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NWT DIAMONDS PROJECT

Report of the Environmental
Assessment Panel

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NWT DIAMONDS PROJECT
ENVIRONMENTAL ASSESSMENT PANEL

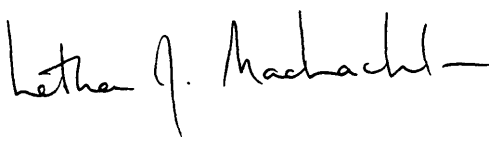
The Honourable Sergio Marchi
Minister of the Environment
House of Commons
Ottawa, Ontario
K1A 0A6

The Honourable Ronald Irwin
Minister of Indian Affairs and Northern Development
House of Commons
Ottawa, Ontario
K1A 0A6

Dear Ministers:

In accordance with the terms of reference issued in December 1994, the Environmental Assessment Panel has completed its review of the NWT Diamonds Project proposed by BHP Diamonds Inc. and the Blackwater Group. On behalf of the panel, I am pleased to submit this report for your consideration.

Yours sincerely,



Letha MacLachlan
Chair

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EXECUTIVE SUMMARY

In December 1994, a federal environmental assessment panel was appointed to review the environmental and socio-economic effects of the NWT Diamonds Project proposed by BHP Diamonds inc. and the Blackwater Group (referred to as the Proponent or BHP). The proposal would involve open-pit and underground mining of five diamond-bearing deposits located about 300 km northeast of Yellowknife near Lac de Gras.

The Panel held scoping meetings to identify issues of concern in March and April 1995, and public hearings in January and February 1996. Scoping meetings and public hearings were held in a total of 10 Northwest Territories (NWT) communities likely to be affected by the Project. All written and oral information received by the Panel since its appointment was considered in this report.

This report to the Minister of the Environment and the Minister of Indian Affairs and Northern Development addresses the acceptability of the Project based on its environmental and socio-economic effects in the NWT. The Panel concludes that the environmental effects of the Project are largely predictable and mitigable. Effects not predicted can be detected by monitoring and can be addressed by the Proponent's proposed environmental management plans and adaptive management strategy. The potential economic benefits from this Project are large and socio-cultural effects are likely to be both positive and negative but are difficult to predict on balance. The Panel believes that adverse social effects can be addressed by policies and programs of governments and the Proponent. Overall, the Panel concludes that the Project has the potential to provide significant benefits to the north and northerners. The Panel recommends that the Government of Canada approve the NWT Diamonds Project subject to the following recommendations.

- **Land Claims and Aboriginal Rights — The Panel recommends that:**
  a) **the Government of Canada and Aboriginal peoples work toward a quick and equitable settlement of outstanding land claims in the region;**
  b) **the Government of Canada clarify, for all parties, the status of lands under exploration in areas where land claims have not been settled, and define when lands are considered to be at a stage of advanced exploration and the effect of this on their availability for selection by an Aboriginal claimant group; and,**
  c) **the Government of Canada examine the processes and policies in place in the region to ensure that they are the most appropriate for resolving the outstanding land claims with Aboriginal peoples.**

  The Indian Claims Commission may provide an opportunity to use alternative dispute resolution techniques to resolve contentious issues.

- **Traditional Knowledge — The Panel recommends that the Government of Canada develop a policy on the inclusion of traditional knowledge in environmental assessment. This policy should be developed in consultation and collaboration with the Government of the Northwest Territories (GNWT), Aboriginal peoples and industry. The most immediate need is to set out guidelines and standards for traditional knowledge that developers are expected to meet when preparing environmental assessments. Moreover, the role and responsibility of government in this area needs to be defined.**

- **Regulatory Regime — The Panel recommends that the Department of Indian Affairs and Northern Development (DIAND) should have regard for the following principles when developing new legislation and management structures resulting from land claims settlements: projects must be managed with consistency, integrity and continuity; effective consultation with the public and Aboriginal peoples is essential; and regional land-use planning must be undertaken to ensure that a broad perspective is considered in decision-making.**

- **Monitoring — The Panel recommends that, as a condition of approval, BHP should be required to submit to government annual reports on the results of its environmental and socio-economic monitoring programs. The reports should be made public and should be presented at a public meeting (or meetings) held in the region and organized by BHP and government.**

- **Monitoring** — The Panel recommends that periodically (for example, every three to five years) BHP prepare a report that would:
  a) take a longer term view of effects monitoring in the context of natural variability;
  b) review actual performance of Project activities as compared to predictions in the Environmental Impact Statement; and,
  c) evaluate how the adaptive management strategy has performed over time.

  This report should be made public and should be presented at a public meeting (or meetings) held in the region and organized by BHP and government.

- **Environmental Management Plans** — The Panel recommends that BHP, government agencies and Aboriginal people work together during the Project design and implementation stages to revise and update environmental management plans as required.

- **Tailings Management** — The Panel recommends that the information it received concerning the design, construction and monitoring of the Long Lake tailings impoundment be taken into account by DIAND and the Water Board at the water-licensing stage.

- **Materials Management** — The Panel recommends that BHP be required to submit a detailed spill contingency plan for fuel haulage to Environment Canada, DIAND and the GNWT for approval prior to commencement of the 1997 fuel haul. As part of this plan, the Proponent, its suppliers and its contractors should confirm that each has the capacity, through insurance or other instruments, to meet the full potential liability should a spill occur on the Echo Bay winter road or on public highways.

- **Mine Site Security** — The Panel recommends that the Government of Canada make the necessary amendments to the Criminal Code to provide a secure environment for the diamond-mining industry prior to the start of full production.

- **Air Quality** — The Panel recommends that an air quality monitoring program be developed jointly by BHP, Environment Canada, the GNWT and DIAND.

- **Water Quality** — The Panel recommends that the water licensing process take into account water quality issues raised during this review including, but not limited to, integrity of frozen core dams, slow settling of suspended particulates, acid generation from waste rock, kimberlite toxicity, nitrogen contamination of waste rock and location of monitoring stations.

- **Fish** — The Panel recommends that:
  a) cash compensation for the loss of fish habitat should be considered by the Department of Fisheries and Oceans (DFO) only when there are no viable options to avoid the loss of habitat or to re-create the lost habitat;
  b) DFO develop a fair, realistic and transparent approach to the calculation of compensation for loss of fish habitat;
  c) DFO settle compensation with BHP as quickly as feasible, reflecting the principles described in b) above;
  d) if it is decided to proceed with the proposed Habitat Management Fund, an effective public consultation program including Aboriginal peoples be undertaken by DFO as soon as possible to identify projects that would be most appropriate; and,
  e) the results of projects paid for by this fund be carefully monitored to ensure that the objective of habitat enhancement is achieved.

- **Caribou** — The Panel recommends that BHP be required to submit a detailed caribou monitoring and management plan for review and approval by DIAND and the GNWT prior to the commencement of mining.

- **Caribou** — The Panel recommends that governments consider establishment of a Bathurst caribou management board. Such a board would provide a focal point for multi-party input to the monitoring and management of this herd.

- **Birds** — The Panel recommends that BHP should continue bird surveys until sufficient information has been gathered to refine the impact prediction. Requirements for baseline information collection and for monitoring should be defined in consultation with government agencies.

- **Impact and Benefits Agreements** — The Panel recommends that all parties set the timely negotiation, conclusion and implementation of Impact and Benefits Agreements as a priority. The Panel also encourages BHP and Aboriginal people to conclude the agreements before the operational phase of the Project begins.

- **Employment — The Panel recommends that the Government of Canada require BHP to report on progress on northern and Aboriginal employment as part of the annual monitoring report previously recommended.**

- **Northern Business — The Panel recommends that BHP include as criteria for the selection of contractors the fairness and adequacy of wages paid to the contractor's employees, as well as the contractor's policy and record on northern and Aboriginal hiring.**

- **Northern Business — The Panel recommends that government ensure that financial programs continue to be available to northern and Aboriginal businesses so that they are able to take full advantage of the opportunities presented by the NWT Diamonds Project.**

- **Socio-Economic Monitoring — The Panel recommends that BHP and the GNWT meet periodically to review the results of monitoring of socio-economic conditions and trends, and of monitoring of Project activities.**

- **Social Effects — The Panel recommends that the Government of Canada and the GNWT undertake work to define the need for information on the socio-economic effects of development in the region and to develop a framework for analysis. The Panel proposes that the West Kitikmeot Slave Study accept collection of regional socio-economic baseline information as a priority to meet the needs of this analysis.**

- **Archaeological and Heritage Sites — The Panel recommends that consultation by BHP with Aboriginal groups continue over the life of the Project and as new areas are explored and developed in order to incorporate traditional knowledge with the archaeological surveys. The archaeological surveys of new sites must be done to the highest standards of the day and must respect places of significance to Aboriginal people. The Panel appreciates the sensitivity of Aboriginal peoples regarding the burial places of their ancestors and the connection of this to land claims issues, and recommends that Aboriginal groups work co-operatively with BHP to ensure that burial sites in the Project area are identified and protected.**

- **Fishing Policy — The Panel recommends that BHP consult with the Aboriginal groups who use the area and with the responsible agencies to develop an acceptable fishing policy.**

- **Firearm Policy — The Panel recommends that BHP establish a consultation process with communities to explain its firearm and fishing policies, to describe the relationship between its policies and people's ability to hunt and fish on the claims block, and to resolve any misunderstandings on these issues.**

- **Compensation — The Panel recommends that the Government of Canada make BHP's compensation policy a condition of approval for the Project. In addition, the compensation policy should set out firm procedures for seeing disputes through to resolution. The Panel also recommends that the Government of Canada ensure that land-users have access to resources to pursue compensation claims.**

- **Compensation — The Panel recommends that DIAND work closely with the GNWT to develop an enforceable compensation policy that addresses the issues of burden of proof, access to resources and means to ensure resolution, in relation to future development in this region. Once developed, the compensation policy should also be applied to this Project.**

- **Diamond Valuation — The Panel recommends that the Government of Canada develop administrative procedures for diamond valuation and ensure that these are in place prior to the start of full production. These procedures should be developed in consultation with the GNWT and BHP.**

- **West Kitikmeot Slave Study — The Panel recommends that the West Kitikmeot Slave Study:**
  - **a) develop a regional approach to the collection of traditional knowledge;**
  - **b) work together with BHP, the federal government and the GNWT on a co-operative approach to environmental effects monitoring for the region;**
  - **c) collect regional baseline information on eskers and other glaciofluvial deposits, in order to provide a basis for development of guidelines and cumulative effects assessment by government;**

d) provide a forum to co-ordinate collection of baseline information on caribou;
e) accept the regional grizzly bear study as a major component of its program;
f) develop baseline information that will be required to identify areas for protected area status;
g) accept the collection of regional socio-economic baseline information as a priority; and,
h) ensure that its study program is designed to provide the information needed for cumulative effects assessment of future development in the region.

Should the West Kitikmeot Slave Study decide not to adopt these initiatives, then responsibility should fall to government to ensure that these issues are addressed.

1. INTRODUCTION

1.1 PROJECT DESCRIPTION

The NWT Diamonds Project (Project), a joint venture between BHP Diamonds inc. and the Blackwater Group (referred to throughout this report as BHP or the Proponent), entails the development and operation of a diamond mining project in the Lac de Gras area of the Northwest Territories (NWT) (figure 1). Five diamond-bearing kimberlite pipes would be mined; four located within a few kilometres of each other in the Koala watershed north of Lac de Gras and a fifth, 29 km to the southeast, adjacent to Lac de Gras (figure 2).

The kimberlite pipes currently named Panda, Misery, Koala, Fox and Leslie all lie under lakes which would be drained before mining commences. Initially, all pipes would be mined as open pits with subsequent underground mining of the Panda and Koala pipes. The proposed development sequence is Panda, Misery, Koala, Panda underground, Fox, Koala underground and Leslie. The estimated life of the mine is 25 years.

Between 35 and 40 million tonnes of waste rock would be excavated annually from the mining operations. Most waste rock would be placed in piles in the vicinity of each pit although some would be used for road building. Over the life of the Project, approximately 133 million tonnes of ore would be processed. Recovery of diamonds from the ore would take place in a centralized processing plant near the Koala pit. Ore would be crushed and diamonds separated by physical rather than chemical means. Final sorting would be done using X-rays to separate the diamonds from remaining host materials.

Crushed rock or tailings would be deposited in the Long Lake tailings impoundment basin for the first 20 years of operation, and for the remaining five years in the mined-out Panda pit. The Long Lake basin would be created by constructing three frozen core perimeter dams to increase the capacity of the impoundment area. The basin would be divided into five cells by intermediate rock dikes and four of the five cells would be filled sequentially allowing time for the tailings to settle. As the tailings in each cell consolidate, they would be covered with waste rock and soil. The soil would be revegetated, converting the tailings basin into a wetland. Water discharged from the tailings facility into the environment would be required to meet prescribed standards.

Ground transportation to the site would be by the winter road currently constructed and operated annually by Echo Bay Mines Ltd. to service its Lupin mine. This road, which is operational for about three months of the year, would be used to transport large volumes of fuel, heavy equipment and materials to the site. A 29 km all-weather road would be constructed from the plant site to the Misery pit to haul ore for processing. This road would also be used to transport materials from the Echo Bay winter road to the plant site. No all weather roads to the site are proposed.

An air strip capable of accommodating Hercules C130, and Boeing 727 and 737 jets has already been constructed at the Project site. Chartered aircraft would be used to transport all personnel, food, other perishables and critical materials to the site and to ship out diamonds.

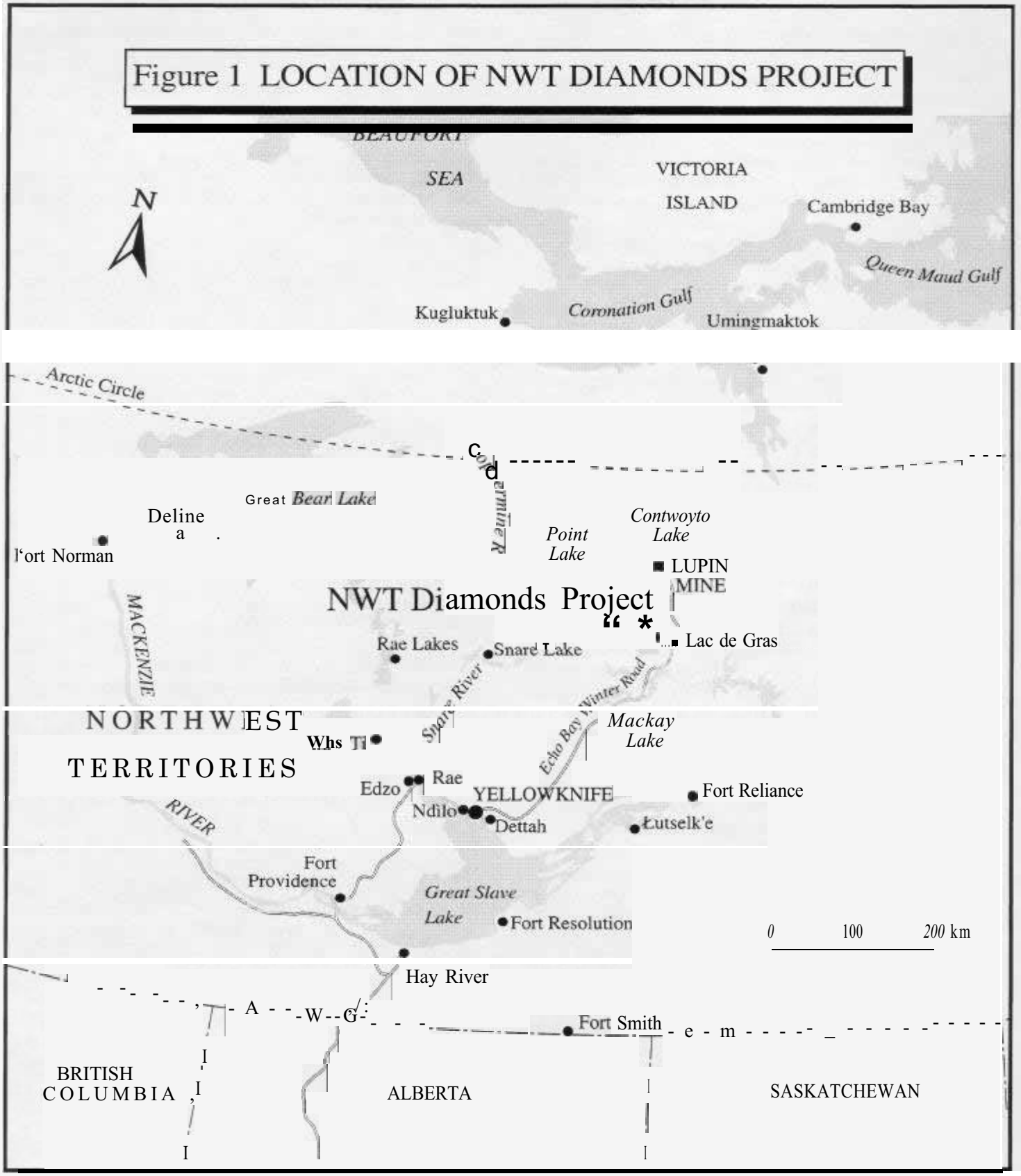
In addition to the mines, process plant, air strip and Misery haul road, other infrastructure would include a 400-person permanent camp, a diesel power plant, an integrated truckshop/offices/warehouse complex and a security building. Other services would include fuel storage and distribution, water supply, sewage treatment, and waste disposal.

1.2 REVIEW PROCESS

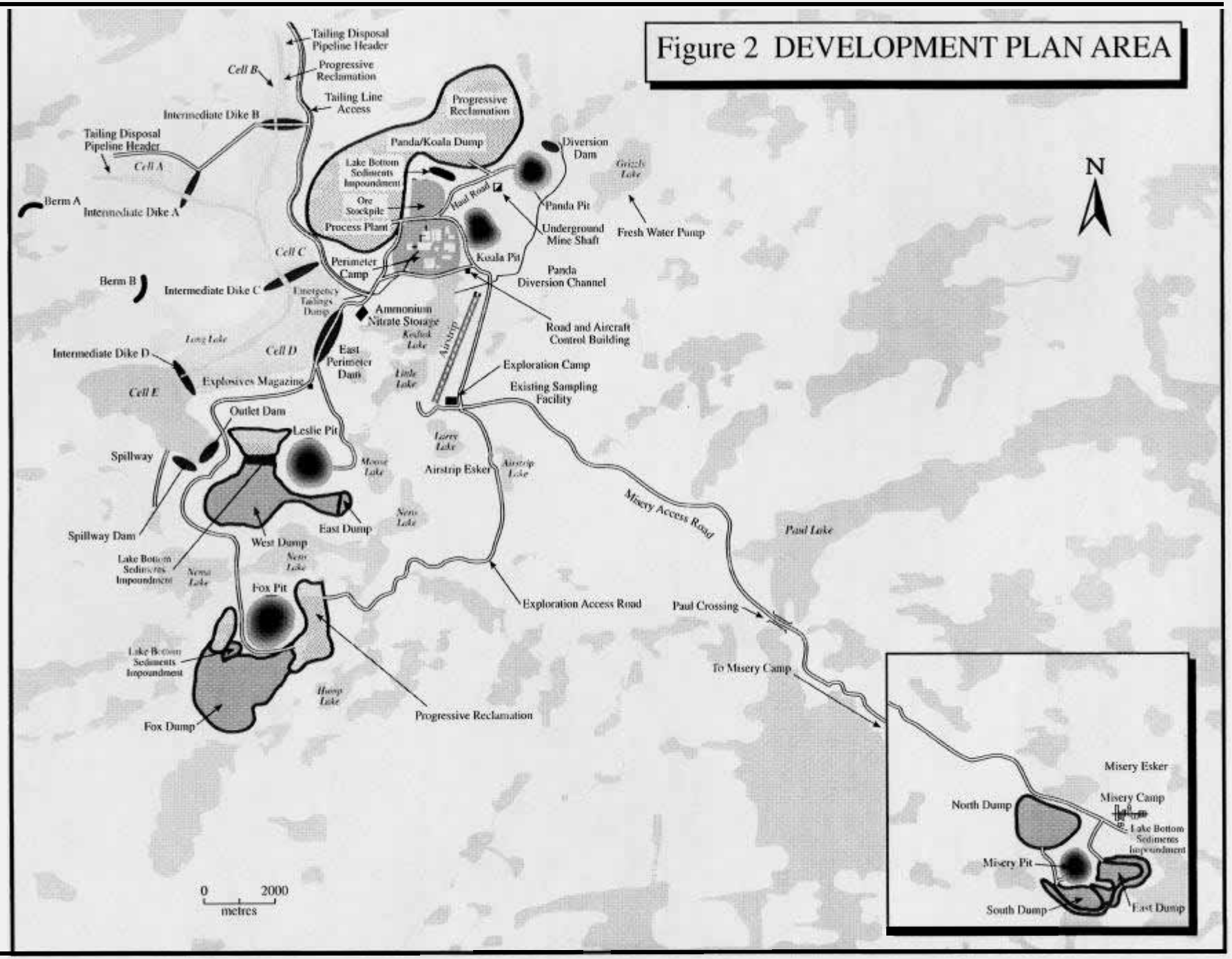
In July 1994, the Minister of Indian Affairs and Northern Development referred the Project to the Minister of the Environment for a public review under the *Environmental Assessment and Review Process Guidelines Order.* The reasons for the referral were that the potentially adverse environmental effects that may be caused by the proposal were unknown and that public concern about the proposal was such that a public review was desirable.

In December 1994, the Minister of the Environment appointed a four-person panel to undertake this *review.* Members of the Panel were Ms. Letha MacLachlan (Chair), Ms. Cindy Kenny-Gilday, Dr. Walter Kupsch and Miss Jessie Sloan. Their biographies are in Appendix A. The Panel was asked to consider the Project's short- and long-term environmental and socio-economic effects within the NWT. The Panel's Terms of Reference are in Appendix B.

Figure 1 LOCATION OF NWT DIAMONDS PROJECT



(After: Environmental Impact Statement)



(After: Environmental Impact Statement)

At the same time that the Panel was appointed, the Minister of Indian Affairs and Northern Development and the Minister of Renewable Resources, Government of the Northwest Territories (GNWT) announced a major study of the environmental, social and economic issues related to mineral development in the Slave Geological Province (now named West Kitikmeot Slave Study). The Panel's Terms of Reference permit it to refer issues to this regional study, but completion of the Panel's report is not to be contingent on this other initiative.

The main steps in the Panel review process are listed in Table 1. These steps included developing draft Guidelines for the Preparation of an Environmental Impact Statement (EIS), scoping of issues, issuing final Guidelines and a request to governments for information, reviewing the EIS, requesting additional information from the Proponent and holding public hearings. A list of review documents is in Appendix C.

The public hearings gave opportunities for individuals, organizations, and government representatives to provide to the Panel their views, opinions and technical information on the acceptability of the environmental and socio-economic effects of the proposal. Eighteen days of public hearings were held between January 22 and February 23, 1996 in Wha Ti, Rae Lakes, Rae-Edzo, Snare Lake, Łutselk'e, Kugluktuk, Ndilo, Dettah and Yellowknife (Appendix D provides a list of current and former place names). The public hearings included community, general and technical sessions. The Panel received 78 written submissions from individuals and groups and heard approximately 260 presentations during public hearings (Appendix E). A glossary of terms used in this report is in Appendix F, a list of abbreviations is in Appendix G, and acknowledgements are in Appendix H.

This report is the final step in the Panel review process. It provides the Panel's findings, conclusions and recommendations to the Ministers of the Environment and of Indian Affairs and Northern Development.

TABLE 1: STEPS IN THE PANEL REVIEW PROCESS

DATE	STEP
26 July 1994	Project referred to public review by Department of Indian Affairs and Northern Development.
9 December 1994	Panel appointed by Minister of the Environment.
9 December 1994	Project Description issued by BHP.
23 January 1995	Operational Procedures issued by Panel.
31 January 1995	Draft Guidelines for the Preparation of an Environmental Impact Statement (EIS) issued.
13 March 1995	Visit to Project site by Panel and media.
14 March -8 April 1995	Scoping meetings held in eight NWT communities. Panel received over 50 written submissions and heard from approximately 125 presenters.
23 May 1995	Panel issued final Guidelines for Preparation of an EIS (Guidelines) and Government Information Request.
27-28 June 1995	Visit to Island Copper Mine, meeting with community officials from Port Hardy, B.C. and local Aboriginal people.
24 July 1995	EIS submitted by BHP and 90-day review period commenced.
1 August 1995	Responses received from federal government and Government of the Northwest Territories to Government Information Request.
22 August 1995	Second visit by Panel and media to Project site to observe conditions during the snow-free period and to examine some environmental baseline studies.
23 October 1995	EIS public review period ended. Panel received written submissions from 26 parties.
27 October 1995	Panel issued draft Procedures for Public Hearings for public comment.
22 November 1995	Panel announced that EIS was sufficient to commence planning for public hearings but also requested additional information from BHP on specific issues.
13 December 1995	Panel announced schedule for public hearings and issued final hearing procedures.
19 December 1995	Additional information from BHP received.
22 January - 23 February 1996	Eighteen days of public hearings held in nine NWT communities. Panel received over 75 written submissions and heard approximately 260 presentations.

2. OVERALL FINDINGS

This section presents overall issues that the Panel considered in reaching a decision on whether the Project could proceed and, if so, under what conditions.

2.1 ADEQUACY OF BASELINE INFORMATION

The adequacy of the baseline information used to predict the environmental and socio-economic impacts of the proposal was an issue raised by many in the review process. The work done by BHP and its adequacy is discussed in detail under specific topics in subsequent sections of the report. The Panel's overall assessment of the adequacy of the baseline information is presented below.

Aboriginal peoples have traditionally used the Lac de Gras area. Until the discovery of diamonds, however, the area received little scientific attention. Consequently, much of the work presented during the review of the Project had not been previously systematically collected and analyzed.

Although BHP collected some baseline information in 1992, intensive field sampling began in 1993. In October 1993, BHP submitted a report entitled "Baseline Environmental Study Protocols" to the Regional Environmental Review Committee (RERC). The report outlined protocols for a biological sampling program as well as cultural and socio-economic studies that would form the baseline for the EIS. The federal departments of Indian Affairs and Northern Development (DIAND), Environment, and Fisheries and Oceans (DFO) as well as the GNWT departments of Renewable Resources, and Education, Culture and Employment provided comments to RERC on the protocols. In December 1993, RERC responded to BHP that there were many issues which would require further analysis and discussion before the protocols could be considered complete but commended the company for a proactive, innovative and co-operative approach. Three items in the RERC response were, in the Panel's view, noteworthy. First, the Proponent was told that significant additional effort was required to integrate traditional knowledge with conventional scientific data collection. Secondly, concerning BHP's proposed aerial surveys of caribou, RERC commented that an intensive aerial survey program was not warranted because sufficient information was available from government, and migration patterns are variable. Thirdly, RERC stated that it did not understand why studies of small mammals and terrestrial birds were proposed.

Although BHP's study protocols and comments from RERC provided a starting point for the collection of baseline information, the subsequent appointment of this Panel and the public review process provided greater direction and focus to this activity. As discussed in Section 1 – Introduction, the Panel issued draft "Guidelines for the Preparation of an Environmental Impact Statement" and held scoping meetings in eight communities. The purpose of the scoping meetings was to allow interested parties to identify the issues and concerns that they wanted to have addressed during the review. At the completion of the scoping phase, the Panel issued final Guidelines which indicated to the Proponent the information that the Panel and the public required to understand the Project and its effects. It was against these Guidelines that the EIS, including the adequacy of the baseline information, was judged. One of the activities BHP undertook, in compliance with the Guidelines, was the identification of valued ecosystem components for which baseline information would be collected.

The Panel heard a range of views on the adequacy of the baseline information. DIAND, the initiating department for this review, concluded that it considered the submissions from BHP on environmental management plans and potential impact on water resources to be "sufficiently comprehensive" for an assessment at the panel review stage. The GNWT concluded that no significant adverse social, economic or environmental impacts were likely to occur. While some specific concerns were raised with regards to the baseline information (on caribou and birds in particular), the Panel believes that the GNWT must have found the information sufficient to form its overall conclusion that the effects would not be significant. On the other hand, in its final submission, the Northern Environmental Coalition stated that a key issue in this review was the presence of major deficiencies in the baseline scientific and technical information provided by BHP in the EIS. Comments from Aboriginal people focused especially on traditional knowledge and their view that its treatment was inadequate. The subject of traditional knowledge is discussed in Section 2.3. Socio-economic baseline is considered further in Section 5.4.2 – Adequacy of Baseline Information.

The Panel concludes that the environmental and socio-economic baseline is sufficient for the purposes of this review, that is, to determine whether this Project could proceed and, if so, under what conditions. The Panel is satisfied that whereas more work will be required in some areas, the framework for collection of baseline information has been defined, considerable amounts of baseline information have been gathered and information gathering is continuing. Nevertheless, there is a significant need to expand the traditional knowledge baseline and to incorporate this knowledge into the design of further baseline studies and monitoring programs.

The Panel notes that the process of impact assessment should not be viewed as static but as continuing throughout the life of a project. During the course of this review, the information in the EIS was supplemented by the submission of twelve 1995 Baseline Study Update Reports, as well as an Additional Information Response on several topics (Appendix C).

Finally, the Panel accepts the comments of DIAND that it considers the information presented by BHP will provide a good basis for regulation of the Project.

2.2 LAND CLAIMS AND ABORIGINAL RIGHTS

Throughout the hearings, the Panel heard from many presenters on the subject of land claims and Aboriginal rights. Aboriginal people spoke eloquently about their attachment to the land and of their strongly-held belief that settlement of land claims would ensure that their use of the land would be protected.

In the four Dogrib communities (Wha Ti, Rae Lakes, Rae-Edzo and Snare Lake), land claims and the importance of land to the Dogrib people were themes in virtually every presentation. Elders spoke of the responsibility of the Dogrib people to take care of the land. Many people spoke of their love for, and strong connection to the land. In each of these communities, "this is our land" was a statement often repeated. Many elders told the Panel that land claims negotiations were underway and asked the Panel to recommend that the Project not proceed until land claims were settled.

The Panel heard from the Dogrib Treaty 11 Tribal Council that an Impact and Benefits Agreement (IBA) was being negotiated between the council and BHP. The council told the Panel that a successfully concluded IBA between the Dogrib people and BHP should be a condition of Project approval and that if an IBA could not be concluded, the Project should not be approved until their land claim was settled. The Dogrib Renewable Resources Committee told the Panel that land claims and self-government negotiations should be concluded before mine development could take place on Dogrib land.

In the Yellowknives Dene communities of Dettah and Ndilo, people spoke to the Panel of the importance of the land to the Dene and of the need to settle land claims before the Project proceeds. Many people in these communities also said, "this is our land." Some people expressed strong opposition to the Project and said they were prepared to engage in civil disobedience and to seek a court injunction to prevent the Project from proceeding until the question of land ownership was resolved.

