Mackenzie Valley Environmental Impact Review Board

Report of Environmental Assessment
on the
Proposed Development of Sable, Pigeon and Beartooth Kimberlite Pipes

February 7, 2001

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Executive Summary
Report of Environmental Assessment on the Proposed Development of Sable, Pigeon and Beartooth Kimberlite Pipes

The Review Board has been guided by the principles outlined in sections 114 and 115 of the MVRMA throughout this environmental assessment. These include the need to protect the environment from significant adverse impacts, and, to protect the social, cultural and economic well-being of residents and communities in the Mackenzie Valley. Having considered the views and concerns of the participants in this process, and the evidence on the public registry, the Review Board made its decision according to section 128 of the *Mackenzie Valley Resource Management Act*.

The Review Board recommends approval of the proposed development subject to the imposition of measures it considers necessary to prevent significant adverse effects s.128(1)(b)(ii). The Review Board concludes that the fiscal arrangement between the federal government and the territorial government with respect to the BHP development is having a significant adverse impact on the GNWT's ability to diversify its economy in order to avoid a boom-bust cycle.

In addition to the imposition of the measures provided in the Review Board's recommendations throughout the Report of Environmental Assessment, the Review Board fully expects BHP to discharge all the commitments and undertakings given in its environmental assessment report and supporting documentation.

The recommendations are based on the evidence presented to the Review Board from participants during the environmental assessment. This body of evidence is contained in the Review Board's Public Registry and comprises some 600 pieces of documentation.

The Review Board, during the course of conducting this environmental assessment, made rulings on different aspects of the environmental impact assessment process. These are covered in more detail in section 4.2. Specifically, the Review Board had to make rulings, based on arguments provided by participants, on the extent of spatial boundaries and temporal boundaries as they apply to this environmental assessment. These rulings, including direction on the determination of significance, has guided the Review Board in coming to its conclusions in this report.

Many of the recommendations contained in this report are notes to the regulatory authorities, specifically the Mackenzie Valley Land and Water Board, to consider certain issues when this body develops the Water Licence and Land Use Permit for the development.

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1 General Information

This section of the Report of Environmental Assessment summarizes the development proposal under consideration, the roles and responsibilities of the Mackenzie Valley Environmental Impact Review Board (Review Board or Board) and the environmental assessment (EA) process to which the development proposal was subject.

BHP Diamonds Inc. (BHP) applied for regulatory approval (1998) for the development of the Sable, Pigeon and Beartooth Kimberlite pipes (the proposed development or mines), and the infrastructure required for the development, reclamation and eventual abandonment of the mines. The proposed development involves construction of a trunk road to connect the three open pit mines to the existing process plant, spur roads where necessary, and supporting infrastructure and undertakings required for the mines. The purpose of the three mines is to contribute mill feed from which diamonds are recovered in order to increase the life of the existing Ekati mine.

The Mackenzie Valley Environmental Impact Review Board is responsible for the assessment of the environmental, socio-economic and cultural impacts of the proposed development according to Part 5 of the *Mackenzie Valley Resource Management Act* (the MVRMA or the Act). The Review Board has completed its environmental assessment of the proposed development. The Board considered the benefits of the proposed development to the residents of the Mackenzie Valley and Canada in light of the possible environmental effects of the development and the public concerns expressed during the environmental assessment process.

This report constitutes the reasons for decision of the Review Board and the report of environmental assessment and recommendations required by the Act.

1.1 Referral of the proposed development to the Review Board

BHP Diamonds Inc., a Canadian subsidiary of BHP Minerals, applied to the Northwest Territories (NWT) Water Board for a Water Licence on November 20, 1998. A preliminary screening of the proposed development was initiated on February 19, 1999 in accordance with the MVRMA. On April 6, 1999 the Department of Indian Affairs and Northern Development recommended that the NWT Water Board (Water Board) refer the proposed development to EA. The Water Board referred the development to the Review Board for environmental assessment on April 16, 1999. The reasons cited for the Water Board's referral included the location of the development in the previously unaffected Exeter drainage basin, cumulative effects, public concern and other concerns that warranted a broader review. By letter dated May 12, 1999 the Review Board formally notified regulatory bodies of the referral. The Review Board then initiated work planning for the EA.

1.2 The Mackenzie Valley Environmental Impact Review Board

The Mackenzie Valley Environmental Impact Review Board administers Part 5 of the MVRMA and has decision-making responsibilities in relation to the proposed development. The Board must conduct an environmental assessment of the proposed development in accordance with section 117 of the MVRMA. The Board is also required to prepare and submit a report of environmental assessment in accordance with ss.128(2), a decision under ss.128(1), and written reasons, required by s.121, to the Federal Minister of the Department of Indian Affairs and Northern Development (DIAND).

As part of its environmental assessment, the Review Board considered the following reports:

- Project Description for the proposed development of Sable, Pigeon and Beartooth Kimberlite Pipes, filed in October 1999;
- *Environmental Assessment Report* (EAR) for the Sable, Pigeon and Beartooth Kimberlite Pipes, filed in April 2000;
- the Preliminary Design of Water Control Structures for Sable, Pigeon and Beartooth Kimberlite Pit Developments filed in April 2000;
- environmental assessment conformity responses;
- Information Requests and responses dated July 2000 and August 2000;
- relevant sections of the 1995 NWT Diamonds Project Environmental Impact Statement and Panel Report; and,
- all of the information contained in the public registry established for this assessment.

A complete list of the contents of the public registry and the documents considered during the preparation of this report is available from the Mackenzie Valley Environmental Impact Review Board.

1.3 General description of the development environment

BHP provided a description of the general environment affected by the proposed development in its Environmental Assessment Report. The proposed development is located within BHP's existing claim block, approximately 300km northeast of Yellowknife, Northwest Territories (NT) in the Slave Geological Province of the Precambrian Shield in the Lac de Gras watershed. Lac de Gras forms the headwater of the Coppermine River. The Coppermine River flows northward discharging into the Arctic Ocean near Kugluktuk, Nunavut. The land is flat and interspersed with chains of lakes, pools, streams and boulder fields. The vegetation is hardy and adapted to the harsh cold winters and the short cool summers. The area is underlain by continuous permafrost, with a shallow active surface layer that thaws during the brief summer. Summers are short and cool, while winters are up to eight months long and cold. Daily temperature extremes vary from 25°C in summer to -30°C in winter. Precipitation is low, averaging less than 350 mm annually, most of which falls as snow. The area is pristine. Known human use was periodic and is recorded in archaeological records and cultures of the First Nations.

2 Development description

This section summarizes the scope of development and scope of assessment for the environmental assessment of the proposed development of Sable, Pigeon and Beartooth Kimberlite pipes.

2.1 Overview of scoping process

The Review board undertook its consultation on the scope of development and scope of assessment through the consultation on the Terms of Reference. The consultation period for the Terms of Reference was from June 1999 to December 1999.

Overall, the comments received favoured keeping the environmental assessment focussed on the expansion proposal and not include elements already covered by the 1996 *Environmental Assessment and Review Process Guidelines Order* panel.

2.1.1 Scope of Development

The Review Board is required to determine the scope of a development according to ss.117 (1) of the Act. Scope of the development includes those components of the proposed development that will be included for consideration in the environmental assessment. The scope of development takes into account the principal development and any accessory developments and activities.

In considering the scope of development, the Review Board paid close attention to the previous environmental impact review conducted in 1996 in order to avoid duplication. In particular, the Review

Board was conscious of its obligation under s.127 of the MVRMA to consider the 1996 BHP-EIR. The Review Board decided that this environmental assessment should only include those changes to the Ekati™ Diamond Mine, occurring as a result of the proposed development and not covered by the previous report.

Within the scope of this development, the Review Board identified the principal development to be the main development proposed by BHP – the mining of the three kimberlite pipes. These pipes were not included in the original mine plan reviewed by the *Environmental Assessment and Review Process Guidelines Order* panel review in 1996 (BHP-EIR). The accessory developments and activities[1] are listed next.

