the central barrens.

**Issue Identification: Insufficient Details of Proposed Environmental Follow-up Programs.**  
(ToR line # 573-577, Section 2.11 Follow-up Programs)

Developer's Conclusion: De Beers has stated that it is presently developing an environmental management system that will set out how the project will be managed to minimize its impact on the biophysical environment. The proponent will develop a program to "*monitor not only the effectiveness of the management system but also the effects of the project on the environment.*" The monitoring program will include:

- monitoring for regulatory compliance;
- monitoring for project-related environmental effects;
- monitoring for effectiveness of mitigation; and
- participating in cumulative effects monitoring.

**GNWT Conclusion:** The Terms of Reference state "*De Beers shall describe the approach, objectives and proposed methodologies that will be used in any proposed monitoring program(s)*". The GNWT concludes that level of detail required for the environmental assessment does not support the opinion of the proponent and that De Beers has not completed a thorough analysis of wildlife monitoring requirements for this project. Information on monitoring programs that has been provided is general and, therefore, does not provide confidence in the efforts to be undertaken by De Beers.

**GNWT Rationale:** Environmental monitoring programs are an integral part of the environmental assessment and environmental management processes. Monitoring is required for a variety of purposes as listed above. Given the inadequacies in the baseline data and the level of uncertainty in the impact predictions, it is essential that wildlife monitoring programs are developed and implemented to address both project specific impacts and regional cumulative effects.

The GNWT acknowledges the proponent's commitment to developing a comprehensive Environmental Management System that will include a wide range of monitoring plans, including those for wildlife (Section 14, EAR).

Given the experience of BHP Billiton and Diavik in conducting environmental effects monitoring, there is considerable knowledge to be gained from these diamond mines. The GNWT has worked cooperatively with both companies to standardize environmental monitoring protocols, programs and reporting to ensure that their wildlife effects monitoring programs complement the monitoring efforts of government and contribute to regional cumulative effects assessment.

Wildlife effects monitoring programs for BHP Billiton and Diavik have been formalized in separate project specific Environmental Agreements.

**GNWT Recommendation:** The GNWT recommends that a comprehensive and detailed environmental effects monitoring program (including wildlife) be developed and implemented as a part of an Environmental Agreement with De Beers.



**Issue Identification:** Uncertainty in Assessing Residual Impacts on Ecological Land Classification Units. (ToR Line # 332, Section 2.6.3 Vegetation and Plant Communities (p.10-77 to 10-93))

**Developer's Conclusion:** De Beers concludes that impacts to ecological land classification (ELC) units such as heath/boulder, esker complex, heath tundra and birch seep will be reversible in the long-term since they will re-establish themselves in the far future (100 years); however, the level of confidence that ELC units will re-establish is rated as moderate. Reclamation efforts are expected to return most ELC units to pre-development equivalent capability.

**GNWT Conclusion:** The GNWT concludes that considerable uncertainty exists about the ecological capability of reclaimed landscape units since there is only a 'moderate' level of confidence that disturbed ELC units will be re-established in the long-term.

**GNWT Rationale:** Reclamation of ELC units has not been demonstrated and claims that disturbed ELC units will be reclaimed to pre-development equivalent capability have a high level of uncertainty. For example, De Beers expects that the North Pile landform will be re-established as heath boulder habitat. From a wildlife habitat perspective, it is difficult to believe that reclaimed heath boulder units on the North Pile will have the equivalent ecological capability as undisturbed heath boulder units off the mine site.

**GNWT Recommendations:** The GNWT recommends De Beers undertake research pertaining to reclamation of disturbed ELC units to test impact predictions made in the environmental assessment report. BHP Billiton has begun work in this regard. De Beers should work cooperatively with other mining companies to address this issue.

The GNWT also recommends De Beers initiate a monitoring program similar to BHP Billiton's and Diavik's to annually assess the direct loss (and reclamation) of ELC units. Using similar monitoring protocols will allow a regional assessment of cumulative direct habitat loss in this region of the Slave Geological Province.