The Yellowknives Dene Band told the Panel that the proposed Project site and the current corridor for the Echo Bay winter road are located in their traditional territory and that the Aboriginal title to their traditional lands has never been extinguished. The Yellowknives Dene also told the Panel that under the Treaty Land Entitlement process they should be entitled to select lands anywhere in their traditional territory, including the Project area, and should have a say in how royalties from any development on those lands are distributed.

The tutselk'e First Nation told the Panel that their people had never surrendered title to their land. The First Nation also expressed the view that approval of the Project would limit their opportunity to select land during the land claims process. Further, the First Nation stated that the Project should not be permitted to proceed until Aboriginal rights, title and jurisdiction in their traditional territory were recognized and implemented through Treaty Land Entitlement, and that until this was achieved, the First Nation could not negotiate a fair agreement with BHP. The written submission from the Łutselk'e First Nation stated that their people would strenuously oppose any development and that they would be prepared to take legal action to defend their Aboriginal rights. During the community hearing in Cutselk'e, many spoke about the importance of the land, and said that development must wait until land claims are settled.

The Métis Nation of the Northwest Territories told the Panel that it represents approximately 7,000 people with the majority living in the western Arctic. It said that the EIS failed to adequately address the rights and aspirations of the Métis regarding lands and resources and that their concerns must be considered along with the land claims of other First Nations. The Panel was advised by DIAND that following the breakdown of the 1990 Dene/Métis Final Agreement, exploratory discussions have been held with Métis eligible for a comprehensive land claim under that agreement.

Land claims to the north of the Project site have been settled with the Inuit by the Nunavut Land Claim Agreement. The Kitikmeot Inuit Association advised the Panel that the agreement contains clauses related to maintenance of the quality and quantity of waters that flow into Nunavut from another jurisdiction, and to Inuit harvesting rights outside Nunavut. It was the association's view that the assessment of the proposed Project needed to consider both factors.

In the EIS, the Proponent outlined the status of land claims in the region and took the position that it would be inappropriate for BHP to speculate on the nature or outcome of any land claims settlement. Based on this, the Proponent is pursuing a "policy of inclusion" to provide benefits to all the Aboriginal peoples of the area, whatever the status of their claims. During the hearings, BHP said that, at the request of the Grand Chief of the Dogrib Nation, it had written to the Minister of Indian Affairs and Northern Development urging him to move forward with land claims settlements. BHP stated that it would like to see land claims resolved and to see certainty in those claims. The Proponent recognized that, in the absence of settled land claims, lease payments and royalties are the jurisdiction of the federal government. Therefore, it chose to consult directly with Aboriginal people on benefits including employment, education and business opportunities. Specifics negotiated between BHP and Aboriginal groups would be included in IBAs. This topic is discussed in Section 5.3.1 – Impact and Benefits Agreements.

Many, not participating in land claims negotiations, told the Panel that settlement of land claims was necessary to provide certainty to all northerners. Some individuals, as well as organizations such as the Status of Women Council of the NWT, the Roman Catholic Diocese of Mackenzie – Fort Smith, and the NWT Federation of Labour, stated that settlement of land claims should be a pre-condition to development of the Project. Others, such as the Mining Association of Canada, supported the resolution of land claims but held that approval of the Project should not be conditional on such a settlement. A third view, typified by the final submission of the Northern Environmental Coalition, expressed strong support for the resolution of land claims but did not comment on the timing of such a settlement relative to this Project.

In its written submission, DIAND advised the Panel that although the Project was located outside the boundaries of Treaty 8 and Treaty 11, it was within the traditional territory claimed by both the Dogrib Treaty 11 Council and the Yellowknives Dene First Nation. Currently, The Dogrib Treaty 11 Council is negotiating a self-government and comprehensive land claims agreement under the Comprehensive Claims Policy; the Yellowknives Dene First Nation is negotiating Treaty Land Entitlement pursuant to Treaty 8 under the Specific Claims Policy. DIAND took the position that the Panel review and the negotiation of land claims are not directly related.

Canada has entered into agreements with the Aboriginal peoples of Treaty 8 and Treaty 11 setting out the principles that will guide their land claims negotiations in the NWT. The agreements for Treaty 11 include an Interim Land Withdrawal Agreement under which lands around the four Dogrib communities were set aside so that no third-party interests on these lands could be created prior to settlement of the claim. This agreement also establishes the border for the Settlement Area to which the Treaty 11 comprehensive claims agreement would apply. Both the Project site and the corridor for the existing Echo Bay winter road are within the Settlement Area but have not been withdrawn. Moreover, the communities and traditional lands of the Treaty 8 Yellowknives Dene lie within the Dogrib Treaty 11 Settlement Area boundaries as set out in these agreements. The Panel was told by the Yellowknives that this overlap is very distressing for them, and that a rift now exists between themselves and the Dogribs, with whom they previously had co-operative working relationships and strong family ties. The Yellowknives regard this overlap issue as an impediment to settling their land claims and, together with the chiefs of Cutselk'e and Deninu Kué (Fort Resolution), asked the Panel to write to the federal government in support of their claim.

The Treaty 8 First Nations and Canada have entered into the NWT Treaty 8 Entitlement Negotiations Protocol Agreement which sets out the procedures and principles under which the parties have agreed to negotiate and settle outstanding claims of the NWT Treaty 8 Dene. That agreement contains, among other provisions, a process for interim land selection and protection agreements, and recourse to the Indian Claims Commission for the purpose of mediating disputes related to the negotiation of the Treaty Entitlement Agreements.

The Indian Claims Commission was established in 1991 to inquire into and report on specific land claim disputes between First Nations and the Government of Canada. The commission concentrates on alternative dispute resolution techniques, including mediation, to provide assistance at any stage of the claims process. The commission's "1994/95 Annual Report" states that the Yellowknives Dene Band referred its concerns to the commission regarding the infringement of its territory by an interim protection agreement signed by the federal government and the Dogrib Treaty 11 Council. According to the report, the claimants have asked that the commission's inquiry be held in abeyance until they receive a response from DIAND to their request that the Minister intervene.

During the hearings, the Panel was told by DIAND that the lands on which the Project would be located are not available for selection by Aboriginal peoples because the Project is "at a stage of advanced exploration." This principle, established during negotiation of the Dene/Métis Comprehensive Claim in the Mackenzie Valley, is embodied in the 1990 Dene/Métis Final Agreement and has been applied in settling claims in other areas of the NWT. The Panel was told that this principle is being followed in the Mackenzie Valley land claims negotiations so that all Aboriginal groups negotiating comprehensive claims will share equally in resource revenues.

As an overall comment, the Panel notes that reviews such as the present one can become a focal point for issues both related and unrelated to the project under consideration. The Panel recognizes that settlement of land claims was a key issue in this review and one that was of vital concern and priority for Aboriginal peoples and others. For many, settlement of land claims was an intense and emotional issue. It is also an extremely complex issue with a long history. In the Panel's opinion, it was not given a mandate to recommend a course of action regarding the settling of land claims. Nevertheless, the Panel strongly believes that it would be in the best interests of all parties to move forward to resolution of this issue. Further, it notes that Canada and both Treaty 8 and Treaty 11 are already engaged in processes to settle outstanding claims and concludes that it would not be in the best interests of the parties involved for the Panel to interfere in these established processes.

The Panel observes that the Project has been developed by the Proponent to the bulk sampling stage under legislation, regulations and policies set by the Government of Canada, and in the absence of resolution of land claims. Canada has permitted the development of other mines in the north without such claims being settled. For more than a decade, Canada has authorized the construction and operation of the Echo Bay winter road which provides land transportation access for this Project.

As noted earlier, the Panel was told by DIAND that the lands on which the Project is located are not available for selection by Aboriginal peoples because the Project is at a stage of advanced exploration. It is the Panel's observation that much of the emphasis placed by Aboriginal groups on settling land claims prior to Project approval was based on their assumption that the Project lands were "available for selection" and that by selecting these lands, revenues from the Project and control over the Project would flow exclusively to them.

The Panel observes that the concern over the need to settle land claims before development proceeds was heightened by the observation that several diamond mines and other developments in the region could follow closely on the heels of this Project. It was perceived that this could result in the loss of Aboriginal peoples' land-use areas, compromise their ability to participate in the regulation of projects and prejudice land claims negotiations.

The Panel concludes that the Project offers substantial benefits to the people of the north generally and is offering specific benefits to Aboriginal peoples. Nevertheless, the Panel believes that the sooner land claims are resolved the sooner Aboriginal peoples will be in a position to focus on building their future. Early settlement of the claims in this region will strengthen the ability of Aboriginal peoples to participate confidently in this and other projects in the region and to maximize long-term benefits from their participation.

1. The Panel recommends that:
   a) the Government of Canada and Aboriginal peoples work toward a quick and equitable settlement of outstanding land claims in the region;
   b) the Government of Canada clarify, for all parties, the status of lands under exploration in areas where land claims have not been settled, and define when lands are considered to be at a stage of advanced exploration and the effect of this on their availability for selection by an Aboriginal claimant group; and,
   c) the Government of Canada examine the processes and policies in place in the region to ensure that they are the most appropriate for resolving the outstanding land claims with Aboriginal peoples.

   The Indian Claims Commission may provide an opportunity to use alternative dispute resolution techniques to resolve contentious issues.

2.3 TRADITIONAL KNOWLEDGE

The Terms of Reference for this review state that "in reviewing and assessing the Project's environmental and socio-economic effects, the Panel will give full and equal consideration to traditional knowledge." This proved to be one of the most challenging aspects of the review because incorporation of traditional knowledge into environmental assessment is relatively new. There is, as yet, no commonly accepted approach. Moreover, the success of a Proponent in working with the holders of traditional knowledge depends on the attitudes of both parties and the receptivity of the Aboriginal people with whom the developer must work.

In keeping with its mandate, the Panel's Guidelines indicated that "the Proponent should fully consider local traditional knowledge and expertise in preparing the EIS." Initially, some participants expected that the Panel would establish criteria or set the standards for the collection and validation of traditional knowledge. The Panel concluded that its role was not to prescribe the methods by which either scientific or traditional knowledge should be collected or analysed. The Proponent was given the task of determining how to incorporate traditional knowledge into the gathering of baseline information, impact prediction, and mitigation and monitoring plans.

BHP told the Panel that, commencing in July 1992, many meetings were held with Aboriginal people to, in part, listen and learn about how to proceed with the Project in a manner compatible with traditional values. BHP stated that several of these meetings specifically addressed the application of traditional knowledge to environmental and social issues, heritage, and traditional lifestyle. Its approach to incorporating traditional knowledge into the EIS was twofold. First, it involved Aboriginal people in data collection for the EIS, including archaeology and wildlife studies. By involving Aboriginal people, BHP felt their traditional knowledge was incorporated, either directly or indirectly, into the EIS. Secondly, BHP undertook the Phase I Traditional Knowledge Study. The main objective of this study was to document concerns of Aboriginal people regarding the Project so that BHP could attempt to address them. On April 28, 1995 the Proponent offered funding to the Aboriginal peoples of Treaty 8 and Treaty 11, the Inuit and the Métis to facilitate the study. The Dogrib Treaty 11 Council, the Métis Heritage Society, and the Kitikmeot Inuit Association in conjunction with the Hamlet of Kugluktuk accepted the Proponent's offer and the information obtained was documented in the EIS. The Dene Nation also made available for inclusion in the EIS traditional Dene/Métis land-use maps covering the Project area.

During the hearings, BHP noted that it had met with several challenges in incorporating traditional knowledge into the EIS. First, the Aboriginal peoples of Treaty 8 (Yellowknives Dene First Nation and the Łutselk'e First Nation) and Treaty 11 (Dogrib Treaty 11 Council) are involved in land claims negotiations with the federal government. Since traditional knowledge is often called upon in negotiating land claims, the Proponent observed that there was a reluctance to release traditional knowledge into the public domain. Secondly, there were concerns about separating traditional knowledge from its cultural context or from the broader systems of knowledge that give it meaning and value. Thirdly, the Inuit, Métis and Dene each have their own traditional knowledge which may or may not coincide. Fourthly, Aboriginal peoples regard traditional knowledge as their intellectual property and insist that the management and use of this information must remain in their hands. Finally, according to BHP, no documented baseline of traditional knowledge exists and there are no accepted standards or methods for traditional knowledge research.

Nevertheless, BHP agreed that work on traditional knowledge needs to continue. It committed to

undertake a Phase II Traditional Knowledge Study, which would "identify categories of traditional knowledge that could be incorporated into the mine development plans and environmental monitoring programs." BHP set out the following principles for the study: it would be designed jointly in consultation with Aboriginal peoples and organizations; no proprietary information would be disclosed to outside parties without prior approval; and each group would determine the extent of its participation and the inclusion of its own expertise and knowledge. BHP said that it would try to involve the Treaty 11Dogrib, the Treaty 8 Yellowknives Dene, the Métis Nation, the Inuit of Kugluktuk, the Dene Nation and the Dene Cultural Institute. When asked about the current status of involvement with these groups, BHP replied that it was in ongoing discussions with the Treaty 11 leadership, in discussions with the Kitikmeot Inuit Association, in preliminary discussions with the Dene Cultural Institute and beginning the process of establishing an accord with the Métis Nation. BHP had notified the Yellow knives Dene and the Lutselk'e Dene that it was ready to talk but no discussions had taken place by the end of the hearings.

During the hearings, there was considerable comment on whether BHP had given traditional knowledge full consideration in the preparation of the EIS. The Dogrib Treaty 11 Council stated that full and equal consideration had not been given to Dogrib traditional knowledge. Moreover, it questioned whether traditional knowledge could be studied adequately in the time frame proposed for the Phase II study. In its submission to the Panel, the Yellowknives Dene First Nation recommended that BHP's Phase I program not be considered a traditional knowledge study nor sufficient documentation for an environmental assessment review. It recommended that the Panel ignore all parts of the EIS claiming to be traditional knowledge because it lacked the traditional knowledge of the Yellowknives Dene or the Cutselk'e people. The Yellowknives Dene First Nation and the Lutselk'e First Nation chose not to participate in the Proponent's Phase I study. The Kitikmeot Inuit Association commented that the traditional knowledge work in their area was incomplete and questioned how traditional knowledge would be used throughout the life of the Project.

DIAND concluded that the EIS did not conform to the Guidelines with regards to traditional knowledge. It provided three reasons why it felt this requirement was not met. First, it believed that BHP should have engaged the Aboriginal communities earlier in the process so that traditional knowledge studies could have been conducted in parallel with scientific studies. In response to a question from the Panel on this point, DIAND could not recall whether it had advised BHP to start traditional knowledge studies at the same time as scientific baseline studies; DIAND commented that this was probably the first project where so much emphasis was placed on traditional knowledge. Secondly, it mentioned the significant logistical challenges to gathering traditional knowledge, including differing languages and differing cultures and the relative newness of the field. Thirdly, it noted the difficulties of trying to meld traditional knowledge with scientific knowledge in an EIS.

In response to DIAND's presentation, the NWT Chamber of Mines expressed concern about a change in the policy regarding the collection and application of traditional knowledge in project reviews and commented that this policy was neither clearly developed nor based in legislation.

The GNWT stated that, in the EIS, the Proponent had demonstrated an awareness and sensitivity to concerns of the Aboriginal people regarding the collection and use of traditional knowledge. Nevertheless, BHP's attempt to meet the requirement of full and equal consideration of traditional knowledge was unsuccessful because the use of traditional knowledge in environmental assessment was relatively new and the degree of importance placed on it in this review was "unprecedented."

The time frame for collection of traditional knowledge was also mentioned by several presenters. In a written submission to the Panel, the Dene Nation stated that the process for gathering traditional knowledge was rushed, went against the traditional ways of the Dene and was therefore unsuccessful. The GNWT stated that it took over five years of consultation to develop its traditional knowledge policy. The Dene Cultural Institute, in a report submitted by the Northern Environmental Coalition, was critical of the time frames established by BHP to gather traditional knowledge and suggested that BHP had attempted to side-step the lengthy process of community-based traditional knowledge research in order to submit the EIS at an early date.

The Panel concludes that the direction in the Terms of Reference to give traditional knowledge full and

equal consideration created very high expectations that proved difficult to meet. The Panel concurs that the Proponent faced many challenges when attempting to incorporate traditional knowledge in its environmental assessment. The Panel concurs with the assessment of the majority of presenters, that BHP was not fully successful in incorporating traditional knowledge in the EIS; nevertheless, it commends BHP for its efforts. Moreover, BHP has proposed to undertake additional studies in Phase II, and the Panel notes that there seemed to be general agreement with the approach proposed by BHP. The Panel encourages all parties to work together to ensure that these studies are successful.

In the Panel's view, one of the major challenges faced by proponents in the study of traditional knowledge is a lack of direction from government. Whereas the GNWT has developed a policy on traditional knowledge, it appears that a similar policy does not exist within the federal government. During the hearings, the GNWT told the Panel that its policy is concerned with the way government incorporates traditional knowledge, that the policy places the primary responsibility for the preservation and promotion of traditional knowledge on Aboriginal people and that it had not discussed the policy with BHP or offered to help BHP develop its own policy. A DIAND official informed the Panel that the department did not have a policy on traditional knowledge and that he could not recall any discussions with BHP on this subject. The Panel believes that a policy on the collection and use of traditional knowledge in environmental assessment is required to provide clear direction to proponents on the type and level of information required.

2. The Panel recommends that the Government of Canada develop a policy on the inclusion of traditional knowledge in environmental assessment. This policy should be developed in consultation and collaboration with the GNWT, Aboriginal peoples and industry. The most immediate need is to set out guidelines and standards for traditional knowledge that developers are expected to meet when preparing environmental assessments. Moreover, the role and responsibility of government in this area needs to be defined.

The Panel concludes that traditional knowledge can be both site-specific and regional. The Panel proposes that the West Kitikmeot Slave Study (WKSS) develop a regional approach to the collection of traditional knowledge. Such an approach could involve both scientific and traditional knowledge holders who would decide on key questions, the kinds of information needed to answer those questions, how to use the information, who collects the information and the rules for its interpretation.

2.4 SUSTAINABLE DEVELOPMENT

The Panel's Guidelines called attention to the principle of sustainable development, defined as development that meets the needs of the present, without compromising the ability of future generations to meet their own needs. The Guidelines required the Proponent to integrate into the assessment four key considerations of sustainable development: preservation of ecosystem integrity, maintenance of biological diversity, respect for the right of future generations to the sustainable use of resources, and attainment of durable, social and economic benefits. In responding to this instruction, the EIS set out the features of Project design, environmental management and mitigation, and the principles of open communications and involvement that the Proponent believes bring the Project into conformity with these four considerations.

At the hearings, the "Leadership Accord of the Whitehorse Mining Initiative" was brought to the Panel's attention by the Canadian Nature Federation, Natural Resources Canada (NRCan) and the Mining Association of Canada. This initiative, endorsed by a broad spectrum of interests, was a multi-stakeholder effort to develop a set of principles and goals to achieve "a socially, economically and environmentally sustainable and prosperous mining industry, underpinned by political and community consensus. "

Several speakers offered views on whether the Project could qualify as "sustainable." Representatives of the Northern Environmental Coalition, among others, believed that the degree of intrusion and disturbance of the ecosystem in the immediate development area was such that this Project, and indeed, any non-renewable resource development, could not qualify. Others held that the effects of this Project could not be assessed in isolation from the impact of potentially extensive development in the region.

It was also suggested, however, that the assessment should take a broader view of the impacts of the Project. For example, NRCan told the Panel that a discussion paper released in September

1995 on sustainable development and minerals and metals offered a definition of sustainable development for non-renewable resources that took into account factors such as improvement of human and fiscal capital. Others, such as the Northern Environmental Coalition, mentioned that investment in social capital and the development of a more stable, diverse and renewable economy could help compensate for a loss of natural capital.

The Panel acknowledges the efforts of the Whitehorse Mining Initiative to develop an understanding of sustainable development that can embrace mining activity. It provides a useful starting point, but more work is needed to refine the standards for assessing conformity of development to the definitions suggested by the initiative.

The Panel also acknowledges the recommendation for an economic diversification or development trust fund. The Panel observes that, based on its understanding of sustainable development, it is indeed important that wealth created by this Project be used wisely for investment in the natural and human capital of the region. The Panel is not taking a position, however, on whether a formalized mechanism for such investment is required or what form such a mechanism should take.

The Panel concludes that, provided the Project is developed as proposed and subject to the Panel's recommendations, the Project can be an example of sustainable development in the mining industry. In coming to this conclusion, the Panel observes the determination expressed by the Proponent to draw on Project revenues to invest in the social- and human-resource capital of the NWT through its employment preference, its work with the Aboriginal communities, and its education and training programs. The Panel draws this conclusion in the context of a rapidly-expanding and young population and in an economy limited in its ability to provide for the livelihood and well-being of this growing population.

The Panel was charged with assessing this singular Project, but it is well aware of the concerns expressed over the prospects for more extensive development on a regional scale. The Panel agrees with the need for a regional perspective on sustainable development.

2.5 CORPORATE ACCOUNTABILITY

In assessing the Project, the Panel believes that it is important to understand the corporate accountability of BHP Diamonds Inc., the proposed operator of the Project. This subject was included in the Panel's Guidelines and its Request for Additional Information. This section addresses three topics: corporate and management structure, experience during the exploration phase of the Project and the experience at other projects of The Broken Hill Proprietary Company Limited (BHPCL), the ultimate parent company of BHP Diamonds Inc.

Corporate and Management Structure

The Additional Information Response provided details on the corporate and management structures of BHP Diamonds Inc. and the mechanisms in place to ensure that the policies of BHPCL are followed. The Panel was told that BHPCL's environmental policy applies to all businesses for which it has an operating responsibility as well as to its employees, contractors and suppliers of goods and services. An Environmental Committee reports directly to the Board of Directors of BHPCL and provides corporate policy direction on major environmental issues. A formalized management and reporting system ensures that any shortfall in environmental performance is quickly identified and redressed. Monthly incident reports are prepared by all business groups within the company and submitted to the committee. BHP said that these reports describe the status and outcomes of any violations or legal actions against the company, identify any incidents or developments that may result in future violations, and delineate the action taken to prevent recurrence of any incident. In addition, if an urgent or significant environmental issue arises, the issue may be submitted to the Environmental Committee of the Board at any time.

In addition to this formalized reporting system, there are functional and operational features designed for accountability on environmental matters. In particular, line managers have responsibility for environmental performance. As well, there is a direct linkage between the Project and the parent company through the President of BHP Diamonds Inc., who is also Group General Manager, New Business Development, BHP Minerals, one of the three main business groups of BHPCL.

NWT Diamonds Project

The Proponent stated in the EIS that its operations have never resulted in a significant environmental breach, release to the environment or default to a regulatory body. The Panel asked for additional information on any spills during exploration activities for the Project. In the Additional Information Response, BHP reported that there were a total of 10 unauthorized discharges or spills since exploration commenced at the Koala site in 1993. Most of these spills involved seepage under dams used to contain tailings. Spills were remediated by pumping discharged water back into the original holding pond. This work included construction of sumps, installation of collection pumps and placement of sand backfills to act as barriers. All spills were reported as required under the NWT Waters Act and no charges were laid. During the course of the hearings, BHP clarified that these dams were not designed as frozen core dams, the type of dam proposed for the tailings impoundment of this Project.

Several presenters mentioned that BHP had been charged for alleged violations of the *Fisheries* Act related to its exploration program at Misery Lake in the winter of 1995. Both BHP and DFO agreed that this matter could not be discussed at the hearings since it was before the courts. The Panel notes that this alleged offence relates to the exploration program which has already received regulatory approval.

Other Projects

In order to observe a BHPCL mining operation first hand, the Panel visited the Island Copper open-pit mining operation near Port Hardy, British Columbia in June 1995. Island Copper commenced operation in 1971 and was acquired by BHPCL in 1984 through the purchase of Utah International. The Panel had a full tour of the operation and the surrounding environment, examined reclamation programs that had been implemented and met with the Environmental Advisory Group to Island Copper. In addition, the Panel met with local government officials and with local Aboriginal people to consider the socio-economic aspects of the operation and, in particular, how BHP was dealing with mine closure. During the hearings, the Panel was told that in the 25 years of operation of the Island Copper mine there had been no charges laid for violation of environmental laws or regulations.

BHPCL's coal mining operations in New Mexico were mentioned several times during the hearings. BHP told the Panel that representatives from the Treaty 8 Yellowknives Dene, the Dene of Cutselk'e, the Dogrib Treaty 11 and the Inuit have all visited these operations. According to BHP, the primary purpose of these trips was to provide a working example of the involvement of Aboriginal peoples in mining. The Panel was told that, on average, 75% of the workforce at the three coal mines are Aboriginal people. The Panel was told that one of the mines is located within the boundaries of the Navajo Nation, that there are contractual obligations with the Ute Mountain Tribe at another mine, and that there are no special provisions with Aboriginal people at the third mine. The Dene Nation expressed the view that the Navajo Nation was able to enter into successful business relationships with BHPCL in New Mexico because the Navajo have control over the land. It observed that the situation was much different for the lands where the NWT Diamonds Project is proposed.

Environmental issues concerning the Ok Tedi Mining Limited copper mine in Papua New Guinea, which is operated by BHPCL, were raised during the hearings. The Dene Nation, as part of its presentation, introduced a clan leader from Papua New Guinea and an Australian lawyer representing landowners in a legal action against BHPCL. In a later presentation, BHP introduced the former Environmental Manager for the Ok Tedi mine and the Corporate General Manager for BHPCL's operations in Papua New Guinea to respond to the issue. Before hearing both these presentations, the Panel Chair advised the participants that the Panel was appointed to review the environmental and socio-economic effects of the proposed NWT Diamonds Project and to make recommendations to the Canadian government. The Chair asked the participants not to discuss any matters that were before the courts, either in Papua New Guinea or in Australia and noted that the Panel has no jurisdiction with respect to this operation.

The primary issue surrounding the Ok Tedi mine was the lack of a tailings management facility and the fact that tailings were continuously discharged into the Ok Tedi River. The effects of this discharge were widely disputed. The clan leader said that the river was "practically dead." He claimed that sediments from the tailings smothered tree roots causing the riparian forest to die, covered formerly-cultivated riverbanks, and made the river water unsafe to drink. In response to the clan leader's claims, BHPCL's representative stated that monitoring

programs have demonstrated that fish remain in the river and that testing has shown that the river water is not toxic to aquatic organisms or humans. He agreed that some vegetation has been affected by flooding, but said that monitoring has shown that vegetation will regenerate once the flooding subsides. The Panel notes that the Ok Tedi mine is operating in a physical environment that is virtually opposite to that found at the proposed Project site and that the social, political and regulatory factors are very different from those of the NWT.

BHPCL said it understands that it is in compliance with the laws of Papua New Guinea. BHPCL also reported that compensation has been paid to people of the lower Ok Tedi River and that a development trust fund was established in 1990 to distribute benefits to communities outside the mine-lease area.

The Panel concludes that BHPCL has the corporate policies, structure and ability necessary to manage the NWT Diamonds Project in a responsible fashion.

2.6 REGULATORY REGIME

Another consideration in this review was whether the existing regulatory regime was adequate to manage the environmental and socio-economic effects of the Project. The Guidelines directed the Proponent to demonstrate an understanding of the regulatory environment in which it would be operating. In addition, the Panel asked governments for information on the institutional framework for administering and regulating diamond mining in the NWT.

The main instruments that would be used by DIAND to regulate the Project would be the *Northwest Territories Water Act* and the *Territorial Lands Act.* The *Northwest Territories Water Act* provides a framework for regulating water use and waste disposal in inland waters. The land-based operations of the Project would be managed under the *Territorial Lands Act.* To go into production, the Project needs a mineral lease, a Type A water licence, a surface lease or leases for areas where it would construct facilities and conduct mining operations, and land-use permits for continued exploration activities and seasonal access to the lease. The water licence would prescribe terms and conditions including the amount of water to be used, the quality of water returned to the environment and the amount of a security deposit required before production begins. Reclamation and abandonment plans would be appended to the water licence. The surface lease would address matters of environmental conservation and protection including waste disposal, sources of borrow materials, road alignments and reclamation and closure plans. DIAND concluded that, based on the information presented, the Project could be regulated and managed effectively.

DIAND told the Panel that management responsibilities for land and water use in the NWT are changing and advised the Panel that once legislation implementing land claims is passed, the responsibility for administering the *Northwest Territories Water Act* and the *Territorial Lands Act* will be transferred to management boards created under the legislation. Specifically, the government will be introducing the *Mackenzie Valley Resource Management Act* which will provide for the establishment of the Mackenzie Valley land and water boards. Nevertheless, DIAND clearly stated that the regulatory standards and enforcement criteria that projects must meet will be equal to or higher than current levels.

The Panel recognizes that assignment of regulatory responsibilities for the Project will likely change over its proposed 25-year life span. However, given DIAND's assertion that regulatory standards and enforcement criteria will be equal to or greater than current levels, the Panel concludes that the overall regulatory framework appears to be adequate to manage the Project.

3. The Panel recommends that DIAND should have regard for the following principles when developing new legislation and management structures resulting from land claims settlements: projects must be managed with consistency, integrity and continuity; effective consultation with the public and Aboriginal peoples is essential; and regional land-use planning must be undertaken to ensure that a broad perspective is considered in decision-making.

2.7 ENVIRONMENTAL EFFECTS

An evaluation of the environmental management plans that BHP proposes for prevention and mitigation of potential environmental effects is essential in assessing the environmental effects of the Project. BHP's overall approach to environmental management planning and its adaptive management strategy are reviewed in Section 3 – Project Engineering and Management Issues. In addition,

management plans for tailings, materials and traffic, as well as for closure and reclamation, are examined in detail.

Potential effects on wildlife, in particular caribou, and water were the most important environmental issues in this review. Concerns about potential effects on the health, numbers, and migratory patterns of the Bathurst caribou herd reflect the central role that caribou play in the physical and cultural well-being of the Aboriginal people of the region. Water quantity and quality were given particular attention since the Project would be located at the headwaters of the Coppermine River, a watershed with currently no industrial development. Effects of any contamination on downstream users of fish and drinking water was of concern to many. Other important environmental issues addressed during the review were the potential effects of the Project on eskers, air quality, fish, vegetation as well as wilderness and protected areas. Consideration of these topics was integral to the Panel's decision on whether the Project could proceed and are addressed in Section 4 – Environmental Issues.

2.8 SOCIO-ECONOMIC EFFECTS

Important socio-economic considerations included the overall economic impact of the Project, the participation of northerners, Impact and Benefits Agreements, employment, opportunities for northern business as well as education and training. The Panel also considered the potential for social and cultural disruption related to Project development and addressed such issues as BHP's approach to assessment of socio-cultural issues, the capacity of police and social services to respond to any negative effects, potential effects on archaeological and heritage sites, restrictions proposed by BHP on hunting and fishing in the Project area, and compensation for affected subsistence and commercial land-users. Finally, the Panel examined possible effects of the Project on the relationship between the land- and wage-based economies as well as diamond valuation and communication issues. All these factors were considered in the Panel's overall assessment of the Project and are addressed in Section 5 – Socio-Economic Issues.