- Beartooth, Pigeon and Sable pits,
- Above ground mining support infrastructure, including office, warehouse and equipment maintenance facilities at Sable,
- Waste rock storage,
- Overburden storage,
- Ore storage stockpiles,
- Borrow pits and quarry sites,
- Tailings and coarse kimberlite rejects and their disposal at the existing Long Lake Containment Facility and the mined out Beartooth pit.,
- Lake bottom sediments,
- Water management,
- Water management structures (dikes, diversion channels, or pipe intake and delivery systems),
- Lake dewatering,
- Pit water management system,
- Sewage treatment and containment areas,
- Sedimentation ponds,
- Transport,
- All weather haul road from Sable, Pigeon and Beartooth pits to the existing processing plant,
- Roads to borrow or quarry sites, and
- All weather haul roads to waste dumps.

In addition, the Review Board noted that the Leslie kimberlite pipe, which was included in the mine plan approved in 1996, had since been found to be uneconomic and was removed from the mine plan in 1997. This meant that the operating life of the Ekati™ mine was reduced from 25 to 15 years. With the proposed mining of the Sable, Pigeon and Beartooth pipes, an additional 3 years of reserves would be gained if mined at a rate of 18,000 tonne per day (tpd).

2.2 Scope of Assessment

In its Terms of Reference, the Review Board established the scope of assessment for the evaluation of impacts from this proposed development. In doing so, and, consistent with ss.117(2) of the Act, the Review Board also took into account the effect of malfunctions or accidents that may occur in connection with the development; any cumulative effect that was likely to result from the development in combination with other developments; and, any public comments.

The Review Board also noted, however, that socio-economic effects of the original development were dealt with in the BHP-EIR report on the basis of the then predicted 25-year mine life. As things stand now, mine life has been reduced by 40% of the term predicted in 1996. Consequently, the nature and scope of positive

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1 *Accessory Developments and Activities* - developments or activities that are associated with the principal development that are necessary for the principal development to proceed. In order to identify accessory developments or activities the following checks can be applied:

?? Linkage: It is accessory if the decision to undertake the principal development makes the decision to undertake other developments and activities inevitable.

?? Interdependence: It is accessory if the principal development could not proceed without these other developments or activities.

socio-economic effects predicted at that time have also changed. In the Review Board's opinion, this change to the socio-economic effects of the development in combination with the expansion also warranted consideration and this environmental assessment.

The Review Board was, however, persuaded by BHP's submission that the 1996 *NWT Diamond Project Report of the Environmental Assessment Panel* had considered and identified directly affected communities. Based on the comments of BHP and others, the Review Board decided to treat the proposed development as an addition to an existing operating mine and not a new mine.

2.2.1 Cumulative environmental effects and consideration of the previous environmental assessment

In the course of preparing the Terms of Reference, the Review Board was required to rule on the relationship to this proceeding of the cumulative environmental effects work undertaken and reported in the 1996 BHP-EIR. It was BHP's position that the previous report already considered the cumulative environmental effects of this proposed expansion.

The Review Board was not persuaded by BHP's submission that the 1996 BHP-EIR report had considered the cumulative effects of the proposed development. The Review Board determined that although three additional pipes were considered in the Panel report, the geographic scope of the cumulative effects assessment conducted in 1996 was limited to only the BHP Claim block. The Review Board also notes that when the Panel report was written, the Diavik Diamond Mine development was not considered in the cumulative effects assessment. Since the Review Board must consider cumulative effects of the proposed development in combination with other developments and since the Diavik operation is a new development, the Review Board decided to revisit the cumulative effects assessment of the BHP operation.

The Review Board decided that the BHP and Diavik developments both have the potential to affect Lac de Gras and the Coppermine River and that they were closely associated geographically. In its determination the Review Board held that the previously completed EARP Report's cumulative effects assessment was incomplete for the purposes of this environmental assessment.

2.2.2 Summary of potential impacts from the BHP development proposal

After receiving comments on the Terms of Reference, the Review Board settled on the following as the components of the environment that had to be evaluated for impacts from the proposed development i.e., scope of assessment.

Physical Environment

Air Quality and Climate

- *atmospheric dispersion of emissions on a local and regional scale*
- *greenhouse gas emissions including, but not limited to, No_x and SO_x*
- *atmospheric conversion processes of emissions (e.g. secondary particulates) and linkages between secondary particulates, the environment, and human health*
- *impact on biological receptors such as vegetation and wildlife; and*
- *potential environmental impacts from particulate matter deposition should be addressed, e.g., dust emissions from road traffic and construction.*

Terrain

- impacts on the Long Lake processed kimberlite containment area resulting from any changes in tailings disposal management and/or accelerated water inflow resulting from the Pigeon pipe development (including impacts on existing frozen-core dams, or changes to capacity)
- impacts of alternatives such as "backfilling" the mined out kimberlite pits with waste rock (especially for pipes that are close together).
- the proposed development's impact on the thermal milieu, including:

  - impact of pit mining activities and infrastructure on permafrost physical conditions (including physical strength characteristics) and thermal regime
  - potential for thermal erosion in relation to altered drainage
  - permafrost temperatures and ground ice conditions at mines and roadways, and in material being moved
- sensitivity of boggy / wetland terrain to drainage and thermal alterations (notably in relation to Pigeon pipe development)
- with respect to aggregate use, including massive ground ice and granular resource extraction, limitations on volumes of resource material and minimization of terrain disturbance associated with ground ice thaw
- rock types, including the chemistry of pipes and stability of kimberlite by-products
- slope stability of pit walls
- seismicity and potential for rock heaves
- amount of overburden, sediments, and rock to be removed.
- acid rock drainage potential and associated mitigation (including sub-aqueous disposal option); and
- impact of remedial actions at the mine site (waste dumps, tailings).

Water

Water Quality and Quantity

- dredging, in-filling, and impacts of blasting and its associated residues, in particular, nitrogen
- lake bed sediment placement and control of runoff
- impact of Pigeon and Sable kimberlite pipe development on the Exeter water shed
- dewatering of 393,000m^3 of water from Sable to Two-Rock Lake and resulting impacts on the water balance, lake levels, outflow rates, etc. in October and November in Two-Rock Lake
- dewatering lakes in October and November and related impacts on Panda Lake and the diversion channel, nutrient loading (in particular phosphorus), and effects on water bodies down stream where changes may occur that are greater then background variation
- impact on ephemeral streams and permanent streams which collect and disperse surface water flow
- impact on water quantity, including changes in timing, volume and deviation of peak and minimum flows due to physical changes in topography, landscape and drainage patterns
- impact on the surface and groundwater flows to associated wetlands
- siltation effects, e.g., runoff along roadways and drainage channels
- subaqueous disposal of potentially acid-generating rock and impact on water quality and aquatic organisms in the subject lake(s)
- the road to the Sable kimberlite pit and water crossings
- nutrient passage in fish and non-fish bearing water courses
- design, and rationale of using pervious rather then impervious dikes for waste water containment at the proposed Sable Kimberlite pit
- pit dewatering impacts including the experience gained from previous and on-going BHP Ekati^{TM} Diamond mine operations, and other comparable operations and its applicability to this proposed development;Water chemistry impacts of surface runoff
- ground water seepage impacts (through water retention dikes, into pits and underground); and
- contingencies for dealing with icing on the pit walls as well as ice removal from the pits.

Water Balance

- A water balance shall be prepared for the Beartooth and Pigeon kimberlite pits, the Sable kimberlite pit retention pond, and the Long Lake processed kimberlite containment area and incorporates the proposed development's components into the existing water balance of the mine.

General Water

- contaminant loading and dispersion (including surface runoff and airborne contaminants)
- acid rock drainage, metal leaching and geochemistry
- sedimentation (plumes and dispersion); and
- associated kimberlite toxicity and implications for aquatic wildlife.

Natural Environment

Vegetation and Plant Communities

- local plant communities classified as vegetation cover types in the existing monitoring program
- rare or highly valued species
- long-term, direct and indirect, habitat loss or alteration
- biodiversity; and
- vegetation productivity.