2.9 CONCLUSION

The Panel has carefully considered the documentation provided throughout the review, including information gathered during the scoping meetings and the public hearings. The following overall conclusion and recommendation must be considered together with the Panel's specific conclusions and recommendations contained throughout the report.

The Panel concludes that the environmental effects of the Project are largely predictable and mitigable. Effects not predicted can be detected by monitoring and can be addressed by the proposed environmental management plans and adaptive management strategy. The potential economic benefits from this Project are large and socio-cultural effects are likely to be both positive and negative but are difficult to predict on balance. The Panel believes that adverse social effects can be addressed by policies and programs of governments and the Proponent. Overall, the Panel concludes that the Project has the potential to provide significant benefits to the north and to northerners.

4. The Panel recommends that the Government of Canada approve the NWT Diamonds Project subject to the recommendations in this report.

The Panel concludes that an effective monitoring program is critical to ensuring that negative effects are minimized and positive effects maximized.

2.10 MONITORING

Introduction

Monitoring of both environmental and socio-economic indicators was an important issue during this review. Many participants emphasized the need for monitoring, especially because diamond mining represents a new industry for Canada and is taking place in a region that has experienced relatively little industrial development. Given that the Panel's recommendation for Project approval is based on the predictions made by the Proponent, government and others, monitoring becomes a critical factor in the implementation of the Project. Monitoring is required to measure compliance with standards established by government and to assess the longer-term environmental effects of the Project. Monitoring will indicate to the Proponent, government and the public whether the Project, including proposed mitigation measures, is performing as predicted or whether changes are required to offset effects not anticipated.

BHP's Proposed Monitoring Program

BHP told the Panel that environmental monitoring was a critical component of its Environmental Management Plan. The overall goals and objectives of the program would involve gathering information for the following: regulatory compliance, measurement of operational performance and effectiveness of mitigation strategies, monitoring natural environmental changes as well as those caused by the Project (environmental effects monitoring), assessing the validity of impact predictions, and triggering response and mitigation to unexpected adverse effects. According to BHP, a key feature of the proposed monitoring program would be the use of criteria or threshold levels to assess impacts. Some criteria would be defined by the regulatory process (e.g. water quality discharge criteria in the water licence) whereas others (e.g. fish and wildlife population health) would be more difficult to establish.

BHP proposed that an Environmental Advisory Group be established and that its functions would be to assist the Proponent in defining the monitoring program and in assessing the significance of changes detected. The group would provide an independent review of the monitoring program to ensure quality and adequacy and would prepare an overview report that would accompany an annual environmental assessment report produced by the company. Both documents would be made public. The proposed composition of the Environmental Advisory Group for the Project would be four members with experience in engineering, wildlife, aquatics and ecology; two members from the Aboriginal community; and one member from the general public. During the hearings, BHP characterized one of the roles of the group as an audit function. It also told the Panel that an Environmental Advisory Group had operated successfully at the Island Copper mine.

It planned to monitor four main systems: air, water, land and socio-economics. Air monitoring would focus on climate and ambient air quality; water monitoring on hydrology, water quality and aquatic biota; land monitoring on permafrost, vegetation, reclamation and wildlife; and socio-economic monitoring on direct NWT employment and purchase of goods and services in the NWT. Details on the parameters, methods and locations for environmental monitoring were provided in Volume III of the EIS. Information on socio-economic monitoring, monitoring criteria and thresholds is in Section 15 of the Additional Information Response. Results of environmental monitoring programs would be reported to government agencies to assess compliance with applicable laws and regulations. Monitoring information would also be used by BHP in designing and modifying management plans, According to BHP, socio-economic monitoring information would be useful as input to the development or refinement of government and industry-sponsored training programs and to business and government planning.

At the end of the public hearings, BHP announced that socio-economic monitoring should not be part of the mandate of the Environmental Advisory Group, but would be dealt with separately. BHP anticipates that IBAs would include monitoring programs, implemented through committees on education and training, on business opportunities, and on culture and education. Socio-economic monitoring on the effects of Project employment and purchasing would use both statistical and attitudinal monitoring methods in order to assess the changes and the reasons for changes. It would also be a function of the BHP's communications program, discussed further in Section 5.7. BHP would continue to rely on government agencies and Aboriginal and community organizations for monitoring of community wellness.

Government and Public Comments on Monitoring

The importance of a comprehensive and effective monitoring program was stressed throughout the public hearings. For example, the Łutselk'e First Nation recommended that monitoring be carried out with full consultation and participation of Aboriginal people. The Dogrib Treaty 11 Council recommended the formation of a joint management structure to co-ordinate surveillance and effects monitoring throughout the life of the Project.

DIAND, in its written submission, concluded that the monitoring plan as described in the EIS and Additional Information Response was adequate. It noted that monitoring plans would change as actual impacts were assessed against predicted impacts but that BHP had taken this into account. It recommended that closer monitoring of as-built structures and operational activities be undertaken to improve understanding of the conditions affecting the environment. DIAND said that it supported the concept of an Environmental Advisory Group. During the hearings, DIAND told the Panel that it would like

to see a group with a strong, independent and effective mandate, with teeth, to ensure responsible environmental management. In response to a question from the Proponent, DIAND agreed that a proponent is responsible for meeting the terms and conditions of its authorizations and that government is responsible for ensuring that these conditions are met. Nevertheless, DIAND concluded that for the Environmental Advisory Group to be effective, its advice must be taken seriously. DIAND suggested that one way to achieve this would be by making the group's reports public.

Environment Canada, in its written submission, expressed support for the proposed Environmental Advisory Group. However, it recommended that the Environmental Advisory Group's mandate be broadened to include government agencies so that the group could serve as a vehicle for inter-agency co-operation concerning monitoring and management of the mine.

The GNWT took the position that an effective Environmental Management Plan requires a comprehensive surveillance and effects monitoring program. In its view, surveillance monitoring would be undertaken by the Proponent to meet the requirements of the regulatory agencies, whereas effects monitoring should be a co-operative program involving the Proponent and resource management agencies. Environmental effects monitoring would measure Project effects where predictions are uncertain and where environmental concerns could not be addressed in terms or conditions of licences or permits. In response to a question from the Panel, the GNWT indicated that its primary concern for environmental effects monitoring was related to wildlife. In its final submission, the GNWT concluded that a separate management structure, which would include the Proponent, resource management agencies, Aboriginal groups and other stakeholders, was required to co-ordinate environmental effects monitoring.

The Métis Nation told the Panel that DIAND normally does not include socio-economic monitoring as a condition of a lease. It agreed with the Proponent's final position that socio-economic monitoring should not be a mandate of the proposed Environmental Advisory Group. The Métis Nation recommended that a socio-economic monitoring agency be established and that this be a requirement of the land lease issued by DIAND. It proposed that the agency would assist with the assessment of the percentage of northern hire, northern purchasing, northern sub-contracting and other socio-economic impacts. It also proposed that this agency would provide advice to BHP on procedures to monitor socio-economic effects of the Project.

In its final submission to the Panel, the Northern Environmental Coalition recommended that a multi-stakeholder environmental and socio-economic effects monitoring agency be established to oversee and recommend to government and the Proponent changes to Project design and operation. It recommended that this agency be a condition of the surface lease.

Conclusions and Recommendations

The Panel notes that BHP's proposed monitoring program includes both compliance and environmental effects monitoring. Requirements for compliance monitoring would be identified in regulatory approvals issued to BHP, for example, the water licence. In addition, government would conduct independent inspections to ensure compliance with permits and licences.

The Panel concludes that environmental effects monitoring is the responsibility of BHP within the area affected by the Project. In addition, the Panel concludes that government has a role in environmental effects monitoring. The Panel was told that government already conducts environmental effects monitoring programs on certain matters. For example, DIAND and Environment Canada jointly monitor water quality and quantity in the Coppermine River. Also, the Panel acknowledges BHP's regional study of grizzly bears and the proposed study of caribou in co-operation with the GNWT as part of the WKSS. The Panel believes that these studies will make an important contribution to understanding the region and the environmental effects of mining development. The Panel urges BHP, the federal government, the GNWT and the WKSS to work together on a co-operative approach to environmental effects monitoring for the region.

The Panel supports the concept of an Environmental Advisory Group. It concludes that the regulatory role of government should not be combined within the advisory role of the group and therefore does not support the suggestion that this group provide a forum for inter-agency co-operation.

The Panel is of the opinion that a separate multi-stakeholder body is not required to manage the

monitoring program for this Project. It believes that responsibility for monitoring must ultimately rest with government and the Proponent. Moreover, government must maintain the ability to participate in compliance and environmental effects monitoring and be prepared to provide additional resources to meet these needs.

A key component of the monitoring program is public accountability. It is important that monitoring results are reported not only to government but also to the public. BHP proposes to produce an annual environmental assessment report which would be made public, and which would be accompanied by an overview report produced by the Environmental Advisory Group. The Panel endorses this concept, and believes that annual reporting is a valuable tool for informing the public and government about progress on the many issues of concern raised during the course of this review. The Panel believes that the annual environmental assessment report should review the results of both compliance and environmental effects monitoring.

The Panel believes that it is equally important for the Proponent to submit a regular report to government and to the northern public on the results of socio-economic monitoring. The content and format of both the socio-economic and environmental reports should be decided by government agencies and BHP, and after consultation with interested parties.

5. The Panel recommends that, as a condition of approval, BHP should be required to submit to government annual reports on the results of its environmental and socio-economic monitoring programs. The reports should be made public and should be presented at a public meeting (or meetings) held in the region and organized by BHP and government.

The public meeting would give northerners an opportunity to provide comments and suggestions to both BHP and government on the results of the monitoring program and on any changes necessary to the Project or to the monitoring program. Other opportunities for the public to contribute to monitoring would include: arrangements negotiated as part of the IBAs, BHP's ongoing communications program, membership on the Environmental Advisory Group and direct interactions with governments. In addition, the WKSS is a multi-stakeholder society that, among other activities, would be gathering information necessary for regional monitoring initiatives. The Panel has made specific recommendations concerning the role of the WKSS in environmental and socio-economic monitoring. The Panel acknowledges that the public is seeking assurances that the concerns it has raised will be addressed by the monitoring program for the Project.

6. The Panel recommends that periodically (for example, every three to five years) BHP prepare a report that would:
   a) take a longer term view of effects monitoring in the context of natural variability;
   b) review actual performance of Project activities as compared to predictions in the EIS; and,
   c) evaluate how the adaptive management strategy has performed over time.

   This report should be made public and should be presented at a public meeting (or meetings) held in the region and organized by BHP and government.

Given the importance of the role of government in effects monitoring, the Panel encourages government and BHP to work together to develop a comprehensive view of effects monitoring that would consolidate the results from the full range of their respective monitoring activities. The Panel foresees that this view could make a valuable contribution to knowledge and understanding of the effects of the Project. The Panel also believes this is an avenue for the interested public to be informed about the effects of the Project; an avenue that is otherwise closed once the environmental assessment and regulatory licencing processes have been completed.

3. PROJECT ENGINEERING AND MANAGEMENT ISSUES

This section considers the Proponent's overall approach to environmental management planning and then focuses on four plans that were the subject of particular attention during the review: tailings management, materials management, traffic management, and closure and reclamation. In addition, this section deals with three Project engineering issues: pace and scale of development, alternative energy sources and mine site security.

3.1 ENVIRONMENTAL MANAGEMENT PLANS

Volume III of the EIS was devoted to environmental management plans which were also the topic of a one-day technical session during the public hearings. Environment management plans are programs and policies that BHP would implement to prevent or mitigate potential environmental impacts associated with each phase of the Project including development, operation, decommissioning and closure. BHP's predictions of how various Project activities could affect the environment have assumed that environmental management plans are in place.

The basis of BHP's environmental management approach is an adaptive management strategy which involves the establishment of criteria or indicators used to indicate change so that appropriate management actions can be implemented. A sensitive and effective monitoring program is key to the success of this strategy. BHP told the Panel that the environmental management plan is intended to be flexible so that it can be modified in response to changes in the mine development plan, regulatory regime, natural environmental or technological advances, research results, and improved understanding of traditional knowledge.

In its submission to the Panel, DIAND stated that the information on management plans was, in general, adequate and where further clarification was required, this could be addressed in the subsequent regulatory process. It concluded that the information supplied by BHP on environmental management plans was sufficient for this stage of the assessment.

The GNWT expressed concerns about the lack of detail in the mitigation measures proposed in the environmental management plans. In particular, it recommended that the Proponent work closely with government to develop appropriate protection measures for sensitive wildlife areas in the claims block. The GNWT concluded that the environmental management plan contained in the EIS provides the framework for a more detailed approach to environmental management. The Dogrib Treaty 11 Council recommended that a detailed and comprehensive environmental protection plan should be a condition of approval. Further, it proposed that the plan be developed in co-operation with the Dogribs and other Aboriginal peoples and that resources should be made available to the Dogrib Treaty 11 Council to enable it to participate effectively in this work.

With regards to environmental management, the Panel agrees with the concept of an adaptive management strategy. This strategy is well-suited to the Project as it is a new endeavour in an area with relatively little information. Also, given the sequential nature of the development, an adaptive strategy allows experience gained during initial stages of the Project to be applied to subsequent stages. The Panel concludes that, in general, the level of detail provided in environmental management plans is sufficient for this stage of the regulatory process and expects that many of the plans would become more detailed as final design and Project implementation proceeds.

7. The Panel recommends that BHP, government agencies and Aboriginal people work together during the Project design and implementation stages to revise and update environmental management plans as required.

3.1.1 Tailings Management

The tailings management plan is a central and critical component of the Project since the success of the tailings management facility would control water quality downstream. The Panel asked for additional information on tailings management and in December 1995 received a report entitled "Tailings Management Plan and Preliminary Design of Retention Structures." The topic of tailings management was discussed in detail during the technical sessions on environmental management plans and water.

During the anticipated 25 years of operation, the processing plant would produce 133 million tonnes of crushed rock or tailings. In the first 20 years of

operation, tailings would be deposited in the Long Lake basin and for the last five years, in the mined-out Panda pit (figure 2). The Long Lake tailings impoundment would be created by constructing three perimeter dams which would permit the water level in the lake to be raised as much as 9 metres. The dams would be of frozen core design, that is, they would contain a central core of frozen soil saturated with ice and bonded to the natural permafrost. A granular rockfill shell would surround the core to provide stability and thermal protection. The frozen core and permafrost foundation would not allow any water to escape provided the soil remained saturated with ice. Two of the dams would be constructed back from the edge of Long Lake on permafrost soils that contain ground ice. The third dam, at the outlet of Long Lake, would span a natural stream channel where permafrost is depressed to about 12 metres below the active stream channel. To overcome this situation, thermosyphons, which enhance the removal of heat from the ground, would be installed in the foundation to freeze it before any water accumulates behind this dam.

Tailings would be discharged as a slurry into the Long Lake impoundment by a pipeline. The slurry would contain about 45% solids by weight with the solids being predominantly sands with variable amounts of silts and clays. The clays would settle slowly when suspended in the water column. The only chemicals added to the tailings would be flocculants to speed the settling of suspended solids.

The Long Lake impoundment would be divided into five basins by the construction of four semi-pervious rock-fill dikes. The dikes would retain the solid portion of the tailings while allowing some seepage of water into the adjacent cell. During seepage, the water would be clarified by filtration through sand and gravel. Cells A through D would be filled sequentially with tailings, starting with the farthest upstream cell (A). Tailings would not be deposited into cell E which, instead, would serve as a final settling pond before water is discharged into the environment by pumping it into Nema Lake. It has been estimated that turbid water would not reach cell E until year 16 but could occur as early as year 13 or as late as year 20 depending on whether wet or dry conditions occur. If necessary, water from cell E would be treated to remove excess turbidity before it is discharged.

Tailings would gradually convert to permafrost. Once a frozen crust has formed over a tailings cell, it would be covered with layered waste rock and topped with fine granular soil. This cover would have sufficient thickness and moisture content to allow the development of a new active layer in the permafrost that would be formed. The soil would be revegetated with the goal of converting the area to a wetland. Following mine closure, the spillway dam would be breached and water would flow naturally from cell E into Nema Lake. At this point, water would no longer have to be contained by the three frozen core dams.

Since the integrity of the tailings management facility depends on the performance of the frozen core dams, this topic received particular attention during the review. BHP indicated that this design was selected because there was no source of impervious fill for conventional dam construction and because the climate of the region lends itself to a frozen core design. It pointed out that there is considerable experience in design and construction of frozen core dams both in Canada and in Russia. In Canada, a tailings dam at the Lupin mine (100 km north of the Project site) is of frozen core design but differs in that a synthetic liner was used for initial containment. The Garrow Dam at the Polaris Mine in the NWT as well as a dam currently under construction at the Raglan Nickel project in northern Quebec also use frozen core technology.

The critical factor in frozen core dams is to ensure that the core remains frozen. The design criterion used for this Project was that the long term mean temperature of the core would not exceed -2^{o} C during the operational phase. Sensitivity modelling demonstrated that this criterion would be met even during global warming scenarios. Since performance of the dam depends on the temperature of its core, BHP plans to have an extensive suite of temperature monitors built into the Long Lake dams. If an unexpected warming trend in the core was observed, this could be offset by various measures such as the clearing of snow from the downstream slope, the installation of additional thermosyphons, the widening of the dam embankment, the creation of a tailings beach on the upstream slope or the lowering of the reservoir level.

NRCan told the Panel that it has confidence in the concept of frozen core dams. It noted that this design had been used in other projects; however, some seepage problems had required remedial actions. Careful supervision during construction as

well as monitoring during operation are critical to the success of this type of dam according to NRCan. As a precaution against unexpected warming, it stated that greater protection could be obtained by raising the dams by 1 metre. It also pointed out the need to manage water levels to keep these from rising above the level of the frozen core of the dams. Similar recommendations were made by the GNWT and, during the hearings, were accepted by BHP. NRCan provided the Panel with a series of recommendations related to the design, construction, and performance monitoring of the frozen core dams.

DIAND concluded that the plan for the Long Lake tailings impoundment was sufficiently detailed for this review process. It noted that this technology was proven under arctic conditions. Legitimate control and contingency measures proposed by BHP would prevent, reduce or minimize potential impacts on water quality. DIAND told the Panel that submission of a complete Tailings Containment Area Management Plan would be required as part of the water licensing process. The Water Board would require final engineering drawings, approved by a registered professional engineer, and would rely on the expertise of the project engineer to ensure that all aspects of construction were within the NWT-established standards.

The GNWT found the frozen core dam design to be acceptable, predicted that it would perform satisfactorily at the proposed location, and agreed with NRCan that construction must be performed under strict control. The GNWT stated that any modifications to the frozen core dam design, to accommodate concerns it raised, would be minor and could be handled at the final design stage. In addition, it noted that monitoring would identify any problems in sufficient time for them to be rectified. A discussion of worst-case scenario with respect to dam failure can be found in Section 4.3 – Water Quantity and Quality.

Based on the information provided to the Panel by the Proponent and government departments, the Panel concludes that the proposed tailings impoundment would be adequate to contain tailings and to prevent downstream contamination of natural watercourses. The Panel notes that it received a considerable number of recommendations concerning the final design, construction and monitoring of the impoundment. Specific topics identified included slow settling rates of suspended materials, performance monitoring of the frozen core dams, as well as supervision and quality control during dam construction.

8. The Panel recommends that the information it received concerning the design, construction and monitoring of the Long Lake tailings impoundment be taken into account by DIAND and the Water Board at the water-licensing stage.

3.1.2 Materials Management

Operation of the Project would require large quantities of diesel fuel to be trucked annually to the site via the Echo Bay winter road. Depending on the stage of operation between 1,380 and 2,095 truckloads (at 38,000 L/truckload) of fuel would be shipped to the site annually. The potential for spills of fuel and other materials, such as glycol and lubricants, during shipping or at the site was an important issue during this review. Concerns about spills, especially along the winter road, were particularly important to Aboriginal people. Concerns for spills on public highways and at trans-shipment points were noted by the Town of Hay River during the scoping process. Environment Canada told the Panel that, at peak operation, this Project would have the largest single fuel supply contract for any mine in Canada. It predicted that the potential for a large spill causing serious or irreparable environmental damage was small but that the potential for small-to medium-sized spills, that could contaminate soils, groundwater and surface water, was both real and significant.

BHP's Materials Management Plan in the EIS addressed emergency response and spill contingency planning to prevent or minimize environmental, health and socio-economic effects. Elements of the spill response plan included inspections, spill response training and drills, and audits for critical components such as the tailings pipeline, tailings dam structures, sewage treatment systems, chemical transportation and storage, explosives plant, and fuel and petroleum product transportation and storage. If spills were to occur on the Echo Bay winter road, BHP told the Panel that spill-response equipment and trained personnel were available from several sources, including BHP's operations, Echo Bay Mines Ltd. and the freight-hauling contractors.

DIAND stated that BHP's proposed handling and disposal methods for hazardous materials were acceptable but DIAND made two specific

recommendations concerning storage-tanker parking and design of a permanent fuelling point.

As part of the Additional Information Response, BHP submitted a revised spill response plan which was to take into account the comments provided by Environment Canada and others. According to Environment Canada, however, the revised plan did not address the majority of the department's comments. Therefore, Environment Canada recommended that a detailed spill response contingency plan covering the claims block and the route from Yellowknife to the Project site (figure 1) should be submitted to Environment Canada, DIAND and the GNWT for review and approval prior to the 1997 fuel haul. Environment Canada provided a list of standards which the contingency plan should meet.

During the hearings, BHP agreed to follow the standards listed by Environment Canada and also made a commitment to submit a detailed spill response contingency plan for fuel haulage and storage as recommended by Environment Canada. BHP noted it could not finalize a contingency plan until the Project was approved and specific details on the maximum volumes and types of hazardous compounds were determined. Echo Bay Mines Ltd. also advised that each year it submits a plan to DIAND and the GNWT dealing with environmental protection and spill response measures related to the transportation of dangerous goods.

Regarding transportation of hazardous goods on public roads, the GNWT advised that it has authority in this area under the *Transportation of Dangerous Goods Act.* Under the act, the GNWT can require people transporting dangerous goods to provide spill contingency plans. According to the additional information supplied by BHP, the contractor transporting fuel and petroleum products in 1996 submitted a Transportation Emergency Response Plan to the GNWT. In response to a question from the Panel, the GNWT stated that it considered the projected traffic volumes related to the Project to be low and that it has the enforcement and monitoring capabilities to respond to any concerns.

The Panel notes that although diamond mining does not require the use of hazardous processing chemicals, the Project would require very large volumes of fuel to be transported to the site via public highways and the Echo Bay winter road. The Panel shares the concerns raised by government agencies, Aboriginal people and individuals that this activity be well-managed to protect the environment. The Panel believes that the procedures set out for operators on the winter road, BHP's own emphasis on safety, its consideration of contractors' past safety and environmental records in awarding contracts, the decrease in the number of spills on the winter road over the past five years, and BHP's spill-free record to date on the winter road combine to demonstrate that the Echo Bay winter road component of the Project can be effectively managed.

The Panel concludes that the existing regulatory framework is adequate to manage the transportation and storage of dangerous goods and notes the commitment of BHP to work with the regulatory agencies to develop more detailed contingency plans as specific Project details become available.

9. The Panel recommends that BHP be required to submit a detailed spill contingency plan for fuel haulage to Environment Canada, DIAND and the GNWT for approval prior to commencement of the 1997 fuel haul. As part of this plan, the Proponent, its suppliers and its contractors should confirm that each has the capacity, through insurance or other instruments, to meet the full potential liability should a spill occur on the Echo Bay winter road or on public highways.

3.1.3 Traffic Management

Two elements of BHP's Traffic Management Plan, vehicle management on the Misery haul road and on the Echo Bay winter road were of particular interest. The potential environmental effects of traffic on caribou were also raised and are discussed in Section 4.6.1.

The analysis in the EIS of traffic effects on public highways and the winter road focused mainly on estimating incremental traffic and on the physical capacity of the system to handle the expected increase. The majority of bulk supplies and all fuel would be delivered to the site by truck: fuel tanker trucks mainly from Hay River, and bulk freight trucks mainly from Edmonton. This traffic would occur during the winter-road season only — the off-season for most public traffic.

Based on a consultant's study of the winter road, the EIS concluded that, with sufficient maintenance and planning, the winter road could accommodate additional traffic in a safe and environmentally-sound manner. The Proponent would work with Echo Bay

Mines Ltd. to upgrade existing arrangements to manage traffic, through the establishment of an additional dispatch station, expansion of the road camp and increased policing. Upon review of BHP's plans, DIAND agreed that the winter road can safely carry the projected traffic loads.

The Additional Information Response provided more detail on implications for public and wildlife safety. It was noted that winter road traffic has been increasing due to exploration activity in the region, with volumes of truck traffic on the winter road up by 120% since 1989. In later stages of Project operation, Project-related truck traffic could be expected to increase traffic on the winter road an additional 164% over 1995 levels. The estimated volume would be 138 vehicle trips per day or, on average, a single vehicle movement every 10 minutes. There would also be a substantial increase in traffic on public highways during the winter road season as a consequence of the Project. At the peak of operational activity, traffic would increase 32-47% on highways to Yellowknife and 135% on Highway 4, the Ingraham Trail.

BHP concluded that these increases would not have a significant effect on public safety on NWT highways in that the amount of traffic on the road does not contribute to most accidents. The GNWT Department of Transportation agreed with this analysis and the conclusions reached. The department also said that the public highway system was in need of upgrading in some stretches and that, subject to fiscal capacity, road maintenance was a continuing priority of the GNWT.

The Canadian Arctic Resources Committee, among others, noted that other diamond mines are likely to be developed in the region and that this could further increase the level of traffic on the winter road. This issue is discussed in Section 6.2 – Cumulative Effects.

The Panel agrees with the conclusion of the governments and the Proponent that the winter road and public highway system can physically accommodate the increase in truck traffic related to this Project, and that this increased traffic would not significantly affect public safety.

3.1.4 Closure and Reclamation

The Panel heard repeated concerns about adverse effects on the environment and people due to past mining projects in the north. Aboriginal people, in particular, expressed anxiety that this Project could cause similar problems.

To respond to these concerns, BHP outlined its plans for effective reclamation and closure of the site. BHP's goals for reclamation would be to re-establish stable physical landforms, to re-establish the productive use of the land and to protect water resources. It proposed a progressive reclamation program that would be implemented as pits were mined out and cells of the Long Lake tailings impoundment filled. By following this approach, most of the disturbed sites would be reclaimed prior to decommissioning and closure. Moreover, by conducting reclamation while the Project was in operation, methods could be evaluated, research undertaken, and any further measures identified and implemented prior to mine closure.

Challenges to successful reclamation include the cold environment, poor soil development, limited topsoil resources, slow growth rates, limited seed production, low soil moisture and short growing seasons. The Panel notes that BHP has already initiated a reclamation research program to address these concerns.

Prior to the actual closure, BHP stated that it would develop more detailed plans in consultation with the appropriate regulatory agencies. During the decommissioning phase, the Project infrastructure, facilities and equipment would be removed. Further, BHP is committed to a post-closure monitoring program which would include water quality, lake and stream biology, hydrology, wildlife, revegetation and landform stability.

According to DIAND, mine-site reclamation is normally addressed through the water licence. Applicants for a water licence are required to file an abandonment and restoration plan with the NWT Water Board. The Water Board may require a security deposit from the applicant to ensure that funds are available in the event of default by the licence holder. In addition, security can also be required under the *Territorial Lands Act* to ensure that the licensee complies with the terms of the lease. The Panel was told that DIAND is currently reviewing the need to develop a formal mine-site reclamation policy for the NWT.

DIAND stated that it agreed with the goals of the reclamation plan as proposed by BHP but suggested that progressive reclamation should also be a specific goal of the plan. The Panel believes that this

suggestion is consistent with BHP's plans for reclamation. DIAND described development of an abandonment and restoration plan as an iterative process that should not be finalized until after the mine has been operating for a period of time. The requirement for regular updates to the plan would normally be specified in the water licence and land lease. For this reason, DIAND considered the conceptual plans and reclamation methodologies contained in the EIS as a good basis for reclamation planning. In contrast, the Northern Environmental Coalition concluded that the reclamation strategy in the EIS was not well-defined. The coalition agreed with the progressive reclamation approach but recommended that more detail was required on the landscape units that would remain when the mine is closed. BHP replied that flexibility was important in developing mine reclamation plans because it allows the incorporation of ongoing research and advancing technology.

Support for the progressive reclamation approach was provided by Environment Canada which recommended that reclamation of the Long Lake tailings impoundment be initiated as early as possible so that BHP would be able to benefit from the experience gained. In its submission on the EIS, NRCan commented that progressive site reclamation during operation was an excellent plan because experience would be gained during Project operation and the use of available resources would be maximized. NRCan also offered several recommendations about operation of the tailings impoundment so that it can be reclaimed successfully.

Concern was expressed at the hearings about the introduction of exotic species as part of the reclamation program. The Northern Environmental Coalition, for example, recommended that only local plant species should be used for revegetation. Similarly, the Yellowknives Dene First Nation said that reclamation must not bring non-indigenous species to the Project site. In response, BHP explained that it would use native species cultivated for commercial production; in other words, species found on the tundra would be used, but seeds would be collected from plants cultivated elsewhere so as to generate a greater volume of seeds.

During the hearings, Aboriginal people in particular expressed concern about the safety to both humans and wildlife of abandoned open pits. The EIS concluded that the time required to refill the pits would range from six years for the Panda pit to 212 years for the Leslie pit. In the Request for Additional Information, the Panel asked for alternative development approaches that could accelerate the rate of filling of pits after mining is completed. BHP stated that backfilling of mined-out pits with waste rock from adjacent waste rock dumps was impractical for several reasons. First, since the dumps would be compacted and frozen they would have to be re-mined. The additional costs associated with re-mining would likely make the deposits uneconomic. Secondly, the waste rock dumps would be progressively reclaimed, hence re-mining would create additional environmental impacts. It concluded that the only practical and economic option was to divert a portion of surface water into the mined-out pits. However, it pointed out that the effects of such diversions on fish and fish habitat would need to be assessed.

The Panel concludes that the reclamation plan described in the EIS represents an acceptable framework for reclamation. It supports the concept of progressive reclamation. The Panel also concludes that this approach would give the Proponent and regulatory agencies sufficient time to address specific problems prior to mine closure. Furthermore, research on revegetation and reclamation would provide a better understanding of the techniques available to restore lands in the region disturbed by this and other projects.

The Panel concludes that the existing regulatory regime is adequate to manage this aspect of the Project. The NWT Water Board has the ability to require a security deposit to ensure that a site is reclaimed in the event of default by a licence holder. In considering this matter, the Panel suggests that the NWT Water Board take into account the Proponent's progressive reclamation approach and not create a disincentive for this approach. The Panel stresses the need for government and the Proponent to consult with the public on the reclamation plan and, in particular, on the plans for closure. Socio-economic aspects should also be considered in closure plans as discussed in Section 5.4.1.

The Panel notes that BHP has made a commitment to post-closure monitoring but the details of this proposal are sketchy at this stage. The results of monitoring during the life of the Project would provide the information necessary to determine the nature of a post-closure monitoring program.

The Panel believes that further consideration should be given to filling the open pits with waste rock, tailings, or water by diverting it from other sources. Should the mining plan or sequence have to be modified, opportunities may arise to fill pits more quickly with waste rock or tailings. As the reclamation plan would be updated periodically, the Panel proposes that the Proponent and the regulatory agencies consider alternative methods for pit refilling that would reduce the duration of negative aesthetic impacts and the need for safety measures to protect animals and humans from unfilled pits.

3.2 PACE AND SCALE OF DEVELOPMENT

In the EIS, BHP stated that the rate at which ore is processed is one of the most important decisions to be made in planning a mining operation and involves consideration of a number of technical, marketing, and economic factors. The Proponent developed a mining plan that would produce a relatively consistent diamond product over the 25-year life of the mine. The mine has been designed with an initial throughput rate of 9,000 tonnes per day (t/d) when the higher grade Panda, Misery and Koala pipes would be mined. Production would be increased to 18,000 t/d in year 10 when the lower grade material from Fox and Leslie pipes would be introduced.

Several presenters suggested that the mine should be developed at a much slower pace. For example, the Łutselk'e First Nation proposed that only one pit be developed and approval to develop a second pit should be granted only if BHP could demonstrate that it had met all regulations, had developed management and reclamation plans approved by affected Aboriginal communities, and had complied with conditions of Impact and Benefits Agreements. A member of the Northern Environmental Coalition took the position that the Panel should approve only a single pit since the Project represents an experiment on the landscape. In its final submission, the coalition recommended that if the Project is approved it should be developed in a staged manner to reduce environmental and social impacts and to allow for monitoring of impacts on a "stage-by-stage" basis.

The Panel questioned BHP about the proposed pace and scale of the development. BHP explained that the development pace and sequencing was based on economic factors related to the grades of the ore as outlined in the EIS.

The Panel observes that the current mine plan envisages that the pits would be developed sequentially over a 25-year period. Experience gained during the early stages of the operation can be applied to the later phases. Since BHP is, in fact, proposing to develop the mine in phases, the Panel concludes that the concerns raised regarding the pace and scale of development have been adequately addressed.

3.3 ALTERNATIVE ENERGY SOURCES

According to the EIS, after review of electrical generation options that included alternative energy sources and hydro-electricity, the Proponent decided that power requirements at the site would be provided by diesel generators. The main power plant would consist of five medium-speed diesel generating units with an additional unit installed in year 10 when production is expected to increase to 18,000 t/d.

The NWT Power Corporation told the Panel that it was looking at hydroelectric development options in the region, primarily to supply the City of Yellowknife, but that diamond mines might provide a catalyst for this initiative. BHP was asked whether it would consider hydroelectric power as an alternative to diesel generation. BHP said that, at this time, hydroelectric power was not an option. Should it become available at a competitive price, it could be considered in year 10 when additional power would be required.

Several presenters recommended that BHP should continually acquire and employ power-saving technology. It was noted that any reduction in fuel consumption would also reduce the emission of greenhouse gases from the Project.

The Panel believes that there is a built-in incentive for BHP to use fuel efficiently as this represents a large operating cost to the Project. In keeping with the adaptive management approach proposed by BHP, the Panel encourages BHP to continue to seek out and employ the most energy-efficient technologies available. The Panel also notes that there are environmental and operational trade-offs entailed by other energy options.

3.4 MINE SITE SECURITY

During its review, the Panel received a copy of a report on policing issues prepared by the Assistant Commissioner of the RCMP after a visit to several

overseas diamond-mining operations. In a presentation from the RCMP, the Panel was advised of the actions that had been taken on recommendations contained in that report. The RCMP told the Panel that it had examined the security systems in place during the exploration program, and those proposed by BHP for its operations. The RCMP concluded that the potential for diamond theft from the proposed Project is probably far less than at some of the operations visited by the Assistant Commissioner.

The Panel was advised by both the RCMP and DIAND that an interdepartmental committee, including the Department of Justice, had been established to review the Criminal Code and other laws to determine whether amendments were necessary to provide a secure environment for the diamond-mining industry. In particular, amendment to Section 322 of the Criminal Code, relating to valuation of stolen uncut or unpolished diamonds, is required. An amendment to include diamonds in Section 394 is also needed. The RCMP said that, with these amendments, the code would be effective in dealing with investigations of diamond theft. In addition, the RCMP is seeking international training to prepare its members to investigate diamond theft.

10. The Panel recommends that the Government of Canada make the necessary amendments to the Criminal Code to provide a secure environment for the diamond-mining industry prior to the start of full production.

4. ENVIRONMENTAL ISSUES

4.1 LANDSCAPE AND TERRAIN

Two features of the terrain, permafrost and eskers, were identified in the EIS as valued ecosystem components (VECs). Permafrost was identified as a VEC due to the possibility of disturbance to the active layer and the resultant ecological effects. During the public hearings discussion of permafrost was primarily related to construction of the Project and, in particular, the building of frozen core dams for the Long Lake tailings impoundment. These issues have been addressed previously in Section 3.1.1– Tailings Management.

The importance of eskers was identified at all stages of the review. During scoping the value of eskers to wildlife was noted many times. Although the EIS addressed the topic of eskers in several areas, the Panel found it difficult to obtain a comprehensive understanding of how this VEC would be affected by the proposed Project and, therefore, requested additional information.

BHP stated that the primary impact of the Project on eskers would result from quarrying for granular material. The Airstrip esker, adjacent to the planned development area, has been quarried under permit since 1993. Approximately 550,000 m^3 of material has been extracted. During Project development, an additional 800,000 m^3 of material would be removed from this esker. More granular material (150,000 m^3) would be obtained from the southern extremity of the 30-km Lac du Sauvage esker adjacent to the Misery mining development. This quarry site would cover approximately 15 ha.

DIAND recommended that further work is needed to develop a quarry management plan for the Misery quarry site before a permit would be issued. The importance of using traditional knowledge in the assessment of eskers in relation to both wildlife use and burial grounds was also raised by DIAND.

Eskers are important to wildlife in that they provide migration routes for caribou, offer habitats for small mammals and are used by carnivores, including grizzly bears, foxes, and wolves for travelling, denning and feeding. The Panel received additional information on this subject in the "1995 Baseline Study Update – Eskers, Carnivores and Dens."

Eskers are also important from an archaeological perspective. Studies undertaken for the Proponent indicated that eskers and esker remnants are landforms with the greatest archaeological potential. Of particular importance is the use of eskers for human burials because esker materials are easier to dig than the surrounding terrain. In this regard, the Yellowknives Dene First Nation recommended to the Panel that no more eskers or parts of eskers, particularly those used by migrating caribou or as burial sites for their ancestors, be destroyed without a full assessment by affected Aboriginal communities.

BHP's approach to managing impacts on eskers included identification and avoidance of sensitive wildlife habitats, in particular dens. Further, BHP proposed to monitor the effects of esker disturbance on wildlife. Archaeological surveys of eskers would be undertaken and any sites identified would either be avoided or mitigated. Following disturbance, quarry sites would be revegetated. In response to concerns raised through the RERC process, BHP changed the proposed route of the Misery haul road to avoid extensive use of eskers as roadways.

The Panel concludes that the effects of the Project on eskers are mitigable. It notes that the extent of disturbance to eskers is relatively minor and that BHP has made efforts to minimize this disturbance by relocating the proposed Misery haul road.

The Panel believes that the development of a quarry management plan for the proposed Misery quarry, as recommended by DIAND, would be the appropriate mechanism to address specific concerns related to development of this pit. Consultation and collaboration with Aboriginal peoples concerning traditional knowledge, burial sites and wildlife use of this site should be an important aspect of developing this plan.

The Panel notes that although the use of eskers for this Project in relation to the overall presence of this landform is relatively minor, the cumulative effects of development in the region on eskers could become significant. The Panel therefore proposes that the WKSS take, as a priority, the collection of regional baseline information on eskers and other glaciofluvial deposits, in order to provide a basis for development of guidelines and cumulative effects assessment by government.

4.2 AIR QUALITY

The main Project activities affecting air quality are in the operation phase and relate to gaseous emissions

(sulphur dioxide [SO_2] nitrogen oxides [NO_x] and carbon monoxide [CO]) from fuel consumption. Another air quality concern is that of air-borne dust, measured as total suspended particulate (TSP), primarily from roads during the summer but also from blasting and crushing operations and wind erosion of waste rock dumps. According to the EIS, the residual effects of the Project on air quality are considered to be negligible.

The EIS presented the results of air quality modelling of SO_2, NO_x, CO and TSP. This analysis used the boundary of the claims block as the reference point for determining whether the Canadian Ambient Air Quality Objectives (CAAQO) were met. The CAAQO has three levels for rating air quality: "desirable", "acceptable", and "tolerable." Based on the Panel's own review and comments received primarily from Environment Canada, the Panel asked BHP to re-run the air quality model using a receptor grid that included data points both within the claims block and locations downwind of the mine and processing plant. The results of this revised modelling were presented in the Additional Information Response and indicated that "tolerable" and "acceptable" levels (as defined by the CAAQO) were not exceeded during worst-case scenarios. Environment Canada concluded that the revised modelling has provided sufficient information on trends to provide recommendations to the Panel.

The GNWT noted that discussions between Environment Canada and BHP had focused on "acceptable" and "tolerable" levels, but that when the GNWT established standards for SO_2 and TSP under the NWT *Environmental Protection Act,* it adopted "desirable" levels. It also noted that lichens are known to be very sensitive to air pollution and that a monitoring program of plant species diversity and vigour would provide a cost-effective method to measure effects from air pollutants.

The Additional Information Response described lichens as a potentially useful indicator species due to the corrosive nature of SO_2 and NO_2 on this vegetation. When questioned during the public hearings, BHP said that it had not yet decided whether to monitor lichens to detect any impacts from air quality. BHP concluded that it would be difficult to mitigate any effects of SO_2 and NO_2 emissions. Alteration of diesel engine operating parameters and the use of low sulphur fuel were proposed by BHP as two mitigation options.

Another air quality issue was the potential for thermal inversions to trap vehicle exhaust in the open pits. These gaseous emissions could affect worker safety should they exceed industrial hygiene standards or impair visibility due to the formation of ice fog. Modelling presented in the EIS suggested that such inversions would occur "a few times per year." BHP proposed testing the environment should a gaseous layer form. If air quality exceeded industrial hygiene levels, work in the pit could be suspended or, if available, electric mining equipment would be used rather than diesel units. Environment Canada recommended that routine monitoring for CO, SO_2 and NO_2 in the open pits should be conducted during the winter months of the first year of operation and, depending on results, scaled back in subsequent years.

Responsibility for air quality in the NWT seems to belong to both the federal and territorial governments. Environment Canada told the Panel that it has jurisdiction for enhancement of the quality of the natural environment (including air) where that jurisdiction has not been assigned by law to any other agency of the Government of Canada. It fulfils this mandate, in part, by developing standards and guidelines including the CAAQO. The GNWT advised the Panel that it has established Guidelines Respecting Ambient Air Standards for Sulphur and Total Suspended Particulate in the NWT under the NWT *Environmental Protection Act.* The Panel understands that neither the federal nor territorial guidelines for air quality are enforceable. Further, it understands that the federal government has the authority under the *Canadian Environmental Protection Act* to make regulations to protect the environment on federal lands.

The Panel accepts Environment Canada's assessment that the Project can be developed and operated in an environmentally sustainable manner provided that an air quality monitoring program is implemented. Further, the Panel believes that the effects of air quality on worker health and safety can be eliminated by monitoring and management actions. The Panel notes that BHP and Environment Canada have been working together on the air quality modelling and suggests that this co-operative relationship be maintained during the development of a monitoring plan for air quality.

11. The Panel recommends that an air quality monitoring program be developed jointly by BHP, Environment Canada, the GNWT and DIAND.

The Panel believes that monitoring of lichens should be a component of an air quality monitoring program due to their sensitivity to SO_2 and NO_2 and because they are important in the diet of caribou.

4.3 WATER QUANTITY AND QUALITY

Baseline Data

The collection of baseline data on hydrology was initiated by BHP in the fall of 1992. Data on lake bathymetry, lake water levels and surface hydrology of the Project area were supplemented with data from regional hydrometric stations operated by the Government of Canada. Preliminary studies of water quality were conducted on eight lakes in 1993. The program was expanded in 1994 to include 28 sites in 25 lakes, and in 1995, four lakes and seven stream sites were sampled. A broad range of water quality parameters was analysed in the field, and on water samples collected and shipped to an independent laboratory. DIAND concluded that data on water quantity and quality submitted by BHP were sufficient for the panel review process and provided an adequate baseline for regulatory purposes. Environment Canada recommended that additional baseline water quality sampling should be conducted throughout the year, in part to characterize late-winter low-flow conditions.

Water Quantity

Water from the Project area drains to the north, eventually reaching the Coronation Gulf, via the 520 km long Coppermine River. Drainage from the main Project area in the Koala watershed would be directed to the Long Lake tailings impoundment and discharged into Nema Lake. From Nema Lake, water would flow through a series of lakes into Slipper Lake which discharges into Lac de Gras. Discharge from the Misery development area would flow into Lac de Gras via a small unnamed lake. (A series of colour plates in the Additional Information Response – Part C provided a useful picture of the ways that flows would be affected by the Project.)

Changes in water flow would be caused by the draining of lakes prior to open-pit mining, diversion of flows around the pits, and by the infilling of Long Lake with tailings. A total of 15 lakes would be affected by the proposed development. Panda, Koala, Leslie, Fox and Misery lakes would be drained prior to open-pit mining. Airstrip Lake would be drained to increase the amount of aggregate available for construction. Long Lake and three adjacent small lakes would be used for tailings disposal. Five small lakes would be covered by waste rock dumps.

Drainage of the lakes prior to mining would be controlled so that flows would not exceed 50% of the mean annual flood in any downstream watercourse containing fish. The main effect of draining lakes would be to extend peak spring flows for a longer period. Because channels connecting the lakes are wide and braided, the effects of this increased flow are predicted to be negligible. According to BHP, the overall hydrological effects of lake draining on Slipper Lake would be minimal and flows would not be affected in the Coppermine River. DIAND advised the Panel that it had assessed the information provided by BHP and concluded that the effects of the Project on Lac de Gras and the Coppermine River would be negligible. Even in a worst-case scenario, in which water from all lakes would be pumped out instantaneously (a plan not proposed by BHP), DIAND estimated that water levels in Lac de Gras would rise only 3 cm.

Water Quality

The effects of the Project on water quality received close attention during the hearings. A principal concern was that any contaminants released from the Project could affect users of fish and drinking water downstream in the Coppermine River watershed. The main issue was the ability of the Long Lake tailings impoundment to yield water of adequate quality to be discharged to the receiving environment. The subject of Tailings Management has been discussed in detail in Section 3.1 .1 above. According to the EIS, three water quality parameters (total suspended solids [TSS], total nickel [Ni] and total aluminum [Al) would be the potentially limiting parameters for the discharge of water from the tailings impoundment. During most of the operation, water would be retained in cell E and would only be discharged when water quality met regulatory standards. Modelling presented in the EIS concluded that water quality in the receiving environment would not exceed the Canadian Council of Ministers of the Environment (CCME) receiving water criteria for TSS, total Ni and total Al, and that all other parameters in the tailings pond water would be below CCME limits.

DIAND reviewed the water quality data submitted by BHP and conducted its own analysis. The department agreed that there would be no measurable effects on concentrations of suspended

solids or trace metals downstream of the Project in Lac de Gras or the Coppermine River. Further, it concluded that measurable effects would not likely be seen in Nema Lake, the first body of water to receive discharge from the tailings impoundment. It did note that diversions of inflows from Nero and Moose lakes might affect water quality, but that there were insufficient data to quantify these effects.

In the Request for Additional Information, the Panel asked BHP to discuss whether a worst-case scenario could lead to an uncontrolled release of tailings into the environment and, if so, to comment on the impact of such a release. The hypothetical worst-case scenario developed by BHP was a failure of the tailings containment dam and release of 4.5 million m^3 of water over a seven-day period into Nema Lake and downstream. In this scenario, drinking water standards would not be exceeded in Lac de Gras and neither would receiving water guidelines for the protection of the aquatic environment be exceeded in the Coppermine River. NRCan said that it had reviewed the scenarios provided by BHP and found them to be credible. According to NRCan, the worst predictable impact of a dam failure would result in the release of suspended solids downstream with little or no dissolved metal contaminants. DIAND said that, given the Project design, it would not expect a total dam failure to be a realistic worst-case scenario. Further, it stated that the issue of worst-case scenarios would be revisited during the water licencing process.

Several other issues were raised in relation to water quality including toxicity of kim berlites, acid generation from waste rock, nitrogen from blasting residue and levels of Radium-226 and Thorium-228. With respect to toxicity of kimberlites, several presenters commented on the work done by DFO on "A Preliminary Evaluation of the Lethal and Sub-lethal Toxicities to Fish from Effluents in the Lac de Gras Area." In response to a question at the hearings, Environment Canada indicated that the tailings management plan, ongoing monitoring and adaptive management would be adequate to address this toxicity issue. Additional work on the toxicity of kimberlites is planned and BHP made a commitment to co-operate with Environment Canada on these studies.

The potential for acid generation from waste rock, according to the Mining Association of Canada and NRCan, is often the most severe water quality problem in mining operations and is the subject of co-operative research projects directed at mitigation. The results of additional geochemical studies were reported by BHP in the "Waste Rock Leaching – 1995 Baseline Study Update." That study indicated that the majority of waste rock would be classified as "very low to low" in sulphate production potential. Two rock types, biotite schist which represents 27% of the waste rock from the Misery pit, and diabase which represents 6% of waste rock from the Fox Pit, have "moderate" acid-generating potential. Acid-generating material from the Misery pit would be isolated and enclosed to minimize infiltration and to preserve permafrost conditions.

DIAND concluded that the geochemical test results were adequate for this review but recommended that static and geochemical testing of waste rock components should continue for the duration of the Project to provide advance warning of potential problems. During the hearings, BHP concurred with this recommendation. Further, it indicated that the quality of water from waste rock dumps would be monitored and if it did not meet the criteria for discharge as specified in the water licence, it would be collected and treated before release. NRCan commented that BHP's proposed treatment of potentially acid-generating waste rock appeared to be workable. DIAND agreed that if runoff from the waste rock piles was monitored and processed through the tailings pond system, problems could be identified and mitigated.

Another water quality issue, raised in particular by the Northern Environmental Coalition, was the potential for contamination of waste rock drainage by residual nitrogen in the form of nitrates or nitrites from ammonium nitrate-based explosives. BHP stated that responsible handling of explosives, including spill prevention and clean up, would minimize the amount of residual nitrogen compounds in waste rock. DIAND concluded that any such effect was mitigable and that this issue could be addressed at the regulatory stage.

During the EIS review stage, Health Canada advised the Panel that levels of Radium-226 and Thorium-228 in water were considered quite high and above the federal level for drinking water for Radium-226 (1 Becquerel per litre). Health Canada recommended that BHP provide radiological data for the ore and the natural environment to establish baseline conditions on which to assess impacts. This issue was raised by several presenters in the hearings. In response, BHP advised the Panel that the units for the data reported in the EIS should be Becquerels

per litre rather than Becquerels per gram as indicated in the document. With this correction, levels of Radium-226 are well below the federal drinking water standard. BHP also told the Panel that these samples had been analyzed by an independent certified environmental laboratory. For greater certainty, the Panel agrees that BHP should submit these revised radiological data to Health Canada so that it can identify any mitigation and monitoring actions required for occupational and public health and safety.

Effects on groundwater was also a topic of discussion at the hearings. Environment Canada recommended that baseline information be collected on groundwater and that long-term monitoring points be established to determine the potential effects of the Project on the hydrogeology of the area. DIAND concluded that the groundwater data were acceptable for the panel review stage but recommended that further data should be collected for the duration of the Project. BHP indicated that it would be very difficult to collect additional groundwater data at this stage but, if the Project was approved, it would be committed to a long-term groundwater data collection program.

Another issue related to groundwater is both the quality and quantity of water that would flow into the open pits during mining. NRCan noted the uncertainty concerning the volume and chemistry of water that would enter the pits. In particular, it noted that as groundwater freezes, dissolved salts can be pushed ahead of the permafrost and concentrate in taliks. NRCan proposed that surface-based geophysical sounding techniques could be used to map permafrost distribution and identify areas of groundwater. BHP indicated that it had already collected considerable geophysical data on the Project area and that water from pits would be pumped to sediment ponds where water quality would be monitored. Depending on quality, groundwater could be released to the environment, treated and released, or pumped to the process plant. Overall, NRCan commented that the issues it had identified could be addressed as the Project develops, consistent with the Proponent's adaptive management approach.

Potential Downstream Effects on Nunavut

A presentation from the Nunavut Water Board Transition Team highlighted Inuit rights under the Nunavut Settlement Agreement. The Panel understands that because the Project is located outside Nunavut, the NWT Water Board would be responsible for issuing the water licence and that regulation of this Project would remain either with the NWT Water Board or successor bodies established in the Mackenzie Valley. The Panel supports the Transition Team's recommendation that a staff or board member of the Nunavut Water Board sit as a member of the Technical Advisory Committee to the NWT Water Board during consideration of BHP's application for a water licence.

The Nunavut Water Board Transition Team made reference to Section 13.10.1 of the Nunavut Settlement Agreement which states that where a drainage basin is shared with another jurisdiction, Canada and the GNWT, assisted by the Nunavut Water Board, should negotiate agreements with other jurisdictions concerning the use and management of such drainage basins. Because the Coppermine River is an interjurisdictional drainage basin, the Panel agrees that the NWT Water Board and its successors should work co-operatively with the Nunavut Water Board towards regulation of this Project and, more generally, on the management of the Coppermine River basin.

Both the Kitikmeot Inuit Association and the Nunavut Water Board Transition Team made reference to Section 20 of the Nunavut Settlement Agreement which relates to compensation for any changes in water quality and quantity. During the hearings in Kugluktuk, BHP and the Kitikmeot Inuit Association agreed that there had been discussions between the two parties on this issue and BHP made a commitment to continue these discussions. The Panel understands that at issue is the location of a monitoring station to determine effects on the quality and quantity of flow of water into Nunavut and the party responsible for conducting the monitoring. It notes DIAND said that there are four water quality and four water quantity stations on the Coppermine River and that water quality samples at Kugluktuk are collected by a local resident.

Conclusions and Recommendations

The Panel concludes that the effects of the Project on water quantity and quality are predictable and mitigable. Effects on either water quantity or quality are not expected to be detectable downstream of Slipper Lake. Monitoring and adaptive management plans have been proposed by BHP to identify and remedy any unforeseen effects.

Monitoring of water quality and quantity would be a major component of BHP's management plan for water. Detailed requirements for monitoring by a proponent are normally contained in the water licence. In addition, the Panel was told that DIAND and Environment Canada maintain water quality and hydrology stations in the Coppermine River basin. To provide baseline data, DIAND made a commitment to collect sediment core data from Slipper Lake in the spring of 1996. It also recommended that a water quality monitoring station be established at Slipper Lake. According to the EIS, BHP plans to establish a biology and water quality monitoring site at Slipper Lake and a stream biology and water quality monitoring site at the outlet of Slipper Lake.

Protection, conservation and use of water in the NWT are regulated by the NWT Water Board established under the *Northwest Territories Water Act.* If approved, this Project would require a Type A Water Licence *from* the Water Board. The process of issuing such a licence requires a detailed review of the Project by all NWT regulatory agencies with mandates related to water as well as major stakeholders in the NWT.

12. The Panel recommends that the water licencing process take into account water quality issues raised during this review including, but not limited to, integrity of frozen core dams, slow settling of suspended particulates, acid generation from waste rock, kimberlite toxicity, nitrogen contamination of waste rock and location of monitoring stations.

4.4 FISH

Fifteen lakes would be affected by the Project by draining prior to open-pit mining, by filling with tailings or by covering with waste rock. BHP's studies indicate that 12 of these 15 lakes are fish-bearing. Connecting streams, outflow streams and inflow streams, 43 in total, would also be affected by mining operations.

BHP conducted a series of studies, starting in 1993, to quantify the potential loss of fish and fish habitat as a result of the Project. The predominant species in the 12 lakes is lake trout, followed by round whitefish, arctic grayling and burbot. The species present in affected streams are arctic grayling, slimy sculpin, lake trout and burbot. An "Estimation of Fish Habitat in Koala District Lakes and Streams" (October 1995) indicates that the greatest losses of potential fish spawning habitat would occur in Long, Leslie, Fox 1, Panda and Airstrip lakes.

DFO's "Policy for the Management of Fish Habitat" (1986) established the principle of "no net loss" of productive capacity of fish habitats. Under this policy the department strives to balance unavoidable habitat losses with habitat replacement. The policy establishes a "hierarchy of preferences" to be applied when fish habitat would be affected by a proposal. The preferred approach is to avoid *any* harmful alteration to fish habitat but, where this proves not to be feasible, compensation to replace the lost habitat is to be considered.

BHP planned to compensate for the loss of fish habitat in streams (primarily arctic grayling spawning habitat) by designing the diversion channel between Panda Lake and Kodiak Lake in such a way as to make it suitable fish habitat. Fish habitat enhancement features would be incorporated at an additional cost of $1.5 million. Since the diversion channel would be 2.25 times longer than the natural connecting streams which contain fish, BHP concluded that this would offset the loss of stream habitats. In its submission to the Panel, DFO indicated that it considered this to be an acceptable approach to compensate for the loss of mainstem streams but required additional information on the fish habitat of streams flowing into affected lakes. The Northern Environmental Coalition stated that, unless the population of grayling in Kodiak Lake is limited by the availability of spawning and rearing habitat, the money spent to provide new habitat may be largely wasted.

The Panel understands that DFO requires a compensation agreement before issuing authorizations to destroy the fish habitat under the *Fisheries Act.* In the Additional Information Response, BHP indicated that discussions concerning fish habitat compensation had been initiated with DFO in the spring of 1995 and that it had produced two reports that attempted to quantify the anticipated loss of fish habitat. Since opportunities for replacement of lake habitat could not be identified within the affected watershed, and because the time required to refill mined-out pits as well as their bathymetry precludes the re-creation of fish habitat, DFO and BHP agreed that financial compensation would be suitable in this case.

DFO indicated that the amount of compensation likely would be based on an estimate of the cost of "whole lake replacement." DFO proposed to use the

cash compensation to establish a NWT Habitat Management Fund to finance habitat restoration and enhancement projects as close to the affected area as possible. Projects would be determined or recommended by the most directly affected local communities. DFO also noted that the proposed fund was a concept that the department had been considering for some time and could eventually involve other developers.

The precedent that would be established, both by accepting cash compensation for the loss of fish habitat and by the methods used to calculate the value of habitat lost, was noted by several participants. In response to a question from the Panel, DFO advised that no compensation had been required for the loss of a lake drained for the Colomac Mine, a mine in the same region. Some concern was expressed that the amount of cash compensation had yet to be established and that BHP was being used as a "guinea pig" in developing this concept. The Northern Environmental Coalition commented that DFO could not provide assurance that fish habitat could be created regardless of the size of the fund. Also, it expressed a preference for the Proponent either to improve existing habitat or to create new habitat rather than pay monies to a fund administered by DFO. The coalition suggested that the Proponent could be given credit if it provided support to the scientific community for studies on newly-created habitat.

Prior to draining or filling lakes, BHP plans to salvage fish. BHP has proposed to make arrangements with Aboriginal people to fish-out the lakes before they are destroyed. Alternatively, BHP could fish-out the lakes and provide the catch to adjacent communities. The removal of fish from these lakes was the subject of intense discussion at the community sessions. The Panel does not believe that consensus was reached on this issue and encourages both BHP and DFO to consult further with Aboriginal peoples on this matter.

The Panel concludes that the primary impacts of the Project on fish would be the loss of existing populations and habitat in 12 lakes and associated streams. The Panel understands that such effects would be localized and would not have an overall effect on fish populations in Lac de Gras or the Coppermine River. Effects on stream habitat would be offset by the creation of habitat enhancement features in the diversion channel between Kodiak and Panda lakes.

It has been proposed that the loss of lake habitat would be compensated for by BHP providing funds to establish an NWT Habitat Management Fund. The Panel believes this approach may have merit but notes that both the establishment of this fund and the method for calculating the cash value of habitat lost may create precedents for other projects. Also, the Panel is left with the impression that DFO has not developed a systematic and generally applicable approach to calculate the value of fish habitat lost.

13. The Panel recommends that:
    a) cash compensation for the loss of fish habitat should be considered by DFO only when there are no viable options to avoid the loss of habitat or to re-create the lost habitat;
    b) DFO develop a fair, realistic and transparent approach to the calculation of compensation for loss of fish habitat;
    c) DFO settle comprensation with BHP as quickly as feasible, reflecting the principles described in b) above;
    d) if it is decided to proceed with the proposed Habitat Management Fund, an effective public consultation program including Aboriginal peoples be undertaken by DFO as soon as possible to identify projects that would be most appropriate; and,
    e) the results of projects paid for by this fund be carefully monitored to ensure that the objective of habitat enhancement is achieved.

4.5 VEGETATION

In the summer of 1994, BHP initiated a vegetation inventory and mapping project over a 190,000 hectare (ha) area surrounding the Project. Using 120,000 scale colour aerial photographs, ecosystem units were mapped at a scale of 1:10,000. According to BHP, no standard ecological classification is in use in the NWT. Therefore, it developed a biogeoclimatic ecosystem classification system similar to that used by the British Columbia Forest Service. Ground-truthing of the mapped area was conducted in 1995 and a set of 30 base maps were produced prior to the hearings. The maps would be used to evaluate the suitability and capability of wildlife habitat. In addition, a Geographic Information System was developed to assess potential environmental impacts and to develop mitigation measures. For example, areas sensitive to off-road traffic could be identified.

The EIS estimated that approximately 200 ha of vegetation would be lost in the areas of the open pits. An additional 546 ha of vegetation would be covered by waste rock dumps or would be flooded in low-lying areas around Long Lake. An unspecified amount of vegetation would be lost by construction of haul and access roads. Offsetting these losses would be reclamation of Long Lake as a wetland and reclamation of waste rock piles and other Project components.

The "Ecological Mapping – 1995 Baseline Study Update" indicated that 116 vascular, 60 moss, and 26 lichen species were collected and identified in the study area. None of the species collected is listed as rare by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC).

The Panel concludes that the effects of the Project on vegetation can be largely mitigated by the reclamation program. It notes that the Project would not affect any rare plant species. The Panel acknowledges that BHP has developed a Geographic Information System which should be useful for future impact assessment and mitigation planning for the Project. This data base should also contribute to an overall understanding of the ecosystem of the region.