Aquatic Habitat

- productive capacity of aquatic systems during construction, operations, closure and post-closure
- impacts of works and activities such as creek diversions, and pit restoration
- impact on all lakes likely to have changes to fisheries resources including, but not limited to Two Rock, Beartooth, Pigeon Pond, Ulu, Sable, Upper Panda, and Exeter Lakes, and streams associated with these lakes
- habitat loss or alteration
- rare and/or sensitive fish species and habitat; and
- mortality (includes fishing).
- No Net Loss (Policy for the Management of Fish Habitat, DFO, 1986) of fish habitat is to be addressed when the loss of lake and stream habitat is being considered and when various proposed development components are restored

Wildlife and Wildlife Habitat

- Impact of loss of terrestrial habitat, and the quality of lost habitat for relevant species, that was not covered in the 1995 EIS
- habitat loss or alteration (e.g. fragmentation, connectivity)
- disturbance of feeding, nesting, denning or breeding habitats
- improved or altered access impacts
- wet-land habitat alteration, loss
- physical barriers to wildlife
- disruption, blockage, impediment and sensory disturbance, of daily or seasonal wildlife movements (e.g. migration, home ranges, etc.)
- rare, vulnerable, threatened or endangered species as outlined in the Canadian Organization of the Status of Endangered Wildlife in Canada (COSEWIC), as well as, species of international significance
- direct wildlife mortality
- indirect wildlife mortality
- reduction in wildlife productivity
- implications of the proposed development acting as an attractant for particular species; and
- displacement impacts

Social, economic, and cultural

Cultural and Heritage Resources

?? Description of potential impacts of the proposed development on cultural and heritage resources.

Land and Resources Use

- traditional land use and occupation
- existing land use and occupation
- hunting, trapping, and outfitting, recreational, commercial and sport fishing
- availability, abundance and quality of wildlife, fishing, gathering, recreational and commercial land and water-based areas; and
- protected areas.

Economy

- wage and salary employment by skills category over the life of the proposed development, including estimates of local and aboriginal participation
- activities such as tourism, outfitting, harvesting and recreation
- opportunities for local, regional and territorial businesses to supply goods and services both directly to the proposed development and to meet the demand created by the expenditure of contractors and new employees
- opportunities to diversify the northern economic base to produce and to supply new goods and services
- barriers to employment
- availability and use of skilled workers in the NWT to meet job requirements
- the impacts on the subsistence economy

- impacts to hunters, trappers
- federal and territorial revenues and costs
- local government finances
- inflation and the cost of living impacts; and
- economic diversification.

Human Health

- impact on human health, as they relate to the proposed development, (i.e. physical health, including death and disease rate, psychological, emotional, spiritual, or mental health and wellness).

3 Consultation

This section summarizes the consultation that was undertaken in the course of this environmental assessment.

3.1 Consultation

In June 1999, the Review Board issued a work plan for the BHP environmental assessment. This work plan provided guidance to BHP for the preparation of a development description. The Review Board instructed BHP to revise its October 1998 development description and notify affected parties of its proposal. Between June and December 1999, BHP consulted in the following communities with the following organizations:

- August 3 & 4, 1999 Kugluktuk public meeting,
- September 17, 1999 Fort Resolution Environment Working Committee,
- September 29, 1999 Dettah Land and Environment Committee,
- September 30, 1999 Lutsel K'e Wildlife Land and Environment Committee,
- October 5, 1999 North Slave Metis Alliance,
- October 5, 1999 Lutsel K'e public Meeting,
- October 6, 1999 Dettah public Meeting,
- October 7, 1999 Rae-Edzo Dogrib Treaty 11 Tribal Council meeting and public meeting,
- October 12, 1999 Lutsel K'e public meeting,
- October 13, 1999 Dogrib Treaty 11 Tribal Council representatives,
- October 19, 1999 Yellowknives Dene Land and Environment Committee,
- October 25, 1999 Yellowknife public consultation meeting,
- November 2,1999 Gameti First Nation Band Council,
- November 3, 1999 Yellowknives Dene First Nation public meeting,
- November 15, 16 and 17, 1999 Dechi Laot'i First Nation,
- December 7 and 8, 1999 Wha Ti First Nation, and
- December 10, 1999 NWT Status of Women.

Arrangements were also made for Aboriginal people and government agencies to make ten (10) visits to Ekati™ to view areas of the proposed development. Some of the meetings held by BHP with respect to the proposed development since the spring of 1999 are listed below. Letters on the public register document other informal meetings between BHP, regulators, Review Board staff and others.

- April 21, 1999 Treaty 8-Lutsel K'e Land and Env. Committee Lutsel K'e,
- August 3, 1999 Inuit of Kugluktuk Kugluktuk,
- August 3, 1999 Yellowknife City Council Yellowknife,
- August 25, 1999 Regulatory Agencies Yellowknife,
- September 7, 1999 1 Treaty 11 Gameti,
- September 29, 1999 Treaty 8-YK Dene Land and Env. Committee Dettah,
- September 30, 1999 Treaty 8-Lutsel K'e Community Meeting Lutsel K'e,
- October 5, 1999 North Slave Metis Alliance Yellowknife,
- October 6, 1999 Treaty 8 – Community Meeting Dettah/N'dilo,
- October 7, 1999 2 Treaty 11-Tribal Council Rae-Edzo,
- October 12, 1999 Treaty 8-Lutsel K'e Community Meeting Lutsel K'e,
- October 19, 1999 Treaty 8-YK Dene Land and Environment Committee Dettah,

- October 25, 1999 General Public Yellowknife,
- November 3, 1999 Treaty 8 – Community Meeting Dettah/N'dilo,
- November 19, 1999 Yellowknife Chamber of Commerce Yellowknife,
- November 25, 1999 Geoscience Forum Yellowknife,
- December 1, 1999 Treaty 11 and Metis IRMA Funding Workshop Rae-Edzo
- December 6, 1999 Treaty 8 – 3 Chiefs Yellowknife
- January 20, 2000 3 Treaty 11 – Chiefs and Councilor Yellowknife,
- February 3, 2000 Kitikmeot Hunters and Trappers Association – Biannual Meeting Kugluktuk,
- February 7-10, 2000 AEMP/Wildlife Workshops Yellowknife,
- March 9, 2000 Kitikmeot Inuit Association – Quarterly Board Meeting Taloyoak, and
- March 19, 2000 Dogrib Leadership and Elders Ekati™.

BHP also undertook a series of public notifications indicating that the company was preparing an EAR for the Sable, Pigeon and Beartooth development, as required by the EA Terms of Reference. BHP made public affairs announcements from December 29, 1999, to January 7, 2000, on CJCD and CBC. The announcements were broadcast twice per day on CBC and more frequently on CJCD. CBC translated the announcements into Dogrib and Chipewyan and broadcast them in the affected communities. BHP published notice of its development intentions in the Yellowknifer and the News North on December 29, 1999, and January 3, 7, 10 and 12, 2000.

The Review Board also undertook its own consultation on the draft work plans and Terms of Reference and it held one public meeting (September 26, 2000) after the environmental assessment report (EAR) was submitted by BHP. As a result of its consultation efforts, the Review Board's public register contains over 600 records of which 500 document communication and consultation about the proposed development. During the environmental assessment, the Review Board issued monthly updates on the progress of the environmental assessment by facsimile, email, newspaper updates, newsletters, and direct telephone contact with First Nations and local governments. The Review Board also placed all of its instruction to BHP and the materials received from BHP over the course of the environmental assessment on its web site.

During the course of Review Board's consultation, the North Slave Metis Alliance (NSMA) advised the Review Board of its concern that its Aboriginal rights were being infringed by the development. The NSMA indicated that consultation with them on this issue had been inadequate. The Board recognizes the vital importance of consultation with respect to the potential effects of a project like the proposed development on the exercise of Aboriginal rights in the mine site area. The Review Board responded by indicating that the responsibility for ensuring that adequate consultation with respect to Aboriginal rights matters rests with the federal Crown which is in a fiduciary relationship with aboriginal people potentially affected by the proposed development. The Review Board is of the view that it cannot act simultaneously as an independent tribunal and as an advocate for consultation with respect to Aboriginal rights.

3.1.1.1.1.1 Conclusion

The Review Board is satisfied with BHP's consultation efforts and with the communication effort undertaken by the proponent in this environmental assessment. In the Board's view, the efforts made by BHP were sufficient to ensure that this environmental assessment was open and fair.

4 Environmental Assessment

This section of the report covers the environmental assessment process and the outcome of the environmental assessment. Also included in this section are the Review Board's recommendations for mitigating for impacts.

4.1 Summary of the environmental assessment process

In June 1999, the Review Board issued a work plan for the BHP environmental assessment. This work plan provided guidance to BHP for the preparation of a development description. The work plan established the milestone dates and identified the Board's expectations for the completion of the environmental assessment. The Review Board advised BHP and the public by letter dated July 2, 1999 that a broader more detailed development description that incorporated the views of the public, Aboriginal people and government would be prepared.