4.6 WILDLIFE

4.6.1 Caribou

Among environmental issues, the potential effect of the Project on the health, numbers and migratory patterns of the Bathurst caribou herd was the most important public concern raised. Concerns about caribou were repeatedly raised at all scoping and community sessions and were a major focus of discussion at the wildlife technical session. This reflected the central role of caribou in the physical and cultural well-being of Aboriginal peoples of the area. The GNWT told the Panel that the cultural value of the herd could not be estimated but that the dollar value of the harvest, based on meat replacement costs, was $11.2 million annually. The importance of caribou to the land-based economy is discussed more fully in Section 5.5 – Relationship Between the Land- and Wage-Based Economies.

The Bathurst caribou herd is the largest herd in the NWT. The most recent population estimate, conducted by the GNWT Department of Renewable Resources in 1990, is 350,000 animals. The herd occupies a range of about 250,000 km^2, which includes wintering grounds in the treeline, and calving grounds east of Bathurst Inlet (figure 3). Spring migration northwards towards the calving grounds begins after mid-February and the return to the treeline starts in July or early August. Caribou pass through the Lac de Gras area during spring and fall migration.

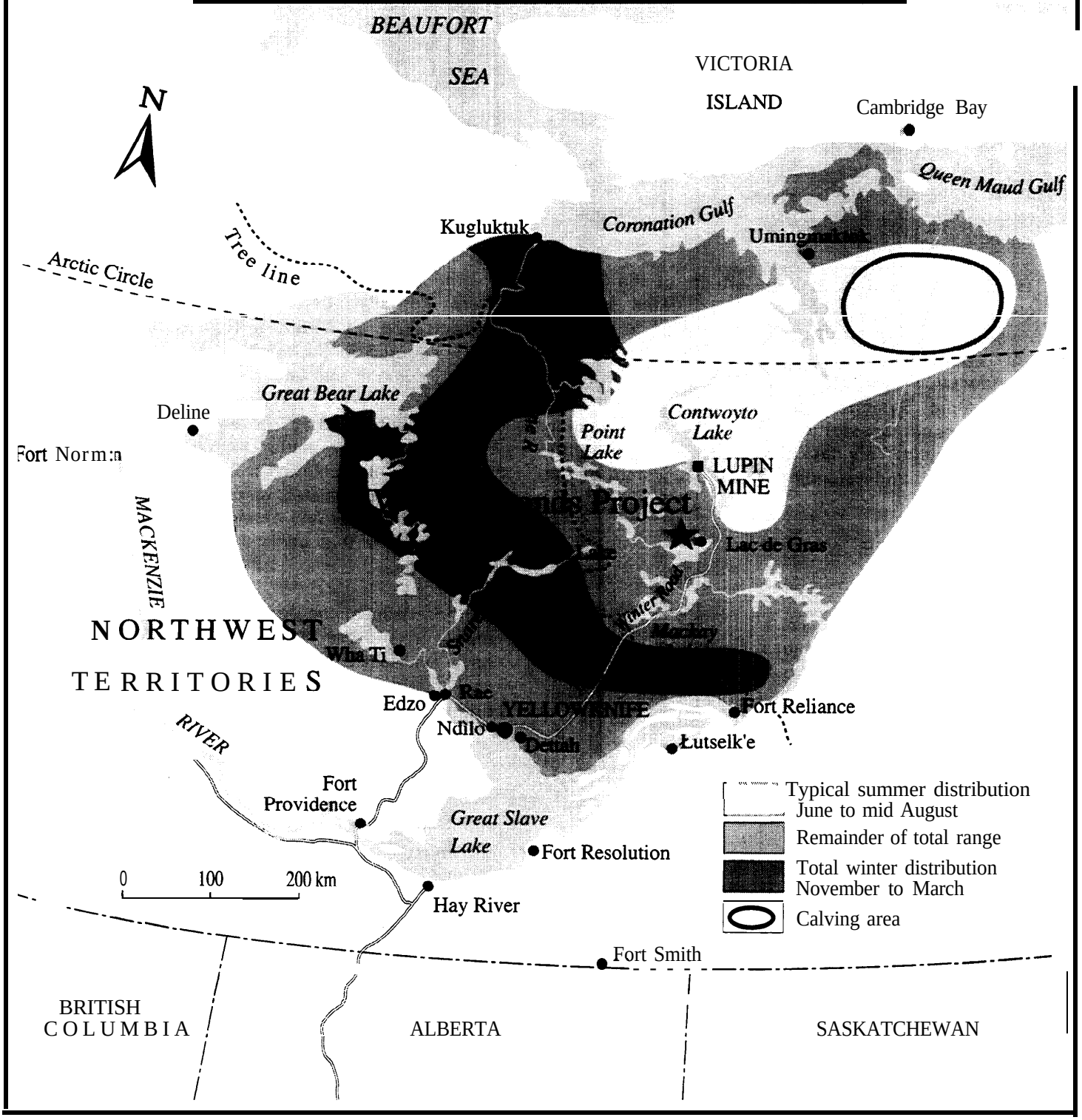
BHP used an area of 1,900 km^2 to conduct wildlife studies. The area included the estimated 73 km^2 which would be affected by the Project and was regarded to be representative of the approximately 3,400 km^2 claims block. Baseline data on caribou were collected in 1994 and 1995 to determine relative numbers using the area during migration, to identify the location of migration corridors, to describe the summer distribution of caribou and to document their use of habitats. During spring migration, two main corridors through the study area were identified, both of which bypass the main Project area. In 1995, a total of 20,000 caribou were counted in the wildlife study area during the spring, summer and fall.

BHP identified that potential impacts of the development on caribou include disruption of movements and migration corridors, deaths due to collisions with vehicles, disturbance when feeding or resting, effects of any changes in water quality, and the possibility that caribou may become trapped in the tailings.

Of these issues, the potential for changes in caribou migration and the effects that such changes might have on access to the animals for harvest were particular concerns expressed by Aboriginal people during the hearings.

In its studies, BHP found that migration patterns differed between 1994 and 1995. This was consistent with the observations of several that there is considerable natural variability in caribou migration and habitat use. For instance, the GNWT agreed that the ability to predict, on an annual basis, the timing and numbers of caribou in the vicinity of the proposed mine was low. A representative of the NWT Barren Ground Caribou Outfitters Association said that over his 18 years of experience, the exact migration route of caribou varied from year to year. During the hearings, the specific question of whether the mine would pose a barrier to caribou migration was addressed. BHP told the Panel that the concept of a specific migration corridor for caribou is an oversimplification and that caribou do not follow the same routes each year. It noted that

Figure 3 DISTRIBUTION OF BATHURST CARIBOU HERD



(After: Environmental Impact Statement)

in spring, there are essentially no barriers to migration as lakes are frozen, but that in the fall, large lakes influence the migration pattern.

The potential effects of diversion of caribou around the mine site on their energy resources, and thus, ultimately, on the quality of the meat, was also raised. BHP told the Panel that only 20% of the energy used by caribou is for locomotion. BHP opined that, as exposure to the site infrastructure during the migration would be minimal, any diversion caused by the Project would not affect the overall energy budget and hence the health of the animals. BHP proposed to monitor the behaviour of caribou as they approach the mine site to determine how they react. Depending on the results of the monitoring, and on consultation with Aboriginal people, traditional methods may be helpful in diverting caribou away from the mine site.

Another concern relates to the effects of roads, either as a result of collisions with vehicles or as a barrier to migration. BHP observed that existing roads and the air strip had not posed barriers to migration; indeed, caribou used adjacent habitats during the exploration period. BHP also noted that the dimensions of the Misery haul road were such that it would not likely create a visual barrier to caribou. In the EIS, BHP cited studies on other caribou herds where roads, railways, or pipelines had not created barriers to migration. The GNVVT, however, in its submission pointed out specific situations in Norway and Russia where a combination of linear structures did affect migration. The Northern Environmental Coalition reported that in the Prudhoe Bay oil fields, traffic in the range of 10 to 15 vehicles/hr prevented caribou from crossing roads. Responses of caribou to traffic of less than 10 vehicles/hr were variable. Studies suggested that the average frequency of use on the Misery haul road is 3 vehicles/hr, significantly less than levels of traffic that have been shown to affect caribou movements. The Panel was informed that the Cominco Red Dog mine developed a caribou monitoring and traffic control plan for a situation analogous to the proposed Project. It was recommended that BHP develop a similar plan that would prescribe a series of management actions which would become progressively more restrictive as caribou activity in the vicinity of the road increased.

The Panel received a presentation from Echo Bay Mines Ltd. concerning the environmental effects of the Lupin mine, the closest mine to the proposed Project. It reported that, in the history of the Lupin operation, there had been very few accidents involving vehicles and caribou. Education of employees and speed restrictions during the time of caribou migration were cited as the key factors in reducing encounters. It was reported that at Lupin, caribou regularly used roads for travel because roads offered some relief from insects and made walking easier.

Concerning the increase of traffic on the Echo Bay winter road, BHP reported in the Additional Information Response that there were no published reports on the effects of the winter road on the Bathurst caribou herd. It noted that the Treaty 8 Yellowknives Dene, BHP, DIAND, Echo Bay Mines Ltd. and Kennecott have initiated a pilot environmental monitoring program on the winter road. The Yellowknives Dene Band designed the program and will administer it. The Panel endorses this effort and believes that it should provide useful information. The GNWT agreed that monitoring to identify when caribou are present along the winter road is necessary and cited the Red Dog mine program as an example.

In addressing the possibility of caribou being affected by drinking water from the tailings pond, BHP's predictive modelling indicated that the water quality in the tailings impoundment would be within the CCME guidelines for the protection of livestock. Further, BHP proposed that, during the five-year period when the tailings substrate may be unstable, techniques based on traditional knowledge could be used to divert caribou from the impoundment to prevent caribou from being trapped in unconsolidated tailings. In support, the GNWT suggested that both traditional and scientific techniques be investigated to direct caribou away from the site.

The effect that construction of the Project would have on loss of caribou habitat was also raised. BHP pointed out that the area affected by the Project represents less than 0.01% of the range of the herd. Further, this habitat is not extensively used as it is not a major wintering or summering habitat and calving does not take place in this area. While the GNWT agreed that the amount of habitat loss was small, it noted that the cumulative effects of incremental losses of habitat could eventually affect the population. It also stated that it would be difficult to attribute changes in herd size to any specific factor.

The Panel concludes that based on information provided by the Proponent, government and others, the likelihood that the Project would have significant impacts on the overall numbers, health or migration patterns of the Bathurst caribou herd is small. However, it recognizes that there is a high level of concern about any potential effects on caribou and that the population dynamics and effects of a wide range of factors on the herd are not well understood. It is therefore essential that BHP continue monitoring caribou to determine seasonal variability in their use of the study area, to document any effects of the Project on caribou and identify remedial measures, and to understand more generally the effects of mining development on caribou. Monitoring programs should include both scientific and traditional knowledge.

The Panel notes that BHP has committed itself to monitor caribou on an annual basis for the initial five-years of operation or until a significant level of monitoring data has been collected. In addition, the EIS outlined preliminary management plans for caribou, including protection of important habitats, diversion of caribou from the tailings pond, water quality monitoring and minimization of disturbance during the spring migration.

14. The Panel recommends that BHP be required to submit a detailed caribou monitoring and management plan for review and approval by DIAND and the GNWT prior to the commencement of mining.

The Panel expects that the results of caribou monitoring programs will be an important component of the annual report on monitoring previously recommended.

Responsibility for the management of the Bathurst caribou herd rests with the GNWT, and its Department of Renewable Resources has developed a draft management plan for the herd. A goal of this plan is "to ensure that exploration or development activities on or near the Bathurst range do not threaten the distribution, quality or productivity of the herd or its habitat."

The Łutselk'e First Nation recommended that a Bathurst caribou management committee be established comprising Aboriginal peoples and government. The objective of the committee would be to monitor the herd and set guidelines for its management. Management boards have been established for other caribou herds in the NWT, including the Beverly and Porcupine herds, and have proven useful when the herd's range spans more than one jurisdiction. During the hearings, the GNWT was asked whether a board was required for the Bathurst herd. The GNWT responded that it was not sure that a management board was necessary but that some mechanism should be established to ensure that all stakeholders are involved in the management of the herd.

The Panel observes that given the large area of habitat used by the Bathurst caribou herd, the overall health of the herd is determined at a regional scale. The Panel therefore believes that greater emphasis on the monitoring and management of the Bathurst caribou herd is required given the potential level of development in the region.

15. The Panel recommends that governments consider establishment of a Bathurst caribou management board. Such a board would provide a focal point for multi-party input to the monitoring and management of this herd.

The Panel believes that the need for a management board will become greater given the pending interjurisdictional nature of the herd's range. The Panel also notes that the WKSS could provide a valuable forum to co-ordinate collection of baseline information on caribou. At the end of the hearings, BHP agreed to support and participate in a regional study on the Bathurst caribou herd as part of the WKSS.

4.62 Grizzly Bear

The effects of the Project on grizzly bears received considerable attention at the wildlife technical session. BHP stated that grizzly bears are likely the species most sensitive to development. Grizzly bears are listed as vulnerable by COSEWIC based on their low densities and productivity.

BHP initiated both Project-specific and regional scale studies on grizzly bears in 1995. The objectives of the Project-specific studies, which focused on the 1,900 km^2 wildlife study area, were to describe bear movements, use of habitats, diet and den locations including their important characteristics.

A regional study, being conducted in association with the GNWT Department of Renewable Resources and the University of Saskatchewan, involves capturing and radio-collaring bears to monitor bear distribution and habitat over a broad

range. Of 21 bears collared in 1995, four used the wildlife study area for part of the summer. Preliminary results confirmed that movements of bears within the regional study area are extensive, with the home range of one female estimated at 1,000 km^2. A total of 34 bear dens were located in the wildlife study area, 15 of which were associated with eskers.

BHP concluded that any bear habitat that would be lost due to the mine's infrastructure is of low value. To eliminate the possibility of having to destroy bears because they would frequent the Project to find garbage for food, BHP advised that it would continue its current practice of incinerating all kitchen wastes. Disturbance to bears would be managed by identifying sensitive habitats and avoiding them during times when bears were present. Displacement of bears from the Project area is, according to BHP, more difficult to predict and the regional study would be used to assess any such impact.

The GNWT told the Panel that the size of the Project in relation to the size of a bear's home range suggests that habitat loss would not be significant. It noted that the indirect habitat loss caused by displacement of animals is of greater importance. The GNWT recommended that an overall approach to cumulative effects of development on grizzly bears in the region is required. Finally, the GNWT stressed the need for a management program to avoid human/bear interactions and noted that BHP had been co-operating with the Department of Renewable Resources in this regard.

The effects of mining generally as a source of mortality to grizzly bears was discussed at the hearings. BHP pointed out that since exploration started in 1991 no grizzly bears had been killed due to its activities. The Chamber of Mines provided data indicating that since the diamond rush started late in 1991, of 58 bear kills in the Coppermine/Slave area only six were ascribed to industry.

The Northern Environmental Coalition's presentation to the Panel on grizzly bears recommended that: the Department of Renewable Resources establish a sustainable mortality quota for grizzly bears; BHP and the Department of Renewable Resources should work together to develop a cumulative effects model for grizzly bears; BHP should make it clear how its research results would be translated into management actions; and eskers and similar features, and wildlife access to them, should be protected because they provide critical habitat. At the end of this presentation, BHP stated that it endorsed all these recommendations. It noted that a regional study on grizzly bears, which will provide data on cumulative effects, had already been initiated.

The Panel concludes that the effects of the Project on grizzly bears are not likely to be significant, provided that BHP undertakes an effective management program. The Panel also notes that the loss of habitat is small and that some displacement may occur but, given the large home range of this species and availability of other habitats, detrimental effects are unlikely. With regards to management, the Panel understands that BHP is already working co-operatively with the Department of Renewable Resources on a program to avoid human/bear interactions and supports the continuation of this activity.

The Panel notes, however, that grizzly bears are already considered a vulnerable species, that they are sensitive to disturbance and that there remain gaps in knowledge related to the overall effects of development on this species. The Panel commends BHP for its initiative in supporting a regional research program. The Panel believes that such a study will yield important results, not only for the management of this Project, but for the overall management of development in the region. The Panel proposes that the WKSS accept this study as a major component of its program.

4.6.3 Other Species

Studies of furbearers, wolves, foxes and wolverines were conducted by BHP in 1994 and 1995. Seventeen wolf dens were found in the wildlife study area in 1995, four of which were used by three families. Seventeen fox dens were found, the majority of which were occupied. Five wolverine dens were located. Foxes and wolves den primarily in eskers whereas wolverines den in snow, which makes wolverine denning more difficult to monitor. Wolverine are listed as vulnerable by COSEWIC because of their low densities and productivity. BHP's management plans for all these species included monitoring the use of denning areas, where possible using traditional knowledge, and reclaiming wildlife habitats.

Small mammals, such as voles and lemmings, are important food sources for carnivores and were also studied in 1995. Surveys of birds were undertaken

in 1995 to identify spring migration corridors and staging habitats, nesting habitats used by raptors, habitats used by birds nesting in the study area, and areas used by birds migrating in the fall. Sixty species of birds were identified, 37 breed and seven are suspected of breeding in the area. Over 10,000 geese were counted during spring migration, and white-fronted geese nested throughout the study area. Nineteen occupied raptor territories were recorded, although none of these would be affected by the Project.

Potential impacts to birds identified by BHP were loss of staging or nesting habitats, disruption of migration routes, and disturbance by human activity both on the ground and by aircraft. BHP concluded that it is inevitable that some bird habitat would be lost and some birds displaced but that ecological maps would be used to identify the location of important staging and nesting areas so that these could be avoided. It agreed that the impact assessment for birds had not yet been completed since bird survey information had not been integrated with the recently completed ecological mapping. BHP has stated its commitment to completing this work.

Discussion concerning birds at the hearings focused on two factors: the adequacy of one-year of data and the overall effect of habitat loss or displacement on bird populations. The Canadian Wildlife Service recommended that baseline bird studies should be continued in 1996 using the same methodology used in 1995. Further, it recommended that BHP develop a long term monitoring program for birds. In response, BHP indicated that it would be prepared to add birds to its monitoring program. The GNWT commented that a single year of data collection cannot portray the annual use of the area by migratory birds. It concluded that additional data collected over several years would be required before the full significance of Project impacts on migratory birds could be evaluated. The GNWT submission went on to suggest that loss of habitat would translate directly into loss of birds. This suggestion was challenged by the Proponent's biologist who postulated that many of these birds would be displaced to other areas. BHP commented that, for migratory birds, the limiting factor may be habitat availability in their winter range so that losses of summer habitat may have no effect on the population.

The Panel concludes that the effects of the Project on furbearers, small mammals and birds are unlikely to be significant but notes, however, that there are some unresolved questions in relation to the effects of the Project on birds.

16. The Panel recommends that BHP should continue bird surveys until sufficient information has been gathered to refine the impact prediction. Requirements for baseline information collection and for monitoring should be defined in consultation with government agencies.

4.7 WILDERNESS AND PROTECTED AREAS

The Panel was moved by the powerful and eloquent statements made during the hearings as to the values placed on wilderness. Wilderness was cherished as a heritage for which both Aboriginal and non-Aboriginal people felt respect and responsibility for stewardship. The value of wilderness, in and of itself, as a spiritual as well as a natural resource, was held by many people: Aboriginal peoples who have lived and relied on the land for centuries and who understand the land through traditional knowledge; naturalists and geologists who study the land by scientific methods; those who make their living from the land through tourism, outfitting, harvesting natural resources and prospecting for mineral wealth; those who spend time in the wilderness for recreation; as well as those who rarely venture out.

While there was a general consensus on the great value Canadians place on wilderness, there was no agreement on the appropriate means to protect it. Some recommended a prohibition of development in the region. Others suggested that the Project be approved either following or in parallel with the establishment of wilderness preserves. Still others 'felt that development could proceed without threatening the wilderness.

The EIS identified wilderness as a VEC and concluded that during exploration, construction, operation and decommissioning of the Project, there was a high probability of "loss of wilderness experience", but the significance of the loss was judged to be minor. According to BHP, the long-term residual effects would be negligible if reclamation were successful.

The Panel received several recommendations concerning the establishment of protected areas in the region. The World Wildlife Fund recommended that protected area planning should commence immediately and that, until this is complete, approval

of the Project should not be granted. The Canadian Nature Federation asked the Panel to urge government to accelerate efforts in establishing protected areas. It also urged the Panel to review the Leadership Accord of the Whitehorse Mining Initiative which adopted the following principle: "Protected area networks are essential contributors to environmental health, biological diversity, and ecological processes, as well as being a fundamental part of the sustainable balance of society, economy and environment." The final position of the Northern Environmental Coalition, which included the World Wildlife Fund and the Canadian Nature Federation, was that a protected area strategy for the West Kitikmeot/Slave Region be developed to ensure that areas of high ecological and cultural value were protected prior to future mineral development in the region.

The Panel notes that there are a number of government initiatives related to protected areas. For example, in 1992, the CCME established a goal to complete a national protected areas system across Canada. The GNWT stated that it has established an interdepartmental process for the conservation of wildlife and wildlife habitat in territorial parks. The Department of Canadian Heritage indicated that the only national park proposed in this region was East Arm National Park. Lands for this national park were set aside under the Territorial *Lands Act* almost 25 years ago, but that, until the people of Cutselk'e and Fort Reliance agree to participate in the establishment of the park, it will not proceed. The Panel understands that establishment of parks can be a component of some land claim settlements.

In response to a question concerning whether any conservation areas currently contain habitat similar to that of the claims block, DIAND said that the claims block is fairly typical of mid-arctic and low-arctic habitat. It told the Panel that Bluenose Park, Wager Bay National Park proposal and Thelon Game Sanctuary probably all contain representative habitat. DIAND suggested that the WKSS could be one mechanism for identification of representative areas.

With regards to the proposed Project, the Panel concludes that approval would not compromise the development of protected areas in the region. The Project has already been developed to the bulk sampling stage and is located close to an existing winter road. The Project would not increase the access to the area because an all-weather road is not part of the proposal. Neither is the Project located in any area that has been designated for protected area status and no rare or unique features have been identified in the Project area.

The Panel agrees with the many presenters who identified the need to develop a protected area strategy for the region. It also notes that there are various processes and legislative frameworks for identifying and protecting unique and representative ecosystems. Moreover, the Panel recognizes that the process for identifying such areas is neither simple nor swift because of the need for broad consultation with stakeholders, including the mining industry and Aboriginal peoples. The Panel proposes that the WKSS undertake, as a priority, the development of baseline information for the region that will be required to identify areas for protection.

5. SOCIO-ECONOMIC ISSUES

5.1 INTRODUCTION

5.1.1 Introduction to the Socio-Economic Assessment

The Terms of Reference for this review call for an assessment of the Project's short and long-term socio-economic effects in the NWT. For the baseline of this assessment, the Proponent drew upon available statistical data, recent literature, survey work undertaken in Kugluktuk, on interviews, and on research undertaken as part of the Phase I Traditional Knowledge Study. These sources were used to describe the regional and local economies, socio-economic conditions, the role of the land-based economy, and the nature of the "mixed" economy of the north. The assessment of impacts used different approaches, based on availability of information and impact models. A multiplier-type economic impact analysis was used to assess the impacts of the Project's employment and purchasing activities on the wage-based economy. Results, specific to the local economies, were calculated by a matching technique applied to supply and demand in the labour force and the service sector. The Panel notes that this latter technique was only feasible in a small, sectorally simple economy such as the NWT. Interviews undertaken during scoping and models suggested in recent literature were used to describe impacts on social conditions and on the land-based economy in qualitative and conditional terms.

5.1.2 Socio-Economic Context for the Assessment

As a baseline for the assessment, the Guidelines required the Proponent to describe the socio-economic context into which the Project would be introduced. Certain features of the socio-economic context stood out. Foremost of these was the significance of the land-based economy in the livelihood, culture and society of the Aboriginal peoples of the region. The role of the land-based economy was more difficult to quantify than that of the wage-based economy because of limits to data and methodology, but it is clear that both the land-based and wage-based economies play substantial roles in all communities in the region.

Demographically, the population of the region is modest, based in towns and communities small by southern Canadian standards. The population is youthful, has high expectations, and is growing quickly; it is outstripping rates of growth in the wage economy and in employment opportunities.

The wage economy of the region is heavily dependent on government and mining. Efforts to promote development of the renewable resource sector have not been very successful in creating employment. The wage-based economy is under pressure because of cuts in government spending and reduced government investment; closure of mines as reserves are exhausted over the next decade; and uncertainty due to the division of the NWT in 1999. The settlement of land claims may inject some offsetting investment in the economy, but the timing and amounts are as yet unknown.

Political and administrative institutions are changing because of prospects for devolution of responsibilities, territorial division, continuing negotiations toward settlement of land claims, and the creation of new planning and management structures occasioned by the settlement of comprehensive land claims. Given the pressures of the growing population and cuts to federal financing, there are doubts as to the ability of government to meet all northerners' needs and expectations. Yet, despite these economic pressures and political uncertainties, there is an underlying confidence in the economic potential of the region.

The communities of the region suffer from severe social problems, primarily as a result of substance abuse and poverty. These social problems and related health effects are a matter of urgent concern, both for communities and responsible agencies, but to date no simple remedies have been found. These conditions and population growth put considerable pressure on government spending in areas of education, health, housing and social assistance.

The Panel observes that these features broadly describe a socio-economic context which, whether the Project proceeds or not, will undergo substantial economic, political and social change over the coming years.

5.1.3 General Observations on Socio-Economic Impact Assessment

BHP suggests that the Project's impact on the socio-economic environment would be largely through its role as an' employer of local people, and as a purchaser of goods and services in the north. During scoping sessions and the public hearings,

northerners made it clear that if the Project proceeds, there would have to be substantial and durable opportunities and benefits to the north.

The Panel notes that the impact of industrial development in this region with a small population is directly related both to scale and pace. In the small economy of the NWT, the Project would be considered large, likely the largest employer aside from government. If the mine is operational for the projected 25 years, it would be a major influence in the economy for a generation. As to the potential for social or cultural disruption, the pace or abruptness of change, whether at start-up or closure, may be more significant than the actual scale of the Project.

The Panel concurs with the statement in the EIS that certain features of the profile of Project activity over time differentiate it from other resource projects with which the north has experience. The profile of activity for open-pit diamond mining would have a less pronounced peak of initial construction activity and a more substantial and protracted period of operation activity. This profile results from the more labour-intensive operation of open-pit mining and the lesser requirements for capital construction for a diamond mine than for other resource projects. While recognizing that mine life is not entirely predictable, the Panel observes that the lifespan of the Project is expected to extend beyond that of mines currently operating in the region, and therefore would provide a longer period over which adjustments to socio-economic change can occur.

5.2 OVERALL ECONOMIC IMPACT

One requirement of the Panel's Guidelines was for an economic impact analysis of the Project, as a measure in quantitative terms of its significance to the northern economy.

The EIS concluded that the direct employment generated by the NWT Diamonds Project, during the construction phase, would be 1,220 jobs to Canadians, of which 400 would be taken by residents of the NWT, and, during the operations phase, on average 830 jobs to Canadians of which 560 would be taken by residents of the NWT. The person-year equivalents would be 22,000 person-years of direct employment for Canada, of which 14,400 person-years would accrue to the NWT.

The total beneficial effects of the Project (direct, indirect and induced) on gross domestic product (GDP) was assessed through a multiplier analysis to be in the range of $6.23 billion to Canada as a whole, and $2.48 billion to the north.

Over the life of the Project, BHP calculated a net revenue gain to federal and territorial governments of $2.4 billion in incremental revenue, offset by an additional cost of $275 million, or 5 cents for every dollar of economic benefit. The EIS broke down these costs and benefits to both levels of government. However, since the EIS was written, changes in financial arrangements between the two levels of government have occurred which have shifted the distribution of fiscal benefits between the territorial and federal governments. The Panel was advised by the GNWT that the effect of further cuts in government spending and employment would not affect the size of the Project's impacts, but may increase their perceived significance. The Panel notes that the Proponent is neither asking for nor receiving subsidies or other government contributions to the Project.

The Panel received comments, for example from the GNWT, DIAND and NWT Construction Association, generally concurring with the methodology and accuracy of the results of the economic analysis, but also heard criticism from the Northern Environmental Coalition on broad limitations to this form of analysis. Individuals, including some local Members of the Legislative Assembly, and organizations, such as the Committee in Support of BHP, the Yellowknife and NWT chambers of commerce, the City of Yellowknife and the Town of Hay River, welcomed the economic potential and opportunity offered by the Project. Some individuals and Aboriginal organizations expressed scepticism over whether they would in fact share in these benefits while others questioned whether such benefits would come at the expense of the environment. Representatives from the Town of Hay River and the GNWT noted that the Project would offer a greater range of employment opportunities, without limiting other options. All who spoke added the condition that whatever the potential benefits, the Project would have to be undertaken in an environmentally responsible manner.

The Panel accepts the conclusions on overall economic impacts as described in the EIS, while observing that there is inevitably a substantial margin of error in such forecasts. The results of the analysis provide a sense of the overall magnitude of the potential benefits, but should not be considered absolute.

The Panel concludes that the potential economic benefits from the Project are large. The Panel also notes that the Project can contribute more subjective benefits, by offering to young northerners the opportunity to choose participation in the wage economy, and by increasing a sense of economic self-reliance for the north.

Finally, the Panel acknowledges the anxiety expressed by many in the hearings over both this Project and the possibility of widespread mineral development in the region. It was expressed by people with a wide range of positions and interests: from those who feared they could not cope with one more source of change to those who feared for the wage-based economy on which their way of life depends. Such anxiety is understandable given the multiple sources of change and uncertainty in the northern economy. The Panel concludes that the Project must be designed to maximize benefits and opportunities for northerners and to minimize disruption.

5.3 PARTICIPATION OF NORTHERNERS

BHP committed to maximizing participation of northerners and Aboriginal people in Project employment and in related business opportunities. The EIS set out the policies and programs to promote such participation: equal opportunity employment with preference to northern and Aboriginal candidates, recruitment strategies to overcome entry barriers, education and training programs, cross-cultural orientation, preference to northern business, the Job Development Strategy, commuting arrangements, and the northern allowance.

At the hearings, three other experiences were described to the Panel as examples of long-term success of Aboriginal peoples' involvement in mining. BHP presented its experience with the Navajo and Ute Mountain people at its three coal-mining operations in New Mexico. The Panel was told that in its New Mexico operations, from 50% of employees at the newest mine to over 90% at the oldest are Native Americans; overall, 75% of employees at the three mines are Native Americans. According to representatives brought in by the NWT Chamber of Mines, in Alaska 60% of employees at the Red Dog mine are Native Americans; at the Cluff Lake mine in Saskatchewan, 58% are from northern Saskatchewan.

In response to questions, each of the presenters recognized that such high levels of Aboriginal employment did not materialize immediately on start-up of a project; participation increased steadily over the life of the mine. One of the presenters cautioned that, initially, as many positions as possible were filled with Aboriginal people; however, many were not trained or properly prepared for the work they were to perform. This resulted in a high failure rate. When appropriate training was instituted, the participation rate of Aboriginal people increased steadily.

The Panel notes that although the individual circumstances of these projects differed, common themes emerged: Aboriginal employment has increased over time to reach levels greater than 50%; Aboriginal economic and development institutions are in place; Aboriginal people play a significant role in the management and/or monitoring of the mine; senior management is committed to northern and/or Aboriginal hiring; the mining companies have comprehensive communications programs; and lead-in time has allowed agencies and communities to put management and monitoring systems in place. It is also significant that ownership of the land was not in question: one of the three mines in New Mexico is on Navajo tribal lands; the Red Dog mine in Alaska is on land selected as Inupiat lands following the Alaska land claim; and the Cluff Lake mine in northern Saskatchewan is on provincial Crown lands. Even though Aboriginal people do not own the land underlying the mine in every case, they have certainty of tenure to their own land.

The Panel concludes that the achievement of substantial northern benefits is not entirely up to a proponent. Success will also be determined by the attitudes and commitment of northerners and Aboriginal peoples in their capacity as individuals, as participants in government, and as participants in business, as well as the willingness of the Proponent, individuals, businesses and government to work together to take full advantage of opportunities and to resolve problems. To this end, the Panel endorses the partnership approach promoted by the Proponent.

5.3.1 Impact and Benefits Agreements

Impact and Benefits Agreements (IBAs) are another means of achieving Aboriginal participation in the Project. IBAs are private contracts between a proponent and an Aboriginal group or community

that set out terms to ensure that the Aboriginal people derive direct and indirect social and economic benefits during the life of a project.

IBAs lay the foundation for a good working relationship between a proponent and Aboriginal people. They can also be seen as a symbol of that relationship and of the ongoing role of Aboriginal people with respect to a project. Although there are no formal requirements for proponents to negotiate IBAs under the current mining regulations, regulation of the petroleum industry has had a history of requiring benefits plans which could include affirmative action programs. Over the last decade, consultation between developers and affected Aboriginal parties has been encouraged as part of doing business in the north. Settled comprehensive land claims across the north formally acknowledge IBAs and require a proponent to negotiate an IBA before a project can proceed. It is anticipated that other land claims in the area will carry similar provisions.

In the absence of settled land claims, BHP has voluntarily undertaken to pursue negotiation of IBAs with each of the Aboriginal groups claiming traditional use of the area in which the Project is located: the Dogrib, the Yellowknives Dene, the tutselk'e Dene, and the Métis. The Proponent has also proposed to negotiate an IBA with the Kitikmeot Inuit, who have a settled land claim.

In the community sessions, the Panel heard about the importance placed on IBAs to secure benefits for Aboriginal people. People felt a written agreement was necessary to ensure that the Proponent followed through on its oral commitments. IBAs are negotiated privately and confidentially; however, the EIS provided a list of issues that might be covered, including benefits, monitoring, and mechanisms for involvement, as well as any other issues agreed between the parties. In view of IBA confidentiality, the Panel considered it inappropriate to comment on the contents of the discussions, but because of the importance placed on them, requested that the parties involved provide a report on the progress of IBA negotiations before the end of the public hearings.

BHP and the Dogrib Treaty 11 Council advised that, with the exception of funding, they had agreed on the issues to be addressed in an IBA. The Dogrib Treaty 11 Council stated that talks were ongoing with BHP and the territorial and federal governments to obtain funding to allow them to hire experts in IBA negotiations. The Dogrib hoped that an IBA would be in place by the time the Panel's report was submitted to the federal government; BHP was hopeful that an agreement could be concluded within three months of the resolution of the funding issue. BHP intends to use the agreement with the Dogrib as a prototype for negotiating IBAs with the Yellowknives Dene, the Kitikmeot Inuit Association, the tutselk'e Dene, and the Métis.

Although IBAs can provide some confidence to Aboriginal groups, many Aboriginal and non-Aboriginal people in the north would not be covered by such agreements. At the hearings, the Proponent outlined elements of its approach which would ensure that benefits were widely available, whether IBAs applied or not. For example, BHP's approach included preferential hiring of northern and Aboriginal people, as well as education and training. The Proponent also said that, during the exploration phase, it had provided benefits that would normally be part of an IBA, such as scholarship programs, work experience, community mobilitation, and employment and business ventures with Aboriginal companies.

The Panel supports BHP's efforts to negotiate IBAs with Aboriginal groups, and encourages government to provide the parties with the support necessary to participate in and conclude these IBAs. The Panel believes that the negotiation of IBAs is an important process both in securing benefits and in involving Aboriginal people in setting their own goals, identifying their needs to achieve those goals and, over time, measuring their accomplishments with respect to the Project. The importance of this process is more acute in a region in which people do not have the level of influence, participation and sense of confidence that settled land claims can provide. Aboriginal people feel strongly that conclusion of an IBA is necessary to ensure that they receive a fair share of benefits. The Panel recognizes this and believes that the process of negotiating IBAs can help to build for Aboriginal people a greater sense of partnership in the Project and that successful conclusion of IBAs is important to establish mutual interests in the long-term success of the Project.

17. The Panel recommends that all parties set the timely negotiation, conclusion and implementation of Impact and Benefits Agreements as a priority. The Panel also encourages BHP and Aboriginal people to

conclude the agreements before the operational phase of the Project begins.

5.3.2 Employment

Based on analysis of Project requirements, the EIS estimated that during the two-year construction phase, 1,220 workers would be employed on the Project (1,200 person years). Of these, one third were predicted to be northerners.

Direct employment during the 25 years of operations is estimated in the EIS to average 830 workers annually (20,800 person years). Two-thirds of these employees would likely be northerners. This would make BHP the largest industrial employer in the NWT, and represents 50% of current mining industry employment. The NWT wage bill would amount to $32 million during construction and would average $39 million per year during operations. It is estimated in the EIS that Aboriginal people could potentially comprise 35% of direct employees during construction and about 40% through the operations phase.

As well, BHP estimated in simple terms that for every ten people hired by BHP, six more would be hired by contractors and service companies, and two more by other businesses in the north. BHP also mentioned the Job Development Strategy, initiated by BHP and now run by northern businesses, which has an objective of retaining as much business activity as possible in the north. By retaining business activity in the north, the multiplier effect of the Project would increase and opportunities for those who do not wish to work in a mine would be created.

The EIS analysis suggested that the Project could reduce unemployment generally in the NWT by 1.4% in the construction phase, and by 3.0% during operations. The impact for small communities would be greater as a proportion: unemployment in First Nations communities could be reduced from 40% presently to approximately 35% in the construction phase and to 30% in the operations phase.

In commenting in the hearings on the confidence limits for these projections, the Proponent expressed the view that the projections are "realistically conservative." BHP says it is confident that these projections are accurate, achievable, and hopes they can be exceeded.

The most important organizational feature of the Project related to employment would be the reliance on a rotational workforce, commuting on a two-weeks-in two-weeks-out (2in/2out) schedule from Yellowknife and other NWT communities to the worksite. BHP has designated Yellowknife as the Project point of hire, but would also conduct recruitment in other NWT communities. In response to concerns received prior to the hearings, the Proponent made the commitment to pick up employees from Snare Lake, Rae Lakes, Wha Ti, Kugluktuk, and Łutselk'e and to fly them directly to and from the mine. Residents of Dettah, Ndilo and Rae-Edzo however, would have to make their way to Yellowknife as there are no permanent landing facilities in these communities. Yellowknife would be the primary hiring office and pick-up point for all other employees.

A frequent concern raised both at scoping and during the hearings was that northerners, and particularly Aboriginal people, would obtain at best unskilled labour jobs with no possibility of advancement. This view was based on the recognition of the low levels of academic attainment and of literacy of people in the region. In response, the Proponent stated that all jobs at the Project would be open to everyone, provided the applicants were willing and reliable. BHP emphasized that lack of formal education or of mining experience would not be a barrier to employment and described unskilled jobs as "entry level", so that employees would have the opportunity to advance within the company.

During the hearings, representatives of women's organizations criticized the lack of gender-specific employment analysis and noted obstacles to full participation by women. In the EIS, BHP stated that women accounted for 12% of the total workforce during the exploration stage and, of these, 50% were Aboriginal women. BHP said it was committed to promoting traditional and non-traditional work opportunities for women in mining. The Proponent offered to work with women's groups to eliminate barriers to employment of women at the site.

BHP cited its employment record to date during the exploration phase of this Project where the workforce was made up of 60% northerners and 25% Aboriginal people. It also pointed to its record at other operations such as the Escondida mine in Chile where 95% of employees are Chilean, and New Mexico coal mining operations where employment of Native Americans averages 75 %. If

the Proponent is successful in working with northerners and Aboriginal people to achieve the results outlined in the EIS, the Panel notes the Project will achieve the highest rate of participation for a mine in the NWT.

The Panel observes that the Proponent committed to undertake many of the measures considered effective in removing barriers to northern and Aboriginal employment. These include the strong commitment of senior management, appointment of a community-liaison co-ordinator, community-based recruitment, waiver of strict education requirements, and special recruitment techniques, including behaviour-description interviews and pre-employment testing. The Proponent also set out orientation, education, training, and school programs intended to improve the long-term potential for northern hire. The Panel notes that the actual numbers of jobs attained by northerners will depend both on the Proponent's commitment and determination to overcome the problems that will inevitably arise, and on the willingness of northerners and Aboriginal people to make the commitment to work, to accept the necessary absences from home and community, and to undertake the education and training that is needed. As the GNWT told the Panel in the socio-economic session, those affected will reap the benefits if they choose.

The Panel cautions that there is a danger in letting expectations of employment opportunities exceed reality. Although the potential number of jobs for northerners is large in the context of the NWT economy, there would still be many people left looking for work. As well, jobs would not materialize immediately upon approval of the Project. Job requirements for construction would be very different from those for operations, with construction offering fewer opportunities for northerners. Those looking for jobs should note that there would be a delay between the start of construction on the Project and the availability of long-term operational jobs. This delay, however, presents an opportunity to undertake education, training or skills upgrading.

The Panel observes that many of the jobs offered by the Project are low-end, unskilled labour jobs but that this is the reality of open-pit mining. It is up to both the Proponent, through career development and on-the-job training, and to the employee, through initiative and commitment, to ensure that as many of these jobs as possible are entry-level with real opportunities for advancement.

The Panel observes that direct employment for the Project, with few exceptions, requires acceptance of the 2in/2out rotational schedule. This may be a deterrent for many who, for family and community reasons, are unable to make this commitment. The Panel notes that some of the employment generated by indirect and induced activity would be community-based.

The Panel commends BHP for its commitment to northern and Aboriginal employment and the procedures it has outlined to remove barriers to such participation. The Panel encourages BHP to work to meet and to exceed the participation levels forecast in the EIS, and believes that northern and Aboriginal employment must remain a corporate priority throughout the life of the mine. In light of the Proponent's public commitment to this objective, the Panel believes that the northern public should have an opportunity to judge the Project results.

18. The Panel recommends that the Government of Canada require BHP to report on progress on northern and Aboriginal employment as part of the annual monitoring report previously recommended.

The Panel envisages that the report would include important results of socio-economic monitoring as described in the EIS. The Panel believes that it would be useful for the report to explain reasons for success or failure in achieving employment levels projected in the EIS and to describe any changes to management plans and mitigation.

The Panel notes the concerns expressed with respect to the loss of northern benefits when another northern mine moved its point of hire south from Yellowknife. The Panel believes that designation of a northern point of hire and maintenance of an office in the north are necessary to meet BHP's commitment to having a strong northern presence.

5.3.3 Opportunities for Northern Business

The analysis of business opportunities provided in the EIS concluded that there is potential for northern businesses to participate in the construction phase: in surveying; provision of mechanical, electrical, water and power services; road work; and architectural design. During the operations phase,

there would be opportunities in supply, service and transport. BHP expected that the northern content of Project purchases would be higher than for existing mines in the north because of proposed mitigation measures, and because diamond mining involves no costly imported reagents or offshore smelting charges. BHP drew attention to its spending record on the exploration phase: to the end of 1994, northern firms met 35% of BHP's requirements, mainly for fuel, air and land freight services. The EIS predicted a northern content of 29% during the construction period and 69% during operations.

To promote northern business participation, the Proponent outlined a northern preference policy, which would give northern companies the first opportunity if their prices were competitive and if quality requirements were met. It is also expected that terms under the IBAs would address opportunities and preferences for Aboriginal businesses. In response to questions on Aboriginal business opportunities, BHP said that of $165 million spent to date on the Project, $20 million had been paid to Aboriginal businesses or joint ventures.

One initiative designed to magnify northern opportunities is the Job Development Strategy, initiated by BHP, and now under the stewardship of northern businesses. A presentation at the hearings described a three-phase pilot project, aimed at identifying and cultivating employment and business opportunities for northern workers and entrepreneurs that reflects the goals and desires of northern residents and of the business community. The Panel was told that there are now more than 50 business partners in the initiative. The strategy also has the potential of creating opportunities for those who prefer not to work at the mine site.

During the hearings, several northern businesses described positive relationships they had had to date in dealings with the Proponent. The NWT Construction Association also reported that a random telephone survey of companies doing business with BH P elicited "overwhelmingly positive" responses about the company.

There were also suggestions at the hearings for ways to improve business opportunities. In the community sessions, the Panel heard concerns that some contracts were too large to permit Aboriginal businesses to compete. This concern echoed the one put forward by the NWT Construction Association during the EIS review. In the course of the hearings, BHP said that it had re-examined this issue and undertook to apportion the work into smaller contracts that would allow more northern businesses an opportunity to bid.

Concerns were also raised over the extent to which BHP's policies and programs are imposed upon or required of contractors. In the case of preferential hire for northerners and Aboriginal people, several speakers advocated that the Proponent's policy be applied to all contractors and subcontractors. Others criticized wages and working conditions reported by local people employed by contractors during the exploration phase of the Project, and called for extension of benefits programs to all employees. The NWT Construction Association on the other hand cautioned that requiring contractors to provide the same benefits as BHP would add a cost burden that could place northern businesses at a competitive disadvantage.

At hearings, the Proponent clarified its approach. It pointed out that there were legal limits to the extent that preferential hire could be applied to contractors and subcontractors. However, BHP said content and dealings with Aboriginal and northern people would be considered in selecting contractors, and would be set out in their commercial arrangements with contractors. As well, BHP committed to hire part-time employment co-ordinators in the communities to assist construction contractors to maximize northern and Aboriginal employment. The Proponent stated that all Project and site policies for safety, environmental matters, site security, and alcohol and drugs would apply to all contractors, but most other terms of employment would be offered only to direct employees of the company. The northern allowance, for example, would not apply to construction contractors, but would likely be applied to long-term contractors. BHP also stated that it would encourage contractors to make use of the community-based Job Development Strategy for training, recruitment and educational support.

The Panel concludes that the business opportunities offered by the Project are generally welcome in the north and commends the Proponent's northern and Aboriginal preference policies.

19. The Panel recommends that BHP include as criteria for the selection of contractors the fairness and adequacy of wages paid to the contractor's employees, as well as the contractor's policy and record on northern and Aboriginal hiring.

The Panel considers the Job Development Strategy to be a constructive and positive endeavour to maximize northern benefits and opportunities from the Project and commends the efforts and commitment of so many to this partnership.

The Panel recognizes BHP's stated intention to divide or "unbundle" large contracts, so that northern and Aboriginal businesses have more opportunities to participate in the Project. The Panel considers this a good approach to doing business in the north.

20. The Panel recommends that government ensure that financial programs continue to be available to northern and Aboriginal businesses so that they are able to take full advantage of the opportunities presented by the NWT Diamonds Project.

5.3.4 Education and Training

In the EIS and at the hearings, the Proponent stated its commitment to training employees, to participating in programs to bring people to a sufficient skill level to enable them to find employment in the mining sector, and to encouraging young people to further their education.

The Panel was advised that the Proponent consulted with government and institutions on the co-ordination of education and training. BHP participated with other mines and Aurora College in the development of a Pre-Employment Mine Training Program to be offered at the community level with a practicum at the mine site. The Proponent's on-the-job training would include a mine-specific Competency Based Training Program, on-the-job learning using the buddy system, orientation including cross-cultural orientation, opportunities for certification and apprenticeship, and continuing career development programs. The Proponent has also implemented youth and schools programs to persuade young people to stay in school, to provide work experience, and to interest them in mining as a career. These subjects are expected to be part of IBAs, but the Panel observes that these programs have already begun in some communities. The Proponent would initially waive strict educational requirements to make job opportunities available to more Aboriginal people.

BHP also advised that its apprenticeship program was designed for the operations phase. Because of the nature of the construction phase, the training opportunities that could be provided by BHP would be more limited than those in the operations phase. BHP said that it is prepared to consider assuming apprenticeships from contractors, in order to provide more continuity for this form of training.

The observation has been made that the lack of formal education is the single greatest impediment to increasing Aboriginal and northern employment in the mining industry. The Panel concurs and observes that the lack of education, of skills, and, in many cases, of basic literacy could seriously limit employment benefits from this Project and from future developments. The need for education was recognized in the communities by elders, youths and women, as well as by industry and government.

The Panel notes that the need for education works at three levels: the need for education, basic and advanced, to prepare people for mine employment; the need for on-the-job training to equip workers to function effectively; and the need for upgrading both for career development and to stay current with rapidly advancing technologies in mining.

The Panel observes that jobs will not be available immediately upon approval of the Project, and that different skills are needed for short-term construction jobs as compared to jobs in the operations phase. The delay between Project approval and the start of the operations phase will allow those wishing to pursue these opportunities more time to further their education and to take training. The 25-year mine life could also provide young people now in school with an incentive to continue their education as there would be more opportunities to find long-term employment in the north.

The Panel concludes that, because of expected rapid growth in the available labour force and the relatively low levels of education, the opportunity to develop young people's skills and experience is a very important positive feature of the Project. To this end, the Panel commends the Proponent's public commitment to hire from the north, its commitment to on-the-job training and the partnership approach it has taken with government in development of training for job readiness.

The Panel believes that the responsibility for general education, to bring northern individuals to an educational level that enables them to take advantage of these opportunities, must remain with government. The Panel urges government to work

with the mining industry to ensure that the best possible quality and range of mining education is available to the people of the north.

The Panel notes the suggestions of various speakers regarding the potential value of training partnerships in non-mining fields such as occupational safety and health, nursing, diamond-sorting, and outfitter guides. The Panel also encourages government's participation in the Job Development Strategy as this could lead to enhanced co-ordination of training and education efforts with the employment opportunities resulting from this multi-party effort.

Because of the possibility that education and skills deficits may pose barriers to the participation of northerners, the Panel encourages the Proponent to pay particular attention to this. Should the Proponent conclude that basic education (such as literacy) is a barrier, it should pursue this with government and education institutions to develop approaches to improve the situation. The Panel suggests that factors related to education could be a useful discussion in the annual report on environmental and socio-economic effects.

Finally, the Panel observes that not just education, but also low levels of interest in mining may prove an obstacle to northern participation in the Project. The Panel suggests that this be a matter for consideration, both by government and by the mining industry, through its representative organizations.

5.4 SOCIAL AND CULTURAL DISRUPTION RELATED TO DEVELOPMENT

5.4.1 Concerns Raised during the Review

Over the course of the review, many participants, including elders, women, youths and social service providers, repeatedly impressed upon the Panel their acute concern over the potential for development to exacerbate social and cultural problems in the communities of the region.

Baseline work provided in the EIS and confirmed by participants at the hearings indicated that social problems in the communities are "moderate to severe" and are closely related to substance abuse. Communities are very worried about these issues, and are in different stages of mobilizing themselves to deal with them. Participants expressed anxiety that new sources of employment income may increase alcohol and drug consumption, and therefore family violence and social disruption, causing pain for the communities and straining the limits of social and health services. Furthermore, the fear was expressed that the difficulties of coping with fortnightly absences of family members would increase stress in families already dealing with cultural disruption.

These concerns were most strongly voiced by the people of Ndilo and Dettah, who live in close proximity to Yellowknife, and who fear that urban Aboriginal people will suffer more than people in smaller centres because they must deal not only with pressures on culture and on the traditional ways of life but also with the effects of in-migration to Yellowknife, the main point of hire. Speakers identified the potential for worsening of existing problems such as chronic poverty, housing shortages, prostitution, and strain on community resources to deal with these issues. Closely allied to this view was the contention that, in light of the disappointment of Aboriginal residents in their dealings with mines in the Yellowknife area, the Project would offer few if any benefits from employment to offset the negative effects. For these people, this grievance is a social reality and stems from a legacy of relations between the local Aboriginal communities and Yellowknife mines over the past half century.

It was also suggested that continuing uncertainty about job prospects and rising unemployment caused by recent layoffs also contributes to stress and has caused the case-load for social services in Yellowknife to increase.

Another concern raised in scoping sessions and during the hearings was how closure of the mine would affect workers and communities. The EIS claimed that the company is aware of its responsibility to its work force and to the local economy when its operations close. BHP would put in place a comprehensive program of workforce adjustment for the last few years of mine operation. It outlined two programs undertaken in the recent closure of its Island Copper mine in British Columbia. There, a joint committee of management, unions and federal and provincial governments was created to provide employee assistance and training programs and to monitor the impacts of mine closure. The company also co-ordinated a program to provide career counselling advice and educational subsidies. BHP said that this process gave individuals, families and the community the time to make choices and to plan for the closure of the mine. BHP told the Panel

that this process had worked very well and that it anticipated undertaking the same type of process towards the end of the NWT Diamonds Project.

5.4.2 Adequacy of Baseline Information

The baseline description provided in the EIS was developed using available statistical indicators, the recent report of the GNWT Special Committee on Health and Social Services, other available literature, and attitudinal surveys undertaken in Kugluktuk. The picture is one of a region suffering from serious alcohol and drug dependency and a growing problem with gambling — factors contributing to poor health, violence to person and property, family breakdown, sexual assault and child neglect. The EIS quoted the comments of many NWT residents to the committee, that NWT community tolerance to drinking, drugs and family violence indicates a loss of self-esteem resulting from a loss of culture or a lack of gainful employment, or both.

The Panel questioned why attitudinal surveys were only undertaken in Kugluktuk. In the Additional Information Response, BHP explained the process it had undertaken to conduct surveys. BHP reported that it had been told by the Dogrib Treaty 11 Council that the time was not right for community consultation and that it was unlikely Treaty 11 would be able to proceed with community visits within the timeframe set for EIS submission. Part C of the Additional Information Response also contained a letter from the Yellowknives Dene Band notifying BHP that the Yellowknives Dene did not wish to participate in studies likely to be part of BHP's submission to the Panel and that it preferred to preserve the information of its elders and other community members for presentation of its position to the Panel.

The baseline on social conditions was criticized during the EIS review phase and the hearings. Aboriginal organizations criticized the description of the land-based economy as inadequate, judging that the significance of traditional activities in the lives of Aboriginal peoples was under-represented. People from Ndilo and Dettah, communities in close proximity to Yellowknife, voiced their concern that the baseline did not describe the problems of Aboriginal people living in marginalized conditions in the urban environment of Yellowknife. The Status of Women Council of the NWT held that the disproportionate burden of social problems on women and families was not given adequate attention. In response, the Proponent explained that there are limitations to available data because of confidentiality and the small size of many communities, and that it had not been able to supplement the available data with surveys in many of the communities. The Proponent also said that the EIS did not dwell at length on social problems in deference to views expressed by some communities, during scoping and to the Special Committee on Health and Social Services, that communities are sensitive to having these matters aired publicly.

The Panel observes that the portrayal of social conditions for Kugluktuk is more fully developed than for First Nations communities, mainly because it integrates people's attitudes and understanding of the nature of the problems as obtained from surveys undertaken by the Proponent. Such survey work is necessary to overcome limitations in the statistical data, and could have helped to address the deficiencies noted both by the Status of Women Council of the NWT and the people of Dettah and Ndilo. The decision against undertaking surveys in the First Nations communities was made by the community leaders themselves, and therefore must be respected. The Panel expects that the monitoring that the GNWT proposes to undertake as part of the Community Wellness Strategy may help to remedy this omission.

The Panel concludes that, to the extent that information sources were available, the socio-economic environment was adequately described for purposes of this review. Nevertheless, the Panel notes that there are limitations in the data and in the techniques for quantifying the contribution of the land-based economy. As well, limitations to the historical data available by community make it difficult to describe the circumstance of Aboriginal people in and around the city of Yellowknife. The Panel notes that the lack of survey data contributed to the publicly perceived inadequacies of the baseline in matters related to gender and of the importance of the land-based economy. The Panel also notes the Proponent's comment in the hearings that Phase II of the Traditional Knowledge Study is expected to consider the role of harvesting and country food in the area.

5.4.3 BHP Approach to Assessment of Socio-Cultural Disruption

In assessing social and cultural impacts, the Proponent did not attempt to quantify the effects or even to speculate on whether the overall effect would be positive or negative. Instead, the

Proponent outlined in the EIS both potential negative and positive effects that could accrue from development and proposed steps to mitigate the negative ones.

On the negative side, increased employment income and work-related absences could aggravate social problems by increasing stress, gambling, alcohol abuse, assaults, family violence and breakdown, strain on social services, drug trafficking, and by causing divisions in communities, more rapid turnover of employees and acceleration of changes in traditional values. On the positive front, employment and income could improve the confidence and self-esteem of some individuals and their families, provide a higher standard of living, contribute to self-reliance, improve education and skill levels, reduce financial pressures on families, and generally improve the quality of life. The assessment concluded that what would actually happen would depend on the actions of individuals and communities in responding to the various opportunities and challenges presented by employment, income and family separation.

To minimize socio-cultural disruption, BHP proposed implementing no-cost commuting services directly to and from communities. Workers could continue to live in their own communities and to participate in their traditional harvesting and cultural activities. No-cost commuting would reduce demographic shifts of population. The Proponent's decision to offer commuting services directly to communities was in response to concerns raised in scoping meetings that routing through Yellowknife might contribute to drug and alcohol abuse and related social problems. BHP also stated that there would also be a strict prohibition of drugs and alcohol on site. Offenders would be dismissed without exception.

The Panel commends the Proponent's decision to adjust commuting arrangements to accommodate the preferences of the communities to have workers transported directly to and from their home communities.

The Proponent is currently offering assistance to communities in their work on social problems, whether the source of the problem is related to the Project or not. Its Community Mobilization Program draws together communities, service agencies, government and the RCMP to ensure that all are aware of the implications and potential timing of Project activities. In addition, the program offers assistance to communities in defining areas for improvement, setting priorities and obtaining the appropriate assistance for a community to begin healing itself. The approach is intended to be adaptable to the needs and priorities of each community, as the community defines them. The Proponent has emphasized that this is an available option -- it is not a framework to be imposed on the community. The communities must decide whether they want to use this resource.

The Proponent would also offer an Employee Assistance Program to help employees adjust to work at the mine. Services would include counselling on financial management, alcohol and drug counselling, work-related stress management, and personal counselling. These services would be provided at the mine site and by Aboriginal community-based counsellors.

The Employee Assistance Program was criticized by individuals and by organizations, such as the Status of Women Council of the NWT, for not taking into account the needs of the employee's family, who, although they remain in the community, must also deal with changes brought about by the Project. The Proponent replied that it would make the program available to family members as well. In response to the concern that BHP would bring new people into the communities to deliver the services under the program, BHP stated that it intended to work with each of the communities to define needs and to ensure the best use of resources.

The Panel notes that the GNWT is conducting a pilot project with respect to a government employee assistance program. The Panel agrees with the GNWT's recommendations that the Proponent make use of this existing work to examine issues such as cost effectiveness and economies of scale.

The Panel is of the opinion that the family dimension for the Employee Assistance Program is important if the program is to be effective in preventing and resolving problems. The Panel also believes that while there will be a modest number of workers from the smaller communities during the construction phase, there is still considerable potential for disruption during this phase. These workers may not be direct employees of BHP and therefore may not be eligible for the program. The Panel encourages BHP and government agencies to work together to ensure that resources are available in the communities in time to deal with any disruptive effects during the construction phase.

5.4.4 Capacity of Social Infrastructure

The EIS concluded that the physical and social infrastructure of the north would be affected by in-migration to Yellowknife and possibly to Hay River, and, to a less predictable extent, by social disruption caused by the Project. The Panel was advised by representatives of Yellowknife and Hay River that these communities were prepared to handle incremental growth, although it was clear that some facilities, specifically recreational facilities in Yellowknife, were very near capacity. These communities pointed out that growth would help take up excess capacity in some areas, and would increase the tax base to help offset costs. At the hearings, the public was more concerned about effects on social services than on municipal infrastructure.

The EIS noted the potential for increased social problems related to the Project to add to the burden on providers of social services. This concern was stressed by members of communities who thought that social services were close to the breaking point, and were insufficient to deal with current conditions, let alone any incremental stresses that could result from further development. The Panel heard from the City of Yellowknife and the GNWT that the capacity of social service facilities was regularly reviewed for adequacy, but notes that this may not reflect the needs of the people of Ndilo and Dettah.

Both the GNWT and the RCMP confirmed the difficulties that agencies have had in developing programs to alleviate social problems. Various measures have been taken to find remedies, but the Panel heard that resources are stretched and funds are very tight. To make the best use of government resources and to give communities the lead in healing themselves, the GNWT initiated a Community Wellness Strategy. The RCMP also described to the Panel its efforts in community policing, a partnership between the community and the police.

The Panel understands that social service providers face difficulties in dealing with existing social conditions in the region. It is possible that the Project would cause an increase in social stress, as well as an increased burden on available services. At the same time, agencies acknowledged that other factors, unrelated to the Project, play a role and that it is difficult to separate out the effects. The Panel also observes that the approach proposed by the Proponent reflects the principles in current government initiatives toward community wellness and community policing. Further, the Panel concurs that communities must be encouraged and enabled to seek solutions to their own problems, according to their own perceptions of priorities and values.

The Panel concludes that it is difficult to predict the Project's impacts on social services, or the limits of those services to meet any additional demand. Nevertheless, this issue is of great importance and must take a high priority for government, working in partnership with BHP. The Panel endorses the GNWT's suggestion that the federal government, the GNWT and BHP work closely together so that Community Mobilization and Employee Assistance programs' resources offered by the Proponent can be effectively integrated with those of the communities and government. The Panel urges the Government of Canada and the GNWT to work co-operatively to ensure that government-led initiatives, such as Community Wellness and Community Policing, continue to receive the necessary funding. It does not seem reasonable to the Panel that the GNWT should bear the potential financial burden with respect to the effects of development on social services and education, yet under current fiscal arrangements receives no incremental revenue from mineral development.

5.4.5 Monitoring of Socio-Economic Effects

The Panel heard from many at the hearings about the importance of monitoring socio-economic effects of the Project. For example, the Métis Nation proposed an agency to monitor socio-economic effects of the Project. Others suggested that socio-economic monitoring should be the responsibility of the Environmental Advisory Group proposed by BHP to monitor environmental effects. The GNWT told the Panel that it had identified 14 indicators for health and wellness, based on data already being collected and that these should be monitored co-operatively with the Proponent and the communities to identify problems that may be generated or increased by the Project. The GNWT also suggested that, whenever possible, data that have already been collected ought to be used. It urged the Proponent to co-operate and provide supporting data as required.