On August 25, 1999, Review Board staff met with BHP, government regulators, and experts to solicit their views, and to request information that could be used to augment BHP's development description. By letter to BHP on September 16, 1999, the Review summarized comments provided by the federal and territorial government experts on the scope of the development and the scope of the assessment. Those comments were subsequently used by BHP in its final *Project Description* document.

BHP submitted the revised development description to the Review Board on November 10, 1999. After reviewing this document, the Review Board issued its Terms of Reference (ToR) for the environmental assessment on December 13, 1999 (Attachment 2.0). Prior to issuing its ToR, the Review Board circulated for a four week period, draft ToR for the environmental assessment commencing on November 8, 1999. Comments on the draft ToR were solicited by newspaper advertising, fax distribution, through regular environmental assessment newsletter updates, placement on the Review Boards Board's web site [2], and by telephoning First Nations, local governments and Band offices.

4.1.1 Conformity and Technical Reviews

BHP completed its EAR on the basis of the final ToR and filed the EAR with the Review Board on April 27, 2000. After receiving BHP's completed EA Report, the Review Board undertook a conformity check to ensure that BHP had provided the information requested in the Terms of Reference. The Review Board concluded that there were several non-conforming areas in the report, and that the conformity phase would have to remain open until the Board was satisfied that BHP's filings were in conformity with the Terms of Reference. BHP was advised that they would have to submit additional information. On September 14, 2000 the Review Board ruled that the BHP EA Report with the accompanying *July 2000 Conformity Responses* conformed to the requirements of the Terms of Reference and closed the conformity review.

A technical review of the EA Report was initiated concurrently with the conformity review. This was done through the Review Board's Information Request (IR) process [3]. The IRs helped to facilitate the technical analysis of the development. The Review Board's staff co-ordinated the analysis of the EA. The analysis included opportunities for regulatory authorities (RA's), expert advisors, First Nations, communities, the public and other interested parties to present evidence and facts to the Review Board. The result of this step was to find and focus on unresolved or unclear issues, and to provide the Review Board the additional information that would contribute to its decision.

2 The Review Board maintains a web presence. The site address is www.mveirb.nt.ca
3 Information requests are an interrogatory in the form of written questions and answers.

The Review Board held a public meeting in September 2000 to hear directly from the public on the project. Review Board staff, throughout the process, visited with communities to make certain that their perspective on the proposed development was included in the evidence presented to the Review Board (Section 10.1). At the conclusion of the EA, the Review Board had over 500 consultation-related documents in its public registry.

4.2 Findings: Spatial and Temporal Boundaries

The Terms of Reference instructed BHP to select and describe the spatial boundaries for the maximum zone of influence of the proposed development on each of the valued ecosystem component that BHP is monitoring. BHP was also required to provide sufficient detail in its description to address the relevant impact issues.

With respect to the temporal aspects of the impacts of the proposed development, BHP was asked to describe and evaluate the environmental impacts for all phases of the proposed development including construction, operation, care and maintenance, closure and post-closure.

BHP presented spatial and temporal boundaries for the effects of the proposed development. In establishing the spatial boundaries, BHP revised the spatial boundaries established in its 1995 Environmental Impact Statement (EIS). For the purposes of this environmental assessment, BHP defined local, regional and broader spatial boundaries on a valued ecosystem component basis.

BHP established the spatial boundaries for its cumulative effects assessment on the basis of ecologically significant parameters, stakeholder interests, downstream effects and its judgement on the ultimate geographic zone within which the residual effects were predicted to be detected.

BHP set temporal boundaries for its cumulative effects assessment so that it would start with the beginning of the development and end with the last residual effect remaining after the decommissioning and rehabilitation of the site.

4.2.1 Spatial Boundaries

The GNWT argued that the Town of Hay River and the Hay River Dene Reserve should have been included within spatial boundaries because this would have improved the socio-economic assessment of this proposal and provided consistency with the 1995 Environmental Impact Statement (EIS). Except for the comment on the socio-economic boundary, the GNWT found the spatial boundaries for the socio-economic assessment to be adequate.

DIAND indicated that the spatial boundaries for the Sable Pipe Development were not specific enough in that reference to effects on "nearby water bodies", "downstream water quality" etc., obscured the fact that the Sable Pipe would affect two separate drainage basins - the Exeter Basin and the Ursula Basin.

The Independent Environmental Monitoring Agency (IEMA) suggested that the spatial boundaries used for evaluation of cumulative effects of the proposed project on the Bathurst caribou were set to include the migration corridor of the herd, but did not include the calving ground and the traditional wintering range [Sec.4.9.5.1.1]. The IEMA also noted that while this may be a suitable choice, no ecological justification was provided for these boundaries. Further, it noted this boundary selection was inconsistent with the cumulative effects assessment undertaken by Diavik. The Diavik comprehensive study recognized that herd-level effects might result at the calving grounds with respect to conception rates and birthing success.

4.2.2 Temporal Boundaries

The GNWT pointed out that the original 25-year mine plan reviewed during the initial environmental assessment was reduced to 15 years with the removal of the Leslie Pipe. The proposed addition of the Sable, Pigeon and Beartooth pipes would allow the mine plan to increase from 15 to18 years of production. The GNWT stated that it would have been beneficial if temporal boundaries reflected the full revised 18-year life of the mine for fiscal and economic information, rather than addressing only the three years accounted for by the three-pipe expansion. However, the GNWT noted that once the decision was made that the development represents a three-year expansion, socio-economic information adequately encompassed predicted effects over the three-year period.

The GNWT submitted that for some socio-economic components longer temporal boundaries should have been recognized in the effects analysis. This is the case for some of the socio-cultural well-being effects that could potentially be felt for three generations. The GNWT also indicated a longer temporal boundary would also have been appropriate in the discussion of sustainable economic diversification and sustainability.

4.2.2.1.1.1 Conclusion

The Review Board concluded that the spatial boundaries proposed by BHP in the environmental assessment report were adequate and acceptable for the purposes of this environmental assessment. The Review Board appreciated the IEMA's suggestion that the spatial boundaries used for evaluation of cumulative effects of the proposed development on the Bathurst caribou should include the migration corridor, the calving grounds, and the traditional wintering range of the herd. However, the IEMA did not provide any evidence to support its proposed boundaries and failed to convince the Review Board that an analysis based on its approach would result in impacts predictions significantly different than those provided by BHP.

The Board noted the GNWT suggestion that the Town of Hay River and the Hay River Dene Reserve should have been included in the socio-economic impact analysis but was satisfied with BHP's use of the directly affected communities as used in the 1996 EARP Report.

The Review Board was convinced by the evidence submitted by the GNWT that longer temporal boundaries should have been recognized in the effects analysis of social impact as the proposed development has the capacity in less than one generation to effect future generations.

4.3 Findings: Definitions of Significance

It is the responsibility of the Review Board to decide when an effect, or change in the environment, that is caused by the development, or the development in combination with other developments is significant. Section 128 of the MVRMA requires the Review Board to decide whether BHP's proposed development will, in its opinion, have a significant adverse impact on the environment and report to the DIAND Minister. In reaching its conclusions about significance, the Review Board forwarded an IR to its expert advisors asking them to advise the Review Board about the appropriateness of the assessment methodology, the methods used to determine significance, and of the spatial and temporal boundaries selected for the environmental assessment.

To facilitate the process, the Review Board required that BHP describe each residual impact at least in terms of the following attributes:

- magnitude
- geographic extent
- timing
- duration
- frequency
- irreversibility of impacts

- ecological resilience; and
- probability of occurrence and confidence level.

In its environmental assessment report, BHP classified the significance of residual effects as being negligible, minor, moderate and major. The attributes used to qualify the residual effects were: geographic extent, duration, frequency, reversibility, probability, capacity of renewable resources to meet needs of the present and future, ecological context, and magnitude. BHP noted that attribute definitions varied depending on the characteristics of the valued ecosystem component (VEC).

The GNWT also noted that the significance attributes such as frequency, reversibility, and probability listed by BHP were generally not addressed in the EAR discussion of predicted socio-economic effects.