The Additional Information Response sets out the definition of northerners, northern business and Aboriginal business that the Proponent has adopted for this Project based on consultation and practical considerations. During the hearings, the Panel heard

from the GNWT that different definitions are used for different purposes. The GNWT suggested that agreement had to be reached through dialogue with stakeholders, government departments and the Proponent on acceptable definitions for the purposes of socio-economic monitoring.

The Panel urges BHP to work together with the GNWT and other stakeholders to develop a clear definition for the terms "northerner" and "northern business" as soon as possible so that systems can be put in place to monitor the positive and the negative impacts arising from the Project and to enable remedial action to be undertaken where the impacts are negative.

The Panel observes that the task of assessing and monitoring the social health of communities is complex and notes the contribution of the GNWT Department of Health and Social Services in identifying 14 indicators of community wellness. The department advised the Panel that, as part of the Community Wellness Strategy, it will monitor these indicators for the communities in the region as well as for other communities in the NWT. In addition to this, the Proponent proposed to use statistical and attitudinal monitoring methods to track parameters related to Project activities, such as the previously described features of employment, purchasing and contracting. The Panel believes that this is an appropriate division of labour, but emphasizes the need for these two monitoring activities to be co-ordinated and for the results to be analyzed jointly to ensure that any negative effects that can reasonably be related to the Project are identified and that action is taken to deal with problems.

21. The Panel recommends that BHP and the GNWT meet periodically to review the results of monitoring of socio-economic conditions and trends, and of monitoring of Project activities.

The Panel would like to draw the attention of the GNWT's Community Wellness Strategy to the concerns expressed at Ndilo and Dettah about the inadequacy of available statistics to describe conditions experienced by the urban Aboriginal person in the Yellowknife area.

5.4.6 General Conclusions on Social Effects

The Panel notes that BHP's approach to assessment and mitigation is consistent with the complexity of the relationship between development and social conditions, and the fact that there are many sources of pressure acting on the communities of this region. Whereas it is certainly true that rapid, poorly planned development can be socially and culturally damaging, the Panel is of the opinion that development-related wage employment can contribute to economic well-being and social stability by alleviating conditions related to poverty, by offering options to people and by relieving uncertainty in the wage economy. There are important conditions to this: the Project must take into account the needs and aspirations of the people of the region, must avoid any damage to the close relationship that Aboriginal people have with the land, and must not limit other available options. The Panel believes that the Proponent has shown a willingness to integrate these concerns into its Project.

The Panel believes that responsibility for the health and well-being of the people of the north rests with public government and with the people themselves. It is the responsibility of the Proponent to recognize the potential for social effects caused by the Project, to minimize disruption by adjusting plans in line with the preferences of residents, to work with government to co-ordinate services offered by the company to make best possible use of resources, to consult closely to identify problems that arise, and to work with government and communities to resolve these problems.

The Panel understands that the Proponent is offering the services of the Community Mobilization Program to communities as a resource. The Proponent is offering to perform the role of catalyst for social change, but leaves the initiative to the community. The Panel believes that this is a constructive approach and shows a commendable sense of social responsibility .

The Panel also recognizes the magnitude and complexity of the task facing communities and government. The Panel commends the efforts by the GNWT and the RCMP to seek community-driven approaches, and believes it is most important that actions by this Proponent, whether in Employee Assistance or Community Mobilization, be thoroughly co-ordinated with the activities and resources of government and communities to ensure that duplication is minimized and that communities receive the most appropriate assistance.

The Panel concludes that the pace of this development and profile of activity over time is

potentially less disruptive than for other projects with which the north has had experience. However, participants also expressed concern about the effects of this Project in combination with other potential development in the region. The Panel notes the potential for cumulative social effects from economic activity of any sort in the region, and urges that a regional perspective be taken in developing a socio-economic baseline and a framework for gaining a better understanding of development-related social effects.

22. The Panel recommends that the Government of Canada and the GNWT undertake work to define the need for information on the socio-economic effects of development in the region and to develop a framework for analysis. The Panel proposes that the WKSS accept collection of regional socio-economic baseline information as a priority to meet the needs of this analysis.

5.4.7 Archaeological and Heritage Sites

The EIS and Additional Information Response set out the work that BHP undertook in conducting its archaeological site investigation. This work was conducted in 1994 and 1995 by a qualified archaeologist governed by a permit issued annually under the *NWT Archaeological Sites Regulations.*

BHP indicated that the archaeological survey for the Project was the first such detailed investigation conducted in this area. Six survey areas, including the proposed mine sites, the Misery haul road route and the Misery Lake area, were assessed. The field investigation consisted of initial helicopter overflights of the survey areas followed by ground reconnaissance. In addition, BHP held community meetings with the Dogrib and Yellowknives Dene to discuss the survey. BHP pointed out that two Aboriginal students were hired to assist with the field investigations on the recommendation of the Renewable Resources Committee of the Dogrib Treaty 11 Council and of the Land and Environment Committee of the Yellowknives Dene First Nation. Elders from these two groups were also invited to visit the Project site to help identify burial and other culturally significant sites.

Sites discovered during this survey were mapped and photographed, and site information was systematically recorded. Archaeological significance was defined according to British Columbia guidelines because there are no NWT guidelines. A significance rating of "low", "medium" or "high "was assigned to each site. Although over 60 sites of archaeological interest were found, only three sites were identified as having "high" significance. No burial sites were identified.

Aboriginal groups expressed concern throughout the review that the Project would disturb burial sites and result in the loss of culturally important sites and material. This takes on an additional sensitivity in the absence of settled land claims. BHP has indicated that, as a matter of policy, its current development plan avoids all known archaeological sites identified as having "high" significance in the archaeological survey. This policy contributed to the abandonment of the originally-proposed route for the Misery haul road in favour of the current route. BHP said that it would continue to avoid all sites of "high" archaeological significance. If sites of "moderate" or "low" significance. were discovered and could not be avoided, those sites would be systematically recorded for future reference and any artifacts would be collected to ensure that no cultural information was lost. Further, BHP maintained that future exploration and development on the claims block would endeavour to incorporate archaeological surveys and that the communities would be consulted with respect to fieldwork and findings. In addition, BHP reiterated its willingness to work with the Aboriginal groups of the region to ensure that burial sites in the Project area are protected.

Concerns were also expressed about the disposition of an artifact discovered in 1994 on the BHP claims block during the archaeological investigation. After analysis, it was sent to the Canadian Museum of Civilization in Hull, Quebec in accordance with the terms of the permit. The Panel heard from the GNWT Department of Education, Culture and Employment, the department responsible for issuing archaeological permits, that there are currently only two repositories for artifacts:' the Prince of Wales Northern Heritage Centre (Heritage Centre) in Yellowknife and the Canadian Museum of Civilization in Hull. The department added that, due to limited storage space and resources required to care for artifact collections, the Heritage Centre does not normally become the repository unless a specific request to retain artifacts in the north is made when an archaeological permit is issued.

After further consultation with Aboriginal groups in the spring of 1995, the 1995 permit stipulation on disposition of the artifacts was changed so that artifacts would be retained by the Heritage Centre.

As well, the department initiated a process to have the artifacts from the 1994 field season transferred to the Heritage Centre. The Panel was advised by the GNWT that BHP and its contractors complied with the terms of the permit during each field season.

The Panel concludes that the assessment of archaeological resources of the region was completed in accordance with regulatory requirements. The Panel notes that the assessment included scientific investigations under permit as well as consultation with Aboriginal groups and site visits. The Panel suggests that government may wish to review the regulatory framework with respect to archaeological matters to ensure the best possible protection of archaeological resources.

23. The Panel recommends that consultation by BHP with Aboriginal groups continue over the life of the Project and as new areas are explored and developed in order to incorporate traditional knowledge with the archaeological surveys. The archaeological surveys of new sites must be done to the highest standards of the day and must respect places of significance to Aboriginal people. The Panel appreciates the sensitivity of Aboriginal peoples regarding the burial places of their ancestors and the connection of this to land claims issues, and recommends that Aboriginal groups work co-operatively with BHP to ensure that burial sites in the Project area are identified and protected.

5.4.8 Restrictions on Hunting and Fishing

In Part C of the Additional Information Response, BHP stated that it has a "no firearms" policy for the mine and that employees would not be allowed to bring firearms into the Project area for any purpose, including hunting. Fishing would also be restricted in order to preserve existing populations.

BHP's firearms and fishing policies caused a great deal of concern on the part of Aboriginal people who understood this to mean restrictions covering the entire claims block. The Panel was told that this conflicted with Aboriginal peoples' right to hunt, fish and trap. BHP explained that the restriction on firearms at mine sites is required under regulation and would apply only to the mine development area, including the camp, open-pit workings and connecting roads. BHP emphasized that the firearms restriction was for safety purposes and would not apply to areas within the claims block away from these active sites. Hunting on other parts of the claims block would not be compromised.

In the hearings, BHP advised the Panel that it had decided on a "no fishing" policy for employees after receiving much conflicting advice from government, Aboriginal groups and scientists on the nature of an acceptable fishing policy. BHP said it was told by government of Aboriginal peoples right to hunt, fish and trap; scientists warned of the fragility of fish populations in the small lakes accessible from the camp; and there was a diversity of opinion among Aboriginal people on the acceptability of a catch-and-release program — some believed this would be acceptable while others believed fish should only be caught if they were to be eaten. BHP indicated that it would be willing to revisit its fishing policy to see if a more acceptable one could be achieved.

The Panel observes that concern over these policies seemed to be reduced once it was understood that the measures applied to a restricted area around the active mine sites and not to the entire claims block.

24. The Panel recommends that BHP consult with the Aboriginal groups who use the area and with the responsible agencies to develop an acceptable fishing policy.

25. The Panel recommends that BHP establish a consultation process with communities to explain its firearm and fishing policies, to describe the relationship between its policies and people's ability to hunt and fish on the claims block, and to resolve any misunderstandings on these issues.

5.4.9 Compensation

During the scoping sessions and the hearings the issue of compensation to subsistence and commercial land-users whose livelihood has been or may be negatively affected by the Proponent's activities was raised. In the Additional Information Response, BHP described how it would approach claims for compensation made by affected land-users. That approach, among other things, placed the burden on the claimant to clearly demonstrate the basis of the loss and committed the Proponent to negotiate in good faith. Failing a mutually-satisfactory resolution, BHP said it would contemplate the use of an independent auditor or mediator to review the information presented. BHP told the Panel that the procedure had been developed in co-operation with a local outfitter; that

this approach had already been followed for commercial land-users; and that BHP proposed to follow it for claims from subsistence land-users in the event such claims were not covered by an IBA.

Although the Panel heard of conflicts with other land-users, BHP confirmed at the hearings that they had not yet been approached by any subsistence land-users in relation to effects from BHP's exploration or bulk sampling operations. The Panel acknowledges the concerns raised by subsistence users of the land, but notes that these pointed to a perceived increase in activity on the land by a multitude of users and were of a more regional nature than specific to BHP's Project-related activities.

The Kitikmeot Inuit Association was concerned about the application of Article 40 of the Nunavut Land Claims Agreement respecting Inuit harvesting rights outside Nunavut. The association was of the opinion that Inuit rights to harvest had already been affected by exploration activity. It recommended that no long-term surface leases be issued until the effects of the Project on Inuit harvesting rights had been dealt with by BHP. BHP acknowledged this issue and noted that further work was required to resolve it. With respect to issues related to Article 40 of the Nunavut Land Claims Agreement, the Panel urges BHP to continue discussions with the Inuit to resolve these issues as rapidly as possible.

The representative of the NWT Caribou Outfitters Association told the Panel that, in the past, the mining industry had shown little regard for the interests of the tourism operators. He suggested that DIAND should take responsibility for consulting with tourism operators when land-use permits for new mining activities were being considered. This presenter also noted that good communications between BHP and outfitters could go a long way to avoiding and resolving conflicts. BHP responded that it had already entered into a dialogue with one local outfitter to discuss outstanding issues and was willing to undertake similar discussions with other outfitters and the association.

The GNWT observed that the legal burden of proof in compensation cases had been difficult for subsistence harvesters and small-scale commercial land-users to meet, and therefore, it had been relaxed somewhat in settled land claims agreements. The NWT Chamber of Mines voiced its concern that the burden of proof would then shift to mining proponents to show that they were not the cause of the disruption.

The GNWT provided the Panel with its 1984 policy on compensation but cautioned that it had been superseded by settled land claims and should be considered only as a conceptual framework for the resolution of renewable resource compensation problems. In addition, the GNWT stated that its policy was unenforceable because they had no licence to which it could be appended.

The Panel concurs with the observation by the GNWT that the strict legal burden of proof may be too demanding a test for compensation issues likely to arise in relation to this Project. Nevertheless, the Panel believes that BHP should only be expected to compensate land-users for effects that can reasonably be shown to result from its Project activities.

The Panel endorses BHP's approach to resolving outstanding issues with other land-users through early and ongoing discussion, and acknowledges that BHP has developed a compensation policy. However, the Panel also notes that this is a voluntary measure proposed by BHP and that there is no binding mechanism to ensure that resolution is reached. The Panel recognizes that compensation is an issue likely to be negotiated in IBAs and that application of BHP's compensation policy would only be necessary for those land-users not covered by an IBA.

26. The Panel recommends that the Government of Canada make BHP's compensation policy a condition of approval for the Project. In addition, the compensation policy should set out firm procedures for seeing disputes through to resolution. The Panel also recommends that the Government of Canada ensure that land-users have access to resources to pursue compensation claims.

The Panel observes that while settled land claims may have provisions for compensation, this Project is taking place in a region where land claims have yet to be settled. The Panel also notes that other development projects are being proposed in this region, yet there are still outstanding concerns related to issues of burden of proof, access by individuals to resources to help them to pursue claims, and means to ensure resolution.

27. The Panel recommends that DIAND work closely with the GNWT to develop an enforceable compensation policy that addresses the issues of burden of proof, access to resources and means to ensure resolution, in relation to future development in this region. Once developed, the compensation policy should also be applied to this Project.

5.5 RELATIONSHIP BETWEEN LAND- AND WAGE-BASED ECONOMIES

The significance of the land-based economy was a recurring theme throughout this review. In order to obtain a better understanding of the relationship between the land- and wage-based economies, the Panel required BHP to provide additional information on this topic before the hearings could begin. BHP's additional information supplements the description of the land-based economy in the EIS and provides a clearer picture of the extent to which northerners rely on country food. The Additional Information Response noted that a study carried out in 1990 by the Dene Nation and Métis Association indicates that approximately 60% of Aboriginal households obtain at least half the meat and fish they consume through hunting and fishing and even when families have considerable cash income from the wage economy, they continue to hunt. The study concluded that country food continued to contribute to the staple diet of Aboriginal people even where the wage-based economy has increased the availability of commercial foods.

Aboriginal people told the Panel that the land-based or traditional economy is more than a means of providing physical sustenance; it is a way of life that sustains emotional, spiritual and cultural values as well. Many presenters told the Panel that the land-based economy also provides a vital link between the older and younger generations.

The importance of the traditional economy was reiterated in every community as were the fears that the Project would compromise the ability of workers to participate in a lifestyle with so much cultural, spiritual, emotional and physical importance attached to it. According to Dogrib elders, the economic potential for trapping is in serious decline as a result of the anti-fur movement, making it difficult for many of the younger men to earn a living from the land. These elders told the Panel it was these young men who needed opportunities in the wage-based economy to support their families and maintain their self-esteem.

The nutritional significance of the land-based economy was also a concern. Several participants said that BHP had not reflected an understanding of the significant role country food plays in the lives of many northern residents. Many spoke of their concerns that the Project would interfere with people's abilities to obtain caribou and other wildlife which are culturally-preferred foods. The Panel heard that because land-based activities were such a fundamental part of their lives, even those young people who did decide to participate in the wage-based economy would find time and resources to go out on the land. As well, Aboriginal people have learned to be sceptical about the long-term prospects for employment, and therefore want to protect the long-term capacity of the land to support them. They wanted the subsistence economy to be always available as a life-line, should the wage-based economy fail them.

Some speakers were concerned that Aboriginal workers at the mine would have to go without caribou during their rotation. The Panel notes that BHP committed to serving country food at the Project site, subject to supply.

Some participants commented that information on the value of the land-based economy should be collected directly from the people affected and from elders. In response, BHP indicated that it expected Phase II of the Traditional Knowledge Study to contribute to a greater understanding of the effect this Project would have on the traditional economy, and that the study would be designed by the Aboriginal groups in co-operation with BHP.

The Panel observes that the relationship between the land- and wage-based economies is a dynamic one. It has evolved over time and will continue to evolve regardless of whether the Project proceeds. Individuals and communities are involved in a continuous process of reconciling the conflicts between what each economy can offer. The Project can be viewed in this context as an additional option for northerners.

The Panel notes that the Project will not eliminate unemployment in Aboriginal communities, nor is it likely that every eligible person in those communities will wish to work at the mine. BHP's commitment to a 2in/2out schedule combined with annual vacation time could give employees up to six consecutive weeks off to spend on the land as they gain seniority with the company. The Panel was told that Aboriginal people working at other mines with the

same rotation schedule have expressed satisfaction with this arrangement. BHP has also committed itself to consult with outfitters to resolve issues regarding the participation of BHP employees as guides during the hunting season. The Panel believes that these measures will help reduce interference between participation in the Project and workers' ability to participate in land-based activities.

The Panel recognizes that country food is culturally preferred and is a vital element of Aboriginal people's relationship with the land. The Panel notes that many factors, including the availability, cost and convenience of store-bought food, the availability of supplies needed for harvesting, the rising cost of harvesting equipment and the distribution of people in relation to the land-based resources, contribute to the decision to choose country food or store-bought food. Further, the Panel observes that not all of these factors are related to development.

The Panel observes that underlying the concerns raised regarding the relationship between the land- and wage-based economies was the potential for broader industrial development within the region. The Panel urges that a regional perspective be taken to develop a baseline and a framework for gaining a better understanding of the relationship between the land- and wage-based economies.

5.6 DIAMOND VALUATION

BHP proposes to produce rough-cut diamonds for sale into international diamond markets. The EIS stated that all transactions would be subject to the same valuation and auditing procedures as other export goods, and that the evaluation and sale processes followed by BHP would be open to observation and audit by the relevant Canadian authorities.

The GNWT noted that the sale of diamonds is difficult to track and audit. Unlike other mineral and metal commodities, diamonds are small and portable and have been likened to a form of currency without serial numbers. During the review process, the question was raised whether fiscal procedures were adequate to ensure that the royalty revenues and taxes returned to northerners and Canadians reflect a fair market price. For example, most diamond-producing jurisdictions require independent valuation of the diamonds before export.

DIAND told the Panel that a discussion paper on changes to the *Canada Mining Regulations* would be circulated in the spring of 1996. This discussion paper would propose changes to the *Canada Mining Regulations* to ensure that diamonds are treated equally with other metal and mineral commodities. DIAND also told the Panel that it intends to ensure that diamond production is valued by a government-appointed valuator for royalty purposes prior to export and sale. This activity is planned for the NWT and, unless it is proven not feasible, for the mine site.

BHP, the GNWT and DIAND agreed that valuation of the diamonds produced by the Project could take place in the NWT. BHP agreed with DIAND's suggestion that valuation take place at BHP's mine site while the GNWT and the Town of Hay River maintained that a valuation site at another location could be of greater benefit to northerners by serving this Project as well as subsequent diamond mines that may be developed in the north. Representatives from the Town of Hay River told the Panel that they would like to see the valuation facility established in their community.

At the hearings, an expert in diamond valuation suggested. that the basic sorting required for valuation of diamonds could be performed in the NWT by northerners given the proper training. He told the Panel that a small, secure facility and two or three trained individuals would be required. An experienced valuator could then come to the site ten or twelve times per year to evaluate the diamonds.

The Panel observes that the diamond industry is a new business in Canada and that it is important to ensure fiscal arrangements are adequate.

28. The Panel recommends that the Government of Canada develop administrative procedures for diamond valuation and ensure that these are in place prior to the start of full production. These procedures should be developed in consultation with the GNWT and BHP.

The Panel concurs that any diamond valuation facility should be located in the NWT. The decision on the location within the NWT should take into account requirements for efficiency, security and benefits to northerners. Depending on the valuation arrangements selected, consideration would have to be given to the training of sorters.

5.7 COMMUNICATION PLAN

The EIS described the communication activities undertaken by BHP during the exploration phase and the communications plan proposed for the Project. This description was supplemented in December 1995 by the document "Communication Program and Public Involvement Update. "

The stated goal of BHP's communication program is to create a dialogue with all groups having an interest in the Project, with the ultimate goal of establishing a "good neighbour" policy for the mining operation. The EIS set out the working principle that, "the Proponent intends to put traditional concepts into practice and respect the diversity that exists between the Aboriginal peoples and will make no attempt to homogenize their cultures."

The communications program, which began in 1992, has taken two broad approaches. First, information delivery and exchange was conducted using presentations, meetings, workshops, field trips and cultural exchanges. Secondly, based on an understanding of community concerns, the Proponent developed initiatives such as Community Mobilization, school programs, scholarships, and site visits for elders.

The communication plan for the Project would add two further approaches to these "interactive methods." The Proponent would issue an annual environmental assessment report, accompanied by an overview report from the Environmental Advisory Group. These reports would be submitted to regulatory agencies and would be made available to the public. For Aboriginal groups, BHP suggested that IBAs consider establishment of joint advisory committees to create a long-term mechanism for an ongoing relationship and a forum for discussion. If this is not possible, BHP has stated its intent to find alternative means for dialogue with Aboriginal peoples.

The Panel heard a range of opinions on the communications efforts to date. Several speakers at the community sessions thought that they had not been adequately consulted by the Proponent, and in particular that they had not heard enough about the Project in advance of the hearings. The Status of Women Council of the NWT stated that women in particular had not been adequately consulted. For its part, the NWT Construction Association considered the communications program to be an extensive and comprehensive strategy for communications between industry and the public. The NWT Caribou Outfitters' Association stressed the role of effective consultation and communication in identifying and addressing potential problems before damage is done.

In reply to the criticisms that the Proponent failed to communicate more widely, BHP gave the following reasons: first, the Proponent conducted its community consultation through community leaders, and deferred to leadership's decisions with respect to contact with general members of the community; and secondly, the Proponent planned community information meetings on the EIS for the fall of 1995, but was unsuccessful in confirming dates with the First Nation communities.

The Panel believes that a comprehensive and energetic communications plan is vital if the Project is to be a success in the socio-economic sphere. Good communications are necessary to ensure a two-way flow of information, to build a sense of common interest in the success of the Project, to understand the concerns of the people of the region, and to indicate the Project's needs and limitations. The Panel understands the communication program is intended to be a conduit for socio-economic monitoring of issues, and is a necessary tool for refining socio-economic mitigation and management plans.

The Panel also sees this requirement for communications in light of the potentially long life of the Project. A 25-year mine life is long enough that there will inevitably be changes over that time in demography, in culture and in societal values. Good communications are needed to enable the Proponent to foresee these changes, and adapt its approach to socio-economic matters appropriately.

The Panel concludes that the framework for the communications strategy is sound and attempts to address a broad spectrum of residents of the region. The Panel is also of the opinion that its recommendations for public reporting requirements on both environmental and socio-economic assessment matters can be integrated into the Proponent's framework to offer greater clarity to northerners on Project issues.

In recognizing the reasons that the Proponent gave for omissions in the communication program, the Panel observes both the necessity of respecting the wishes of the communities as expressed through

their leadership, and the demanding schedule of land claims discussions in which the leadership was participating. The Panel also observes that effective communication requires the building of trust with communities, and that this is a time-consuming process. The hearings brought to light omissions in the communication process, in particular the need to discuss the Project in more detail with community members generally, and to reach the women of the communities. The Panel encourages the Proponent to make these priorities in the near term. The Panel also hopes that communities will avail themselves of opportunities to discuss the Project directly with the Proponent.

The Panel commends BHP for the efforts it has made to establish lines of communication with the diversity of groups and interests that may be affected by this Project and endorses BHP's commitment to continuing the communications program throughout the life of the mine. The Panel believes that an active, ongoing dialogue between the Proponent and the public can serve to foster a spirit of co-operation and to enhance an understanding of this Project.

6. OTHER ISSUES

6.1 WEST KITIKMEOT SLAVE STUDY

On December 9, 1994, concurrent with the appointment of the Panel, the federal Minister of Indian Affairs and Northern Development and the Minister of Renewable Resources for the GNWT announced a major study of environmental, social and economic issues related to mineral development in the Slave Geological Province (now termed the West Kitikmeot Slave Study [WKSS]). The study was initiated in response to the great deal of activity surrounding the 1991 discovery of diamonds and because there were very few data on the possible cumulative effects of potential mining and related infrastructure developments.

The stated objective of the study was to provide information on the environment, such as wildlife populations, habitat and sensitivity to disturbance. In addition, it was to examine the links between environmental, social and economic factors in order to understand the potential negative effects of development and to identify measures to monitor and reduce them.

The study was to be established as a partnership among the federal and territorial governments, the mining industry, and Aboriginal and environmental groups. The partners were to be responsible for contributing funds to the study and for deciding on its specific terms of reference, structure and priorities for research.

The Panel's Terms of Reference were to review the environmental and socio-economic effects of the NWT Diamonds Project; however, the Panel could recommend approaches on how to deal with generic issues related to other development initiatives, including referral of these issues to the WKSS.

At the public hearings, the chair of the WKSS working group provided an update on its activities. He reported that the study involved nine partners and that they had met on a number of occasions, had selected a management board and had developed a goal, vision and objectives. In January 1996, the study became an incorporated society and was in the process of hiring a study director. Collectively, the founding partners of the WKSS determined that the goal of the study was to collect and provide information for the study area in order to assist informed decision-making by the partners and to facilitate sustainable development.

The Panel was told that the WKSS had, as yet, approved no research projects. This statement surprised the Proponent who was under the impression that a regional grizzly bear study, for which it had provided $300,000 of funding, was being conducted under the auspices of the WKSS. Moreover, the partners had not yet established a research strategy, a framework for research proposals or priorities for research. However, the Panel was told that all parties were aware of the need and were in favour of initiating research on the Bathurst caribou herd. The GNWT advised the Panel that it had been working with the WKSS to develop research proposals related to this herd.

Although there was general support for the WKSS initiative, several presenters expressed concern about the time taken to activate the study. Another concern was that, because the WKSS is an independent society, there could be no assurance that any recommendations from the Panel for studies would be implemented. One presenter also observed that the objectives of the WKSS seemed to have been narrowed from the original intention of developing an understanding of the possible effects of development, to one of baseline information collection.

The Panel shares the concerns of participants and the Proponent that the WKSS, which was to have been a parallel initiative with this review, has been slow to start. It is apparent to the Panel that the WKSS's goal to collect baseline information is narrower than the mandate envisaged in the ministers' announcement. Moreover, it is not clear to the Panel how the WKSS is accountable to government and the public. Neither is it clear whether the study will adopt any recommendations from the Panel.

The Panel stresses the need to have a better understanding of the ecological importance of systems in the region and to ensure that this information is collected so that decisions about development in the region can be made on an informed and timely basis. The Panel proposes that DIAND and GNWT, as initiators of this study, review, on a periodic basis, the effectiveness and progress of the WKSS in meeting the need to obtain the necessary baseline information for this region, and ensure that data collection and research meets the needs of regional decision making including requirements for cumulative effects analysis.

Throughout this report the Panel has identified a number of issues that could be addressed by the WKSS. These proposals are summarized below as a recommendation.

29. The Panel recommends that the West Kitikmeot Slave Study:
    a) develop a regional approach to the collection of traditional knowledge;
    b) work together with BHP, the federal government and the GNWT on a co-operative approach to environmental effects monitoring for the region;
    c) collect regional baseline information on eskers and other glaciofluvial deposits, in order to provide a basis for development of guidelines and cumulative effects assessment by government;
    d) provide a forum to co-ordinate collection of baseline information on caribou;
    e) accept the regional grizzly bear study as a major component of its program;
    f) develop baseline information that will be required to identify areas for protected area status;
    g) accept the collection of regional socio-economic baseline information as a priority; and,
    h) ensure that its study program is designed to provide the information needed for cumulative effects assessment of future development in the region.

    Should the WKSS decide not to adopt these initiatives, then responsibility should fall to government to ensure that these issues are addressed.

6.2 CUMULATIVE EFFECTS

The Terms of Reference instruct the Panel to consider issues relating to long-term cumulative effects of the Project in addition to future development scenarios identified by BHP on its Lac de Gras claims block. The Panel's Guidelines issued to the Proponent included this topic. A review of the effects of other development initiatives in the region was not within the Panel's mandate; however, the Panel was given the opportunity to recommend approaches on how to deal with such issues.

The EIS included an assessment of the cumulative effects of additional activities within the claims block, recognizing that some effects may extend beyond the claims block. For this analysis, BHP used a hypothetical case that three additional kimberlite pipes might be developed within 30 km of the processing plant but outside the Koala watershed. Rather than increase the capacity of the processing plant, any additional pipes would probably be developed sequentially following mining of the five pipes in the current plan. Tailings would be placed in the mined-out Panda and Koala pits.

According to the EIS, development of additional pits could extend the mine life beyond 25 years and could therefore prolong employment and economic benefits. Environmental effects would be similar to those associated with the development of the proposed project and would include loss of fish habitat by draining lakes and disturbance of the terrestrial environment from mining activities, waste rock dumps and road construction. Until additional pipes were actually identified as candidates for mining and studies have been undertaken, the exact effects could not be quantified. BHP concluded that the net socio-economic benefits of additional developments would outweigh any environmental losses that could occur.

BHP pointed out that the discovery of additional economically viable pipes was speculative and had been included only to illustrate cumulative effects of hypothetical future developments. It noted that although 44 kimberlite pipes have been found in the claims block, so far only the five subject of this review have been identified as economically viable. Further, BHP stated that of 5,000 known kimberlite bodies in the world, only 50 have contained economic diamond deposits and only 15 have produced major diamond mines.

With regards to the cumulative effects analysis performed by BHP, DIAND commented that the Proponent provided an adequate definition of a cumulative impact and outlined an acceptable approach to its assessment. Further, DIAND endorsed the approach of monitoring and of adaptive management to mitigate potential cumulative effects. DIAND pointed out that the department and the other partners in the WKSS recognize the need to increase the understanding of the region to improve management of future development.

The Panel concludes that the cumulative environmental effects of additional development by BHP on the Lac de Gras claims block are unlikely to be significant. It has reached this conclusion for several reasons. First, mining of additional pipes would extend the life of the mine and would not result in development of additional processing

capacity. Secondly, tailings would be deposited in mined-out pits and no expansion of the Long Lake tailings impoundment or creation of a new impoundment would be required. Thirdly, if additional pits were developed, the Proponent and government would have some years of experience in managing the effects of the Project. Nevertheless, continued monitoring and adaptive management would be required, especially if the new pits were located in previously undeveloped watersheds. Finally, the panel agrees with the Proponent's conclusion that the cumulative socio-economic effects entailed by extending the life of the mine are likely to be positive since extension of the life of the mine would provide economic stability. However, continued socio-economic monitoring would still be required to determine actual effects and to ensure that any negative social or cultural effects are identified and mitigated.