The GNWT contended that in some instances, there appeared to be an inconsistency in the way that BHP applied its criteria for the magnitude of an effect. BHP stated that "effects are classified as minor, moderate and major if the effect duration is short, medium, or long term suggesting that effects be considered major only if they endure over the long term (more than 60 years). The GNWT argued that if this interpretation were correct, then the significance of an effect could have little relation to its duration. The GNWT noted that when contemplating a development of the magnitude of the BHP mine, a significant alteration in the lifestyle, and well-being of NWT residents, positive or negative, could certainly occur in less than one generation and could be irreversible.

The GNWT indicated that using BHP's method for determining significance would result in the economic effect at Ekati^{TM} Mine likely being considered minor, lasting less than 30 years. The GNWT asserted that the employment and income effects of either the existing Ekati^{TM} Mine, or the proposed expansion are of greater significance to the NWT than would be suggested using the BHP approach to the determination of significance.

The GNWT also noted that the significance criteria such as frequency, reversibility, and probability listed by BHP were generally not addressed in the EAR discussion of predicted socio-economic effects. GNWT noted as well that only a cursory reference is made to the issue of future capacity and sustainability, and that there appeared to be no consistent relationship between the criteria established for that determination and the conclusions in instances where significance was more than minor.

The Kitikmeot Inuit Association indicated that the criteria for describing the effects of the development were addressed to area-wide and long-term (i.e., chronic) impacts, and that they were only discussed as residual (i.e., meaning lasting after mining) effects. Summary tables described the residual effects only and graded them negligible or minor. The Kitikmeot Inuit Association indicated this system appeared to avoid the direct, local, or short-term effects (i.e., acute), that can be locally very significant (i.e., the permanent or temporary losses of lakes, streams, and wildlife and aquatic habitat).

The IEMA expressed concern about how the significance of effects was determined throughout the EAR. It indicated that assessments relied on "professional judgement" with no description of who was applying the judgement or, the process used for the determination of any particular significance. The IEMA acknowledged that determining significance of effects is very difficult and suggested a more transparent process detailing the factors and people making such determinations.

The IEMA also indicated that wetlands lost were rated as "negligible" because the amount of wetland habitat to be affected was a small percentage of the local study area. This presumed that all habitat types are of equal value. The IEMA claimed that significance of the effect needed to be determined based on the loss of this habitat type in comparison with the total amount of the habitat available within some ecologically relevant boundary, and its relative value to species depending upon it. The IEMA felt that these factors were not fully considered in the assessment, so that the true ecological significance of the predicted losses remained uncertain.

The IEMA suggested that the significance of footprint effects should have been derived from an examination of the loss of each habitat type, in comparison to the amount of that habitat type available in some larger, ecologically relevant zone, not to an arbitrarily chosen unit such as the claim block. The IEMA added that the significance could also be related to the value of a particular habitat type to its resident animal species. The IEMA suggested a more realistic and conservative conclusion would be that the effect is permanent rather than reversible. The final rating of "negligible" might yet be correct, but it could not be supported until the relative ecological significance of each habitat type loss is evaluated.

4.3.1.1.1.1 Conclusion

The Review Board agrees with the GNWT that a significant alteration in the lifestyle and well-being of NT residents, positive or negative, could certainly occur in less than one generation and that irreversible changes are also possible. Given this conclusion, the Review Board also agrees that to require an impact to last for more than 60 years before being considered "major" could lead to an underestimation of the significance of the effect. The Review Board further notes that that BHP's conclusions about the significance of socio economic impacts are not supported by its own data where a 50% variance has been found between the predicted and actual 1999 employment levels. Likewise, as noted by the GNWT, operating expenditures for the 9,000-t/d level have been almost five times higher than those predicted in the 1995 environmental impact statement.

The Review Board, therefore, is persuaded that BHP could have underreported the significance of the economic effects of the proposed development as it could result in a lasting effect in less than 30 years. The Review Board is also persuaded that a significant alteration in the lifestyle and well-being of NT residents, positive or negative, could occur in less than one generation.

The KIA and the IEMA submissions respecting significance determinations did not persuade the Review Board. They did agree that BHP could have been more transparent in how it reached its conclusions, but in the absence of any new data or information for consideration, the Review Board accepts the conclusions of BHP.

The Review Board would like to comment on the matter of significance determination. The Review Board found the exercise of determining the significance of an environmental impact difficult, based on the material filed by the participants in this proceeding. In reviewing the EAR and the interventions, the Board frequently had to deal with opinions rather than facts. The Review Board would have been assisted by well-explained analyses based on the significance criteria listed in the Terms of Reference. The MVRMA requires that the Review Board decide if a development will have a significant adverse impact or significant public concern based on the evidence provided. In this process, the Review Board has no objection to the proponent or others applying professional judgement, in fact it is encouraged, as long as the basis for the conclusion is documented, the expertise applied is identified, and ,if possible, the person responsible for the conclusion is also identified. The Review Board recognizes that this may be seen as a challenge for holders of traditional knowledge. However, it is the position of the Review Board to give due regard and weight to First Nations' oral history and accord appropriate weight to traditional knowledge.

In addition, in order for the Review Board to make the decision required by subparagraph 128(1)(b)(ii) of the MVRMA , there must be a clear explanation of the effect that the mitigation measure to be imposed will have on the impact that it is meant to ameliorate. In other words, it is the Review Board's view that it must, under ss.117(2) of the MVRMA, be advised of the significance of an impact without mitigation and then receive a careful explanation of the effect mitigation will have in reducing that impact.

4.4 Environmental Optimization

The Review Board, in addition to describing residual impacts in a consistent manner to facilitate significance determination, required BHP to report the comparative costs of proposed development alternatives and the corresponding environmental benefits. Any assumptions or uncertainty surrounding implementation of mitigation measures, such as untested technology, were to be reported.

In response to this request, BHP discussed alternatives for disposal of processed kimberlite, the Sable access road, mining methods, and backfilling of pits. In response to Information Requests, BHP provided more detail on the alternatives for the access road and mining method and addressed a question regarding alternatives for electrical power generation. In each case BHP described the alternatives considered; the factors that would affect the development and/or operating costs associated for each alternative; and, compared with the chosen alternative, the comparative environmental effects.

BHP concluded that its review of development alternatives showed no technical, environmental or economic advantage to methods other than those already in use or proposed in its development proposal.

Praxis, an independent firm engaged by the Review Board, found that although the analysis of each alternative was brief, BHP did, however, refer to its 1995 environmental impact statement (EIS) for a more comprehensive discussion of development alternatives.

Praxis noted that the economics of each alternative was described using indicative measures or qualitative descriptions, instead of a reasonably detailed economic analysis. For example, in the case of mining methods, the BHP described better utilization of equipment, personnel, and infrastructure, and higher production rates for open pit as opposed to underground mining. Values per tonne of underground resources are provided for existing and proposed pits and for typical NWT gold mines, but are not compared on a cost per tonne basis. In the case of the Sable access road, the analysis described the infrastructure requirements that would be associated with a winter road, as opposed to an all-weather road. Here BHP estimated these would add $129 million to the capital cost for the Sable site development. It is also suggested that delays due to weather could increase costs. Discussions of other alternatives took a similar approach.

Given the use of qualitative descriptions, the discussion of development alternatives generally did not include a reporting of comparative costs and, therefore, does not constitute an assessment of economic feasibility that can be corroborated in any quantitative way. Praxis suggested that one of the concerns that might have led BHP to choose this analytical approach may have been a reluctance to release proprietary information. Given this situation, Praxis suggested that BHP could have provided operating cost data for alternatives. Even if BHP had taken this approach, it was recognized, that the analysis would still only have been indicative of economic feasibility, instead of conclusive.

Regardless, Praxis felt that the analysis put forward by BHP was logical and supported the conclusion that the chosen approach in each case was the most economical from its perspective.

4.4.1.1.1.1 Conclusion

The Review Board is satisfied with the attempts at environmental optimization for this proposed development but would have preferred a more quantitative discussion and analysis.

4.5 Alternatives to the proposed development

In its environmental assessment report, BHP responded to the Board's Terms of Reference regarding alternatives. The Terms of Reference requested that BHP provide a description of the alternatives to the main development, production components and technical components. BHP was asked to concentrate on alternatives for the key elements (infrastructure or activities) of the proposed development; in particular,

- those associated with mine design;
- sites for waste rock and tailings disposal e.g., back-filling depleted pits; technologies for tailings management;
- transportation modes or routes; and
- decommissioning and reclamation options.

Alternative kimberlite pit development sequencing, and mitigation measures considered were also to be reported on and reasons provided for their rejection.

4.5.1 Alternative Transport

BHP indicated that the potential alternative to the proposed all-weather road to Sable Pit would be a winter road (ice road), with appropriately-designed portage segments to smooth irregularities in the tundra surface and to protect the underlying permafrost from degradation. However, once in use, the winter road would be used more intensively than an all-weather road in order to take full advantage of the available season.

BHP concluded that all-weather roads and winter roads are both technically-proven options. Notwithstanding this, BHP indicated that a winter road operation would have a significant effect on the mine's operation, without positive environmental benefits. BHP indicated that it would require a substantially larger fleet of haul trucks to transport ore from the Sable Pit to the Process Plant to compensate for the shorter season and the reduced travel speeds. This would increase infrastructure requirements to manage both preventative maintenance and unscheduled repairs. BHP also claimed that it would require a fleet of winter road construction and maintenance equipment to ensure that the winter road operation is not restricted in any manner.

BHP indicated that transporting kimberlite ore from the pits in winter would require a pad for the storage of mined ore during the ice-free months. This would increase the size of the proposed development footprint in the Sable Pipe area.

With winter access only, and no fixed link to the existing Ekati™ site, BHP indicated that a permanent camp and ancillary facility to house employees, along with camp catering personnel, would be required to support a year-round mining operation. This would increase overall terrain disturbance.

DIAND concluded that any increase in the Sable Pit land use area would have to be factored against the effect of a winter access road. A seasonal operation would likely result in an increase to the overall size of the Sable Pit development and land use area, due to necessary storage requirements, etc. In addition, given the projected traffic volumes and load sizes to be hauled on the road, the overall effect to the land would appear to be reduced using an all weather road, as load frequency would be distributed throughout the year. From a land management perspective, the overall land use effect would appear to be minimized with an all season road.

4.5.1.1.1.1 Conclusion

The Review Board concurs with DIAND and BHP that from a land management perspective, the overall land use impact would appear to be minimized with an all-season road.

4.5.2 Alternative Mining Method

BHP in its consideration of alternative mine designs for the Sable, Pigeon and Beartooth pipes used previous studies and experience to essentially arrive at two alternatives - open pit and underground mining. BHP determined that underground mining would be based on the sub-level caving method. BHP cited that non-caving underground mining methods would be uneconomical because of lower production and extraction ratios, higher unit costs, higher capital and infrastructure costs, and the difficulty of supporting weaker rock masses such as kimberlite. Underground mining with non-caving methods would require a substantial amount of kimberlite to be left in place as a crown pillar. The crown pillar, or approximately the top third and largest portion of the pipe, would be left in place and render the Sable, Pigeon and Beartooth pipes uneconomic. BHP concluded that open pit mining was the best alternative.

The IEMA remained concerned that what could be a solution to a long-term environmental management issue on the claim block (open pit vs. underground mining) was, in its opinion, escaping rigorous public analysis. The IEMA considered the implications of surface waste rock disposal on terrestrial and aquatic ecosystems cumulatively as an issue that warranted priority for all new pipe developments in the diamond fields. The IEMA suggested that perhaps an independent evaluation would be the appropriate course of action.

4.5.2.1.1.1 Conclusion

The Review Board is satisfied that BHP has adequately considered alternative mining methods and has provided rationale for its selection of preferred mining method.

4.5.3 Alternative Power Generation

BHP indicated that no additional power would be required for ore processing beyond that planned for the ramp-up to 18,000 tonnes per day. Power supply for the planned two-bay maintenance shop at Sable would be provided from a small on-site diesel generating facility. Further, as reported in its 1995 BHP-EIS, the climatic conditions of the Northwest Territories were found to be not suitable for alternative energy generation because of extreme variations in wind and sunlight availability. BHP did not undertake a detailed study of the other systems. They did, however, refer to the recent Diavik Diamonds Project comprehensive study. There, for technical and economical reasons, the following alternatives were discounted for that project:

- Wind-generated – not feasible due to low wind conditions, even as a possible supplemental power source; and
- Hydroelectric – not feasible due to economics and potential significant destruction of habitat.

4.5.3.1.1.1 Conclusion

The Review Board notes that BHP is engaged in a review of suplemental power generation at the Sable site and the Review Board looks forward to the results of BHP's study.

4.6 Analysis of Environmental Effects

The following section contains the Review Board's conclusions and recommendations for the environmental and cumulative environmental effects of the proposed development. Environmental effects analyses are based on information contained in BHP's environmental assessment report, augmented with information from technical reviews, peer reviews, the Review Board's public meeting, and documentation on the public registry. For each environmental effect, the BHP's position, reviewer's comments and the Board's conclusion and recommendation are presented.

4.6.1 Physical Environment

This section of the report includes air quality, climate, terrain and water. In order to keep this report within manageable limits, the Review Board did not discuss all Terms of Reference matters listed. Instead, this report of environmental assessment focuses on those matters that the Review Board has decided warrants discussion. For any other matters, the Review Board was satisfied with the Environmental Assessment Report and supporting documentation filed by BHP and expects all commitments will be fulfilled.

4.6.1.1 Effects on Air Quality and Climate

BHP concluded that the residual effects of the proposed development on air quality was negligible for all activities evaluated.

4.6.1.1.1 Fugitive Dust

BHP reported that dust generated by vehicles on the roads and mining activities represented the largest source of air emissions at the site. The results of modelling, air monitoring and snow surveys have confirmed that most dust particles would settle out within 100 m from the source with only the smallest particles travelling further. BHP has been investigating commercially available dust suppressants, but has not found one that meets its requirements based on a number of factors identified by BHP that restricts their suitability.

BHP also reported that the development activities would also generate dust and gaseous emissions that could result in changes to vegetation productivity or species composition in certain areas. However, based on the studies reviewed in the EAR, the effects can be either negative or positive. For example, heavy dust blankets may eliminate lichens and mosses, but lighter dust loads may enhance moss growth. Similarly, some plants, including willows and grasses, may thrive in light to moderate dust deposition areas, while some berry-producing plants may be inhibited. These indirect effects will be limited to small parts of the local study area and all effects will be reversible once dust and gaseous emissions cease. BHP has established a number of vegetation plots around the Ekati™ mine to determine if emissions are adversely impacting on vegetation.

The YDFN expressed concern about the potential dust accumulation resulting from heavy trucks moving on the road (up to 99 loads per day) and its potential effects on wildlife. In particular, they expressed concern for effects on berry production, a primary source of food for grizzlies. BHP responded by indicating that most dust fall will be within 100m of the road or pits and this was within the zone of influence anticipated for bear displacement.

The YDFN indicated that early open water created by dust deposition on water bodies could result in concentrations of birds in areas where they would be more likely to encounter effects. BHP felt that this would be a temporary effect because as the season progresses, the migrating birds would move on. The potential for a collision with a vehicle could be mitigated by driver awareness and low speed limits.

The GNWT indicated that a number of dust suppression methods have been employed by BHP but that problems with dust continue, especially between April and August. Watering is the method that had proven most effective, but it requires frequent application. Longer lasting dust suppressants are commercially available.

The GNWT also suggested that the BHP conclusion that the effect of dust on vegetation is negligible does not incorporate uncertainty related to inadequate collection of data. The predictions are based on 1995 models instead of actual measurements. The GNWT also wondered why BHP failed to include the findings from its 1998 lichen study and the increased levels of trace metals as compared to construction phase reference levels.

The IEMA argued that such data, along with chemical profiles for fugitive dust sources were required to correctly interpret snow and vegetation sampling data.

4.6.1.1.2 Greenhouse gas emissions

BHP predicted that airborne emissions of carbon monoxide, sulphur dioxide, and nitrogen oxides from mine equipment and power generation were expected to remain low for the proposed development, and within the National Ambient Air Quality Objectives (NAAQO) recommended levels within the local study area (Wildlife Effects Monitoring Program boundary).