Throughout the review the cumulative effects of potential future developments in the region was of much greater concern than the effects of any additional pits that BHP may open on its claims block. This concern was heightened by the fact that there has been little industrial development in the region and that available baseline information for cumulative effects assessment is limited. Two cumulative effects already of concern are the effects of exploration in general, and of increased traffic on the Echo Bay winter road, in particular. The effects of these activities on wildlife were frequently raised during the review. The panel concludes that further work is needed on the cumulative effects of exploration activities on wildlife in the region and believes that government and the WKSS should ensure that this is done.

As previously discussed, the WKSS was initiated to understand the potential effects of development in the region but it seems to have adopted a narrower mandate. In the Panel's opinion, the WKSS has the potential to gather the information necessary to assess the cumulative effects of development in the region, but it appears that the assessment may fall to others. The Panel urges the WKSS to ensure that its study program is designed to provide the information needed for cumulative effects assessment of future development in the region.

The Panel understands that future mining developments requiring regulatory approvals from the federal government (for example, a water licence or land-use permit) would trigger an assessment under the *Canadian Environmental Assessment Act.* This act specifically requires that the assessment consider any cumulative environmental effects that are likely to result from the project in combination with other projects or activities that have been or will be carried out. It will, therefore, fall to the responsible government authority under the act to ensure that cumulative effects have been considered prior to granting approvals to any future projects. The Panel notes that careful monitoring of the effects of the BHP project would provide valuable information for the assessment of cumulative effects of future developments. The design of monitoring programs should, therefore, keep this broader need in mind.

6.3 PUBLIC REVIEW PROCESS

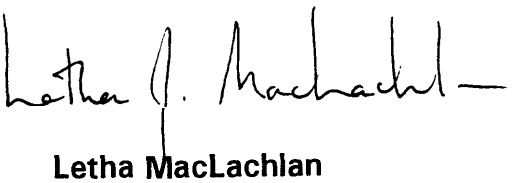
The Panel's Terms of Reference set out the main steps in the review process, and for most of these steps, identified a time frame. From the outset, the Panel took the time frames seriously and was successful in completing each step within the time allotted.

During the early stages of the review, concerns were raised about the lengthy time that the review process was likely to take. As the review progressed, and the Panel met the time lines in the Terms of Reference, these concerns diminished. The Panel interprets some of the early concerns as related more to the time taken to appoint the Panel than its activities. Nevertheless, a segment of those involved continued to remind the Panel of the need to conduct the review in a timely manner. Others felt that not enough time was allocated for the review in general, and for the review of the EIS in particular. Some Aboriginal people expressed concern that a portion of the review occurred during summer and over Christmas when they were occupied with culturally important activities. During the hearings it was noted by Aboriginal people that they did not have the time to examine and understand the EIS.

The Guidelines issued by the Panel encouraged the Proponent to conduct a public information program during the EIS review period to explain the Project and its effects. With the exception of Kugluktuk, the Proponent was unable to hold meetings with the communities to discuss the EIS and to respond to questions. In the Panel's view, the fact that this step did not occur made the community sessions of the public hearings more difficult for all, since it was necessary for the Proponent to describe the project and its effects during these sessions.

Participant funding also was a concern of some groups. For example, the Northern Environmental Coalition stated that there is a need for public accountability for participant funding. The NWT Federation of Labour recommended that the Auditor General of Canada review the administration and disbursement of participant funding, in particular for the scoping phase. The Łutselk'e First Nation took the position that it was not provided with sufficient resources to review the EIS and that it could not afford to hire specialists due to limited participant funding. On the other hand, several presenters including the Northern Environmental Coalition acknowledged the support provided by the Participant Funding Program. As the Panel was not involved in the allocation of participant funding, it is in no position to comment on the disbursement of funds nor to make a comment on future procedures for participant funding. These comments are, however, flagged for the information of the Canadian Environmental Assessment Agency.

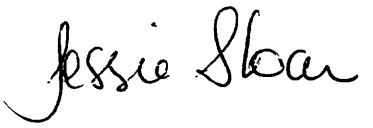
NWT DIAMONDS PROJECT
ENVIRONMENTAL ASSESSMENT PANEL



Letha MacLachlan
Chair

Cindy Kenny-Gilday

Walter Kupsch



Jessie Sloan

APPENDIX A

PANEL MEMBER BIOGRAPHIES

Letha MacLachlan (Chair)

Ms. MacLachlan has worked in the NWJ since 1972 with Aboriginal people, government, small businesses and environmental interests. Her experience appearing before and sitting on administrative tribunals is extensive and backed by a strong practical and academic background in environmental, corporate and administrative law and Aboriginal comprehensive land claims. She is a former member of the NWJ Water Board and independent chair of two public reviews of Workers' Compensation in the NWJ. She has served on the boards of numerous territorial and national organizations, and currently practices law in Calgary.

Cindy Kenny-Gildav

Ms. Kenny-Gilday is a Dene originally from Deline, NWJ. She now works as a private consultant out of Yellowknife. She has worked as a teacher and a communications specialist with Aboriginal organizations on local, national and international levels. One of the founders of Indigenous Survival International, she served with the World Conservation Union as Chair of their first indigenous forum. She is a member of the National Round Table on Environment and Economy and a board member of the Canadian Native Arts Foundation. She received the Aboriginal Achievement Award in 1994 for her work on environmental and Aboriginal rights issues.

Walter Kupsch

Dr. Kupsch is Professor Emeritus, Geological Sciences, University of Saskatchewan. Until his retirement in 1986, he had a long and distinguished career at the University with considerable experience in the NWJ and on northern issues. He was the recipient of the NWJ Commissioner's Award for Public Service in 1992 and editor and co-editor of *The Musk-Ox – a Journal on the North* from 198 1 to *1994.*

Jessie Sloan

Miss Sloan is an economic consultant specializing in resource and environmental issues. Prior to moving to Yellowknife in 1990, her career included work with a management consulting firm in Ottawa and service with the Alberta Department of Energy and Natural Resources as Director of Resource Economics. Her academic background includes degrees in geology and in economics.

APPENDIX B

TERMS OF REFERENCE

Environmental Assessment Panel Review Of The Proposed BHP Minerals NWT Diamond Mine, Northwest Territories

Introduction

At the request of the federal Minister of Indian Affairs and Northern Development, an Environmental Assessment Panel has been appointed by the federal Minister of the Environment in accordance with the requirements of the Environmental Assessment and Review Process (EARP) Guidelines Order to conduct a public review of the environmental and socio-economic effects directly associated with BHP Minerals Canada Ltd.'s proposed diamond mine project in the Lac de Gras area of the Northwest Territories.

These Terms of Reference are issued by the Minister of the Environment and were developed through consultation with the Department of Indian Affairs and Northern Development, the Government of the Northwest Territories and directly affected First Nation and Inuit organizations.

For purposes of this review, the Department of Indian Affairs and Northern Development is the project initiator and BHP Minerals Canada Ltd. is the project proponent.

Scope of the Review

In conducting its review, the Panel will take into consideration the following:

- **the project's short and long-term environmental effects within the Northwest Territories and the social effects directly related to these environmental effects; and**

- **the project's short and long-term general socio-economic effects within the Northwest Territories.**

The above effects will include those associated with:

- **construction activities;**
- **mining operations;**
- **milling operations;**
- **transportation of mine products, materials and consumables within the NW;**
- **tailings and waste water management;**
- **waste rock management;**
- **site infrastructure including camp, roads, powerhouse and air strip;**
- **regional infrastructure including access roads (all weather and ice roads); and**
- **mine abandonment and reclamation activities with emphasis on waste rock and mine tailings.**

The Panel's review shall also include consideration of issues relating to long-term cumulative effects of the current project in addition to future development scenarios as identified by BHP on its Lac de Gras properties.

In reviewing and assessing the project's environmental and socio-economic effects, the Panel will give full and equal consideration to traditional knowledge.

In the course of conducting its review of the BHP proposal, the Panel may identify issues which, in its view, may also arise in conjunction with other development initiatives in the Slave Geological Province and which could, therefore, be considered as generic issues. Although a review of other development initiatives is not within the Panel's Terms of Reference, the Panel may recommend appropriate approaches on how to deal with these generic issues, including referral to the regional study being proposed for the Slave Geological Province. This regional study is intended to establish an information base that would be used in decisions related to future developments in the area. The Panel's report is not to be contingent upon this other initiative. Rather, the Panel should proceed to conduct its work and produce its report, including any input it may provide to the regional study, in a timely manner.

If, at the completion of its review, the Panel concludes that the effects of the project referred to above are acceptable, it shall recommend terms and

conditions under which the project could proceed and provide recommendations relating to appropriate procedures **for the management of short-term and long-term cumulative effects associated with any future development by BHP on its Lac de Gras properties. If the Panel concludes that the effects of the project are unacceptable, it shall provide its rationale** for this conclusion.

Review Process

The main steps in the Panel review process shall be **as follows:**

1. **Preparation and, subject to the approval of the Executive Chairman of the Federal Environmental Assessment Review Office, issuance by the Panel of operational procedures for the conduct of its review (within one month of appointment of the Panel).**

2. **Submission by BHP Minerals Canada Ltd. of a project description document that will form the basis for the review. This document should include the project description that the proponent wishes the Panel to review including longer term future development scenarios for the BHP Lac de Gras properties. It should include a description of all of the project elements listed in the Scope of the Review above. If the Panel concludes that the project description document does not adequately describe all aspects of the proposal, it can request additional information from the proponent. Should the project be changed by the proponent at any time during the review, the Panel may choose to repeat some or all of the review steps to ensure that these changes are subject to review.**

3. **Review by the Panel of existing project documentation including the project description and the results of the Regional Environmental Review Committee's technical evaluation.**

4. **Preparation by the Panel of draft Guidelines for the Preparation of an Environmental Impact Statement (EIS Guidelines) and distribution for public comment (within one month of receipt of project description).**

5. **Holding of public "scoping" meetings by the Panel in communities and centres in the Northwest Territories that could be affected by the project (within three months of receipt of project description). The Panel will determine which communities are appropriate for these meetings. The purpose of these meetings will be to introduce the Panel to the communities, to explain its review process, to help identify priority issues to be addressed during the review and to receive comments on the Panel's draft EIS Guidelines.**

6. **Finalitation by the Panel of the EIS Guidelines (within five months of receipt of the project description). These EIS Guidelines will be issued to the project proponent, BHP Minerals Canada Ltd., which will then be responsible for preparing the EIS. The final EIS Guidelines will be made publicly available.**

7. **Submission to the Panel of the completed EIS by the project proponent. Upon receipt, the EIS will be publicly distributed by the Panel for review and comment.**

8. **At the completion of the EIS review (within three months of receipt of the EIS in appropriate languages as determined by the Panel), if the Panel identifies deficiencies in the document, it may request additional information from the proponent. If these deficiencies are deemed significant, the Panel may provide an additional period for public review and comment on the proponent's response to the request for additional information.**

9. **Once the Panel determines that the EIS documentation is sufficient to proceed to public hearings, it will schedule and announce the hearings. The Panel will issue detailed procedures for the conduct of the hearings. As in the case of the public meetings described in (5) above, the Panel will decide which communities in the Northwest Territories will be included in the hearing process. The hearings will be conducted in a non-judicial manner but will be structured to allow for an examination of matters relevant to the Panel's mandate.**

10. **Preparation of Panel report containing its findings, conclusions and recommendations (within four months of the completion of the hearings). This report will be formally conveyed to the federal Ministers of the Environment and Indian Affairs and Northern Development. The report will also be transmitted to the Premier of the Northwest Territories as well as to the Dogrib Treaty 11 Council, the Yellowknives Dene Band and Nunavut Tunngavik Incorporated.**

Specialist Advisors to the Panel

The Panel may secure the services of independent specialists to provide information on and help interpret technical and scientific issues and issues relating to traditional knowledge.

Translation/Interpretation Requirements

Key review documents shall be translated into appropriate native languages. The Panel, following consultation with appropriate First Nation and Inuit organizations, will determine into which languages these documents will be translated. For some of the documents, the Panel may decide that translation into an oral format may be more appropriate than a written translation.

During the Panel's "scoping" meetings and at the public hearings, appropriate interpretation services will be provided by the Panel.

APPENDIX C

LIST OF REVIEW DOCUMENTS

- NWT Diamonds Project Description Report. Submitted by BHP Diamonds Inc., December 1994.
- Submissions received during Scoping, February-April, 1995.
- Final Guidelines in the preparation of an Environmental Impact Statement. Issued by the Panel, May 1995.
- Government Information Request. Issued by the Panel, May 1995.
- NWT Diamonds Project Environmental Impact Statement. Submitted by BHP Diamonds Inc. and DIA MET Minerals Ltd., July 1995.
- Federal Government Response to the BHP Diamond Mine Environmental Assessment Panel's Government Information Request, August 1995.
- Government of the Northwest Territories' Response to the BHP Diamond Mine Environmental Assessment Panel's Government Information Request, August 1995.
- Submissions received during Environmental Impact Statement Review, July-October, 1995.
- Request for Additional Information. Issued by the Panel, November 1995.
- 1995 Baseline Study Updates. Submitted by BHP Diamonds Inc., December 1995.
  - 1995 Archaeological Investigation for BHP Diamonds Inc.
  - Caribou Assessment
  - Fisheries and Aquatic Life
  - Meteorology, Hydrology and Water Quality
  - Ecological Mapping
  - Eskers, Carnivores and Dens
  - Water Rock Leaching
  - Small Mammals Inventory and Habitat Assessment
  - Bird Inventory and Habitat Assessment
  - NWT Community Mobilization Partnership Strategy
  - Communications Program & Public Involvement Update
  - Status of The Traditional Knowledge Program
- Tailings Management Plan and Preliminary Design of Retention Structures. Prepared by EBA Engineering Consultants Ltd. for NWT Diamonds Project, December 1995.
- NWT Diamonds Project Environmental Impact Statement, Additional Information Response. Submitted by BHP Diamonds Inc., and DIA MET Minerals Ltd., December 1995.
- NWT Diamonds Project Environmental Impact Statement, Additional Information Response – Part C. Submitted by BHP Diamonds Inc., and DIA MET Minerals Ltd., January 1996.
- Submissions received during Public Hearings, January-February, 1996.
- Transcripts of Public Hearings, January 22, 1996 to February 23, 1996.

APPENDIX D

CURRENT AND FORMER PLACE NAMES

Place names in the NWT are in the process of being revised to reflect the name originally used by Aboriginal peoples. A list of current and former names follows for the convenience of the reader.

CURRENT NAME	FORMER NAME
Kugluktuk	Coppermine
Łutsel k'e	Snowdrift
Ndilo	Rainbow Valley
Umingmaktok	Bay Chimo
Wha Ti	Lac La Martre

APPENDIX E

LIST OF PRESENTERS AT PUBLIC HEARINGS*

January 22, 1996
Community Session
Wha Ti, Northwest Territories

Chief Charlie Jeremick'ca
Grand Chief Joe Rabesca
Mayor Mike Nitsiza
Alexi Arrowmaker
Johnny Nitsiza
Joe Migwi
Joe Zoe Fish
Nick Mantla
Jimmy Nitsiza
Gertie Brown
Jonas Nitsiza
Mary Adel Rabesca
Nick Black
Jimmy Rabesca
Pierre Beaverho
Narcisse Bishop
Louis Williah
Johnny Simpson

January 23, 1996
Community Session
Rae Lakes, Northwest Territories

Chief Henry Gon
Grand Chief Joe Rabesca
Harry Simpson
Alphonse Quitte
Amen Tailbone
Sally Anne Zoe
Jimmy Arrowmaker
John D. Quitte
Fred Mantla
Johnnie Washie
Rita Blackduck
Joe Zoe
Charlie Wetrade
Joseph Black
Lana Rowland
Joe Wetrade
Charlie Gon
Eddie Chocolate
Fred Mantla
Nick Black

January 25, 1996
Community Session
Rae-Edzo, Northwest Territories

Grand Chief Joe Rabesca
Mayor Dan Marion
Joe Migwi
Phillip Huskey
George Blondin
Jean Pierre Michel
Bobby Gon
Henry Zoe
Pierre Wedzin
Shelto Douglas
Chief Charlie Jeremick'ca
Phillip Dryneck
Joe Mackenzie
Eddie Lafferty
Nick Black
Harry Simpson
Jimmy Martin
Amen Tailbone
Chief Henry Gon
John Mantla
Marilyn Martin
Shirley Drybones
Celine Football
Violet Camsell-Blondin
Elizabeth Quitte
Alphonse Eronchi
Charlie Bishop
Ernie Smith
Jimmy Beaverho

* BHP made presentations at each community session, the general session and at each technical sessions.

January 26, 1996
Community Session
Snare Lake, Northwest Territories

Chief Joseph Judas
Alexi Arrowmaker
Louie Wane
Charlie Football
Joe Dryneck
Sam Simpson
Jimmy Kodzin
Joe Bolin
Margaret Lafferty
Pierre Judas
Johnny Arrowmaker

January 29, 1996
Community Session
Łutselk'e, Northwest Territories

Chief Felix Lockhart
Maurice Lockhart
Lawrence Catholique
J.B. Rabesca
Eliza Enzoe
Bernadette Lockhart
Noel Drybone
Pierre Marlowe
Antoine Michel
Dora Enzoe
Jackie Coulter
Henry Basil
Angie Lantz Lockhart
Florence Catholique
John Rabesca
Louie Abel
Annie Catholique
Emily Saunders
Lorraine Catholique
J .C. Catholique
Pierre Catholique

January 31, 1996
Community Session
Kugluktuk, Northwest Territories

Ernie Bernhardt
Joe Allen Evyagotailak
Millie Kuliklane
Michael MacLachlan
Connie Nalvana
Joe Niptanatiak
Ron Tologanak
Mayor Donald Havioyak
Baba Pedersen
Jim Cunningham
Randy Mulders
Peter Evoyala k
Buster Kailik

February 2, 1996
Community Session
Ndilo, Northwest Territories

Chief Jonas Sangris
Joe Charlo
Fred Sangris
Isadore Tsetta
Michel Paper
Fred Erasmus
Judy Charlo
Elisa Liske
Reanna Erasmus
Joanne Erasmus
Steven Charlo
Erica Abel
Paul Betsina
Diane Betsina
Chief Bill Erasmus
Rick Edjericon
Ernest Betsina
Isadore Sangris
Muriel Betsina
Fred Turner
Frank Betsina
Alex Beaulieu

February 3, 1996
Community Session
Dettah, Northwest Territories

Chief Jonas Sangris
Michel Paper
Fred Sangris
Danny Beaulieu
Tommy Unka
Chief Darrell Beaulieu
Florence Erasmus
Isadore Tsetta
Judy Charlo
Lena Cleary
Cecilia Bealieu
Bob Turner
Rick Edjericon
GeorgeTatsiechele
Sarah Charlo
Roy Erasmus
Lisa Charlo-Piper

Ernest Betsina
Bertha Blondin
Chief Bill Erasmus
Verna Crapeau
Ted Tsetta

February 12, 1996
General Session
Yellowknife, Northwest Territories

Deputy Mayor Blake Lyons

Department of Indian Affairs and Northern Development:
- Warren Johnson
- Hiram Beaubier
- Dan Murphy
- Jane Ann Manson

West Kitikmeot Slave Study Society:
- Hal Mills

Dene Nation:
- Grand Chief Gerald Antoine

Dogrib Treaty 11 Council:
- Violet Camsell-Blondin
- Joe Mackenzie
- James Wah-Shee

Environment Canada:
- Tim Coleman

Government of the Northwest Territories:
- Joe Handley
- John Donihee

Yellowknives Dene Band:
- Chief Jonas Sangris
- Chief Darrell Beaulieu

Northern Environmental Coalition – World Wildlife Fund:
- Monte Hummel

February 13, 1996
Technical Session – Traditional Knowledge
Yellowknife, Northwest Territories

Department of Indian Affairs and Northern Development:
- David Livingstone
- Fred McFarlane

Yellowknives Dene First Nation:
- Fred Sangris
- Susan Quirk

Cutselk'e Dene Council:
- Louie Abel
- Noel Drybones

Government of the Northwest Territories:
- Marius Tungali k
- Joe Handley
- Tom Andrews
- Cheryl Fennell
- Chuck Arnold
- Vicki Robillard

Dene Nation:
- Chief Bill Erasmus
- François Paulette

February 14, 1996
General Session
Yellowknife, Northwest Territories

Northern Environmental Coalition – Ecology North:
- Charles Laird
- Andrew Spaulding

Northern Environmental Coalition – Canadian Nature Federation:
- Larry Reynolds

Northern Environmental Coalition – Canadian Arctic Resources Committee:
- Marina Devine
- Terry Fenge
- Kevin O'Reilly

Braden-Burry Expediting Services:
- Gordon Stewart

Alex Hall

Town of Hay River:
- Mayor Jack Rowe
- Jim Guthrie
- Alan Milo

NWT Chamber of Mines:
- Tom Hoefer

Joachim Obst

Joanne Lowell

Rene Fumoleau

Ann Bowen

Dene Nation:
Chief Bill Erasmus

Yellowknives Dene First Nation:
Chief Darrell Beaulieu

Finning:
Mike Penn

Dave Olesen

NWT Caribou Outfitters Association:
Jim Peterson

Clark Builders:
Scott Hunt

February 16, 1996
Technical Session – Environmental Management Plans
Yellowknife, Northwest Territories

Department of Indian Affairs and Northern Development:
David Livingstone
Floyd Adlem
John Witteman
Annette McRobert

Environment Canada:
Laura Johnston
Karen McDonald
Dave Tilden

Northern Environmental Coalition:
Doug Baker

Government of the Northwest Territories:
John Donihee
Stephen Matthews
Andrew Gamble

Łutselk'e Dene Council:
Chief Felix Lockhart
Angie Lantz

Northern Environmental Coalition:
Larry Reynolds

Northern Environmental Coalition – World Wildlife Fund:
Kevin Kavanaugh

Dene Nation:
Chief Bill Erasmus

NWT Chamber of Mines:
Tom Hoefer
David Hohnstein

February 17, 1996
General Session
Yellowknife, Northwest Territories

Coronation Impact Review Committee:
Jim Cunningham

NWT Community Mobilization Partnership Society:
Glenn Zelinski
Peter Arychu k
Adam Bernbridge

Robert Hay

Canadian Coast Guard:
Yvette Myers
Diane McClymot-Peace

Alberta Building and Construction Trades Council:
Bob Blakely
Jim Evoy

Government of the Northwest Territories:
Graham Nicholls
John Munroe
Michael Cunningham
Milos Vainer

Cutsel k'e Dene Council:
Chief Felix Lockhart
Alex Moun
Nick Styant-Brown
Chief Bill Erasmus

Chris O'Brien

Alternatives North:
Suzette Montreuil

Roman Catholic Diocese of Mackenzie:
Sister Marie Zarowny

Mining Association of Canada:
George Miller

NWT Chamber of Commerce:
Don Yamkowy
Bob Brooks
Ray Anderson

February 19, 1996
Technical Session – Water
Yellowknife, Northwest Territories

Department of Indian Affairs and Northern Development:
David Livingstone
David Jessiman
Juanita Peddle
Chris Spence
Bill Coedy

Natural Resources Canada:
Ron Edwards
Grant Feasby
Alan Judge
Wayne Shinya

Department of Fisheries and Oceans:
Brian Ferguson
Jeff Stein

Environment Canada:
Scott McDonald
Gary Grove
Jack Klaverkamp
Jesse Jasper
Doug Halliwell

. Government of the Northwest Territories:
Neill Thompson
Igor Holubec

Northern Environmental Coalition:
David Schindler
Peter McCart

Dene Nation:
Chief Bill Erasmus

Łutselk'e Dene Council:
Antoine Michel

February 20, 1996
Technical Session – Wildlife
Yellowknife, Northwest Territories

Government of the Northwest Territories:
Anne Gunn
Ray Case
Andy McMullen
John Donihee
Bob Bromeley

Northern Environmental Coalition:
Steve Herrero
Dick Schideler
Bill Fuller
Josef Svoboda

NWT Chamber of Mines:
Walter Sampson

Dene Nation:
Chief Bill Erasmus

Environment Canada:
Paul Latour
Tim Coleman
Laura Johnson
Jim Hines

Cutselk'e Dene Council:
Lawrence Catholique

February 21, 1996
Technical Session – Socio-Economic
Yellowknife, Northwest Territories

Government of the Northwest Territories:
Graham Nicholls
Ken Lovely

NWT Construction Association:
Bill Aho
Dick Bushey

Chuck Fipke

Northern Environmental Coalition:
Susan Wismer
Frances Abele

NWT Chamber of Mines:
Joe Whitehawk
Walter Sampson

Métis Nation of the Northwest Territories:
Gary Bohnet
Mike Paulette
Bill Carpenter

Yellowknife Chamber of Commerce:
Liz Wyman

Northern Environmental Coalition – Canadian Nature Federation:
Kevin McNamee

Northern Environmental Coalition – Dene Culture Institute:
Joanne Barnaby
Allice Legat

February 22, 1996
Technical Session – Socio-Economic
Yellowknife, Northwest Territories

Department of Indian Affairs and Northern Development:
Warren Johnson
Dan Murphy
Doug Camilucci

Status of Women Council of the NWT:
Marsha Argue

City of Yellowknife:
Mayor David Lovell
Joe Kronstal
Dan Levert
Bernie Girardin
Grant Rice
Max Hall
Trevor Kasteel

Dene Nation:
Chief Bill Erasmus

Łutselk'e Dene Council:
Lawrence Catholique

General Session

City of Edmonton:
Mayor Bill Smith

BHPCL:
Ian Wood
Kipling Uiari

NWT Chamber of Mines:
Joe Whitehawk

Association of Professional Engineers, Geologists and Geophysicists of the NWT:
Anne Lanteigne

Jamie Bastedo

Allice Legat
Gabrielle Mackenzie-Scott

NWT Federation of Labour:
Jim Evoy

Ross Burnet

Royal Canadian Mounted Police:
Chief Superintendent Ross Grimmer
Superintendent Bill Sweeney

Nunavut Water Board Transition Team:
Violet Ford

February 23, 1996
General Session
Yellowknife, Northwest Territories

Mary-Anne Bromley

Andrew Spaulding

Yellowknife Economic Development Authority:
Garth Wallbridge

Yellowknife Métis:
Garth Wallbridge
Darcy Arden

Canadian Congress for Learning Opportunities for Women:
Lynn Fogwill

NWT Enviro Watch:
Peter Atamanenko

Canadian North:
Bob Davies

Concerned Group of Citiznes in Support of BHP:
Brian Harrison
Doug Witty

Jake Ootes, MLA

Business Committee for Support of BHP:
Dale Vance
Eric Sputek
Gord Stewart

Aggie Brockman

Wayne Fipke

Rauri Carthew
Amanda Halldorson

Karen Hamre
Peggy Holroyd
Ri k LeBlanc
Chris Perry
Missy Chenard
Eri ka Pittman

Anke Tuininga

Closing Statements

Northern Environmental Coalition:
Terry Fenge

Métis Nation of the NWT:
Bill Carpenter

Government of the Northwest Territories:
John Donihee

BHP:
Jim Excell

APPENDIX F

GLOSSARY

Active layer: soil, subsoil or other ground that freezes and thaws annually.

Bathymetry: information on depths of water bodies.

Biological diversity: the variety of living organisms.

Biogeoclimatic: a system of land classification that considers biological, geological and climatic factors.

Borrow materials: granular materials excavated for use as fill.

Claims block: the area of the mineral claims established by the Proponent.

Closure: the process of closing down and cleaning up a mine site.

Cumulative effect: an effect that results from effects of a project when combined with effects of other past, existing and imminent projects and activities.

Decommissioning: the orderly closing down of a mining facility.

Demography: the statistical study of human populations.

Ecosystem: an interdependent system of living organisms and their environment.

Ecosystem integrity: a measure of the overall health of an ecosystem.

Esker: a sinuous ridge of gravel and sand deposited by a stream flowing in or beneath the ice of a retreating glacier, and left behind when the ice melted.

Geochemical: the chemical and geological properties of a substance.

Glaciofluvial: unconsolidated rock material deposited by meltwater streams flowing from glaciers.

Gross domestic product (GDP): a statement of the distribution, at market prices, of the goods and services produced in the economy during a given year.

Hydrology: a science dealing with the properties, distribution and circulation of water on the surface of the land, in the soil and underlying rocks, and in the atmosphere.

Kimberlite: an igneous rock that consists mainly of the mineral olivine and is found in volcanic pipes.

Mitigation: the elimination, reduction or control of the adverse effects of a project.

Multiplier effect: the way in which an increase or decrease in new capital formation can cause cumulative effects in the national income through consumer expenditure.

Nunavut: the name of the settlement area created by the Land Claim Settlement between Canada and the Inuit of the NWT. It is also the name of the new territory that is scheduled to come into being in 1999.

Permafrost: soil, subsoil or other ground that stays frozen for more than two years.

Raptor: a bird of prey.

Reclamation: the process of returning a disturbed area to a more natural state.

Residual effect: an effect that persists after mitigation measures have been applied.

Scoping: public meetings held in communities to identify issues and concerns.

Talik: a layer of unfrozen ground below the active layer in permafrost.

Valued Ecosystem Component (VEC): environmental attributes or components identified as having scientific, social, cultural, economic or aesthetic value.

APPENDIX G

LIST OF ABBREVIATIONS

BHP	BHP Diamonds Inc. and the Blackwater Group
BHPCL	The Broken Hill Proprietary Company Limited
CAAQO	Canadian Ambient Air Quality Objectives
CCME	Canadian Council of Ministers of the Environment
COSEWIC	Committee on Status of Endangered Wildlife in Canada
DFO	Department of Fisheries and Oceans
DIAND	Department of Indian Affairs and Northern Development
EIS	Environmental Impact Statement
GNWT	Government of the Northwest Territories
IBA	Impact and Benefits Agreement
NRCan	Natural Resources Canada
NWT	Northwest Territories
RERC	Regional Environmental Review Committee
VEC	Valued Ecosystem Component
WKSS	West Kitikmeot Slave Study

APPENDIX H

ACKNOWLEDGEMENTS

The Panel thanks all individuals, organizations and agencies who contributed to the review process. In particular, the Panel thanks the people of the north who welcomed the Panel to their communities and provided many thoughtful presentations. The Panel appreciates the full co-operation of BHP Diamonds Inc. throughout the review.

The Panel also wishes to extend special thanks to its secretariat that assisted in the review and in completion of the report. They are:

John Mathers, Panel Manager
Catherine Badke, Manager, Operations
Denise Burlingame, Office Co-ordinator (April 1995 - June 1996)
Jackie Kelly, Office Co-ordinator (February - April 1995)
Rosa Wah-Shee, Community Liaison Officer (February - April 1995)

Finally, the Panel thanks the staff of the Canadian Environmental Assessment Agency in general for their assistance.