BHP in its response to a Review Board information request estimated its greenhouse gas emissions for the Sable, Pigeon and Beartooth development, of which CO_2 was the most important, to be 59.6 kilotonnes, or about 4.2% of the estimated 1999 NWT total. Overall, the CO_2 emissions for the entire Ekati™ mine will not change due to the Sable, Pigeon and Beartooth development because production and associated emissions from opening the new pits replaces production from other pits that had been included in the mine plan in the 1995 BHP-EIS.

The GNWT notes that the current 107.9 kilotonnes of CO_2 emissions a year from Ekati™ represents approximately ten percent (10%) of the estimated total of 1,090 kilotonnes emitted in the Northwest Territories (not including Nunavut) during 1996. Ekati™ mine emissions are expected to rise as production increases. Emissions are also expected to increase in other sectors according to the GNWT.

4.6.1.1.3 Total Suspended Particulate

BHP measured for TSP using high volume air sampling at selected sites within the claim block: accommodations' building and Grizzly Lake pumphouse. Twice during the summer of 1998 at the accommodations building did the TSP concentrations exceed the CAAQO level of 120ug/m^3. The concentrations at Grizzly Lake have been low and close to undisturbed baseline.

The IEMA noted that the current monitoring program for TSP provided no chemical characterization for the emission. It felt that such data would be useful in determining the source of any contamination.

Environment Canada noted that the EAR referred to the CAAQO for TSP as being less than 70ug/m^3 per annum. This is the maximum acceptable level. Environment Canada indicated that the maximum desirable objective is 60ug/m^3.

4.6.1.1.3.1 Conclusion

The Review Board concludes, based on the analysis provided, that the effects on air quality and climate will not cause a significant environmental effect. The Review Board did note the GNWT's analysis indicating that the emissions of CO_2 are expected to rise. The Review Board expects that any changes will be monitored for. The Review Board also supports BHP's initiatives to control greenhouse gas emissions, and encourages BHP to take what steps it can to further control emissions, and to participate actively in implementation of the Strategy to Control Greenhouse Gas Emissions. The Review Board commends BHP's for its commitment to continue routine monitoring of CO, NOx and oxygen during predicted thermal inversions as the pits become deeper.

4.6.1.1.3.2 Recommendation

The Review Board concurs with the recommendations of the Independent Environmental Monitoring Agency and Environment Canada:

1) That BHP should continue to incorporate pollution prevention measures and best adaptive management practices consistent with the approaches described in their environmental management plans as described in the EAR [4] .

2) That BHP use CAAQO "desirable objectives" in management planning regarding fugitive dust emissions.

3) That BHP continue with its air quality monitoring program[5], particularly the TSP sampling during the summer months and that BHP consider measuring inhalable particulates and SO_2 during thermal inversions.

4) That BHP's climate reports include proper documentation of calibration procedures, error analysis, interpretation, and identify the corrections as part of its QA/QC procedures.

5) That BHP analyze data in a manner suitable to interpret seasonal trends or occurrences, and reported in a format that demonstrates relevance to conclusions being drawn and provides credibility to the EA process.

6) That BHP incorporate discussions of climate change as part of the reporting procedures.

7) That BHP provide the results of its greenhouse gas emissions control initiatives to the IEMA and to the environmental protection agencies of the federal government and the Government of the Northwest Territories.

8) That regulators responsible for managing air quality review BHP's current air quality-monitoring program with a view to improving its design and adding a source of contamination characterization program.

9) That BHP provide its climate reports to the Review Board and the Independent Environmental Monitoring Agency so that the regulatory authorities may validate the conclusion of the EAR, and determine if BHP is meeting its 1995 EIS [6] predictions.

4.6.1.2 Terrain

4.6.1.2.1 Effect of Pit Mining Activities and Infrastructure on Thermal Regime

BHP concluded that permafrost would be affected during all phases of the proposed development due to activities such as road building, construction of site facilities, dam construction, stream diversion, open pit mining and waste rock deposition. However, with the application of sound engineering principles and practices for arctic regions and based on previous experience, BHP predicted that residual effects on permafrost would be localized.

NRCan raised no concerns for the understanding of the distribution of permafrost or the implications of permafrost for safeguarding the environment or safely carrying out the proposed operation. They, however,

4 BHP Diamonds Inc., April 2000. Environmental Assessment Report for the Sable, Pigeon and Beartooth Kimberlite Pipes. P. 7-14 and 7-15 Management Plans.

5 Environment Canada commends BHP for its efforts to formulate a thorough monitoring program through the use of, dispersion modelling, high volume sampling at selected sites, mass-balance emissions calculations, snow surveys, and vegetation studies.

6 NWT Diamonds Project, Environmental Impact Statement; BHP, DIAMET

did express concern for the creation of a talik zone under the Sable pit and the possibility of the talik zone altering deep groundwater flow significantly if no talik existed before. BHP responded that the larger lakes surrounding the pit (i.e., Ursala, Nancy) had taliks below them and provided a natural hydraulic connection to any deep aquifers. NRCan indicated that the effects of newly formed areas of unfrozen rock around the open pit should be documented and quantified in terms of steady-state ground water inflow or outflow rates from the pit lake using results from the modeling study. BHP responded to NRCan's concerns by indicating that it expected that once the Sable Pit was flooded for reclamation, there will be a hydraulic connection to the deep underlying groundwater regime.

4.6.1.2.1.1 Conclusion

The Review Board concludes, based on the analysis provided, that the effects of the proposed development on the terrain will not cause a significant adverse impact on the environment.

4.6.1.2.1.2 Recommendation

10) The Review Board expects BHP to implement any mitigation measures aimed at reducing impacts on terrain as mentioned in its EA report or supporting documents.

4.6.1.3 Water Quality, Quantity and Water Balance

This section on water is a compilation of the water effects assessment requirements in the Terms of Reference.

4.6.1.3.1 Effects of Waste Rock and Surface Drainage

BHP identified the two main issues in its management of waste rock and surface drainage:

- the potential for acid generation and acidic drainage; and
- the potential for metal leaching at alkaline, neutral and acidic conditions.

Water contamination commonly occurs as a result of the oxidation of sulphide minerals contained in waste rock if it is exposed to air and water. For example, pyrite oxidizes in the presence of oxygen and water to produce dissolved ferrous iron and sulphuric acid. The term acid rock drainage (ARD) is used to describe drainage that occurs as a result of natural oxidation of sulphide minerals contained in rock that is exposed to air and water. Static testing is used to evaluate the potential for acid generation and neutralization in a sample of rock. Kinetic testing is used to evaluate metal leaching and drainage water chemistry from the rock.

BHP completed static tests on rocks from each of the three proposed pipes but kinetic tests have not been completed. The static test results indicate that the waste rock samples are net acid consuming or essentially inert. They have very low sulphur content and low neutralization potential. However, some of the samples did show elevated sulphide content so BHP suggests that, until kinetic testing is done, it would be prudent to assess the quantities of this material and incorporate contingencies for special handling into the waste management plan.

BHP's *Waste Rock Runoff Management Plan* for each of the waste rock storage areas is directed at minimizing the risk of potentially adverse effects on nearby waterbodies. This will be accomplished by designing the waste rock pile perimeter berms to retain water to minimize or eliminate impacts on the environment. BHP planned to test its berm design at the existing Panda waste rock storage area. BHP indicated that the results would be used to refine the concept as necessary.

Based on the static test results and the mitigative measures included in its waste rock management plan, BHP concluded that the potential effects of waste rock on water quality and fish habitat would be negligible. However, BHP was proposing further work to refine the waste rock and water management programs for the three proposed pits. This work will include:

- Kinetic testing to address metal leaching potential;
- Quantification of the amount, location and scheduling of the different types of waste rock from the pit, and potential for segregation of this material during mining;
- Potential and methods for segregation of this material if so indicated by kinetic testing results. Alternatively, if there is no significant metal leaching, this material can possibly be disposed of with other waste rock types that may contain sufficient alkalinity to buffer the acidity;
- Definition of the sampling program during mining to identify potentially "reactive" (i.e. generate acidity and/or leach metals) rock and development of criteria for segregation; and
- Provision for drainage water monitoring and collection, if required.

BHP has not indicated how it would control and treat surface run-off from site facilities. From past experience at the main campsite, surface run-off has had to be collected and pumped to Long Lake for treatment, as it did not meet discharge criteria.

Environment Canada requested more information about the Pigeon Pit area's biotite schists to confirm potential local sources of ARD (e.g., sulphide minerals present and their abundance). Environment Canada advised of the need for examination of the existing static geochemical test data and the future kinetic geochemical test data. Environment Canada also noted that BHP has proposed the use of toe berms to retain water percolating through the waste rock piles, which would then freeze. Once these internal permafrost zones became saturated, precipitation would flow through the active layer and emerge as seepage. Environment Canada suggested that monitoring of seepage from waste rock piles be required, and that a plan for dealing with potential acid leachate from mine rock and tailings be developed.

The YDFN indicated that there was insufficient knowledge about the effectiveness of the tundra at filtering the suspended solids, heavy metals and nitrogen from waste rock pile runoff water. The YDFN also noted that waste rock from the Sable Pit would be kept 100 m from the nearby lakes but not from the stream connecting the Ulu and Horseshoe Lakes. The YDFN indicated that, should any contaminated water reach the stream, it would eventually discharge to Horseshoe Lake, potentially creating a problem there. In addition, steep slopes from the toe of the Sable Waste Rock Dumps to Ulu and Horseshoe Lakes could promote rapid drainage from the rock piles to the lakes, thereby contributing to potential contamination of the lakes. BHP responded to the concern by stating that studies were underway to evaluate the effectiveness of tundra soils and organics at filtering suspended solids, heavy metals and nitrogen from runoff water.

DFO expressed concern about the gradual acidification of lakes near the waste rock piles citing uncertainty regarding the untested containment berm that BHP is proposing. DFO suggested that if the berm system proved ineffective then residual effects on water quality in previously unaffected lakes might occur. DFO also expressed concern about the potential impacts of acid rock drainage from waste rock used for infrastructure construction. DFO stated that this issue was not addressed in the EA report.

The IEMA concluded that the sampling and data analysis reported in the EAR were inadequate to render a clear and accurate understanding of the runoff water quality that might be expected from the proposed waste rock dumps. The IEMA asserted that while BHP's conclusions about "not expecting" net acid generation and metal leaching from the waste rock could be true, they were unsubstantiated based on the work reported. The IEMA suggested that further work should be undertaken to make meaningful conclusions. Preferably, this work should be completed before the conclusion of the EA and definitely before regulatory licensing.

DIAND expressed concern that the runoff from waste rock piles might not meet discharge criteria. The department said that if there is runoff from the waste rock piles, it will be difficult to control because of the topography of the area. DIAND was concerned that this water could directly enter the receiving environment.

BHP stated that exact placement of control berms could not be identified until the problem of seepage from the Sable Pit Waste Rock Pile occurred. DIAND noted that BHP had proposed to conduct a full-scale test of this system around a portion of the Panda waste rock pile.

Gartner Lee Ltd. (GLL) agreed that BHP's proposal to construct perimeter berms at the planned toe of the waste rock piles could be a useful measure. To GLL's knowledge, this approach is the first of its kind and shows a proactive approach to containment and in-situ freezing of runoff. GLL indicated that the proposed design would be appropriate until the waste rock placement level reached the height of the perimeter berm at which time the traffic layers would likely direct runoff to discharge points above and outside of the berm. However, this problem could potentially be avoided through appropriate waste rock placement and waste rock pile design.

4.6.1.3.1.1 Conclusion

The Review Board concludes, based on the analysis provided and the mitigation proposed by BHP, that the effects of waste rock and surface drainage will not cause a significant adverse impact on the environment. However, the Review Board recognizes that the retaining waste rock pile berm is an untested mitigation measure. The Board notes the concerns expressed by Environment Canada, the YDFN, DFO, IEMA, and DIAND and concludes that they are valid. These concerns warrant the careful evaluation of BHP's plans. These plans should include alternatives in the event that the testing at the Panda waste rock storage area does not achieve the required level of environmental protection. The Review Board expects that this issue will be investigated in further detail during the water licensing process.

4.6.1.3.1.2 Recommendation

The Review Board recommends that the Mackenzie Valley Land and Water Board consider the following:

11) That the existing Aquatic Effects Monitoring Program be expanded to include all potentially affected water bodies throughout the development, production, and post-production stages of the mine expansion, and that the AEMP expansion plans should accompany the application for the water license.

12) That BHP prepare a map detailing the potential sources of runoff from the development, how runoff will be controlled and where it will be collected, and that a monitoring station be located at the collection sites during the regulatory phase of the project. Water collected at these stations would be tested for pH, Total Suspended Solids, conductivity, metals, nitrates, nitrites, phosphates.

13) That BHP complete the characterization of acid drainage from the Panda Waste Rock pile and an assessment of the proposed frozen perimeter berms before approval of any further waste rock storage at the Panda Waste Rock pile. BHP should complete the full-scale test of the proposed berm design and provide the MVLWB with the results.

14) That BHP proceed with its intended waste rock management planning for each of the three pipes. This includes the following work:

- Kinetic testing to address metal leaching potential;
- Quantification of the amount, location and scheduling of the different types of waste rock from the pit, and potential for segregation of this material during mining;
- Potential and methods for segregation of this material if so indicated by kinetic testing results. Alternatively, if there is no significant metal leaching, this material can possibly be disposed of with other waste rock types that may contain sufficient alkalinity to buffer the acidity;
- Definition of the sampling program during mining to identify potentially "reactive" (i.e. generate acidity and/or leach metals) rock and development of criteria for segregation; and

- Provision for drainage water monitoring and collection, if required.

15) The Review Board recommends that the potential interaction between Panda Pit and Beartooth Pit waste rock be evaluated.

16) That BHP provide the preliminary results of its waste rock sampling program identifying potentially acid generating and metal leaching rock as part of its water licence application.

17) That BHP's discharge requirements for waste rock and surface drainage, at a minimum, be consistent with the Canadian Council of Ministers of the Environment (CCME) requirements for the protection of freshwater life.

18) That BHP complete its studies to evaluate the effectiveness of tundra soils and organics at filtering suspended solids, heavy metals and nitrogen from runoff water.

19) That BHP develop and test contingency plans for dealing with waste rock and surface drainage so that there is no danger of exceeding regulated water license limits.

20) That BHP modify its plans under its water license to reflect the proposed changes in operation, including the Acid/alkaline Rock Drainage (ARD) and Geochemical Characterization Plan, the Wastewater and Tailings Management Plan, the Waste Rock and Ore Storage Plan, and the Seepage Surveys. The waste rock management plan needs to address the management of all rock that is generated by the expansion. This plan shall describe operating procedures and how all rock will be managed during construction, mining, and post-closure phases of the project. Rock chemistry data should be provided in support of any decisions as they relate to the plan.

21) That BHP does not use the waste rock from the proposed pits for construction purposes such as roads and water retention/diversion structures until such time as the waste rock is proven to not have acid generating or metal leaching potential.

4.6.1.3.2 Effects of Lake Dewatering

Each of the three waterbodies will need to be drained before the Sable, Pigeon and Beartooth Pits can be constructed. BHP intends to dewater the lakes during the fall once there is ice cover on the lakes. BHP's past experience at Koala and Panda has indicated that fall dewatering minimizes the effects. By dewatering under ice, the effects of wind and wave action on sediment suspension should be minimized. At this time of year, the discharged water will still be able to flow through the outflow streams and the hydrological effects will dampen as the flows continue into downstream water bodies. BHP believes that discharging in this manner will not affect the hydrological conditions for the next year as excess water will not be stored in the streams to be released over a short period of time in the spring.

The water from Sable Lake will be pumped into the outflow stream from Two Rock Lake. As the water level drops, the water quality will deteriorate. The water quality will be monitored during the dewatering. When the water quality approaches the water license criteria, the remaining water will be pumped into Two Rock for settling and filtration prior to release to the environment. The dewatering will occur over one month with a low discharge rate employed. The dewatering of Sable Lake will cause a small reduction in the lake storage capacity of the Yamba/Exeter watershed. This effect will persist until the pit has been reclaimed to lake status. BHP predicts that the effect will be highly localized as flows will be attenuated by the outlet dam in Two Rock Lake. BHP concludes that the residual effect of the loss of lake storage capacity is expected to be minimal. BHP also concludes that the possible residual downstream water quality effects will be negligible due to the implementation of the mitigative measures proposed.

Pigeon Pond will be dewatering into Little Reynolds Pond, which flows into the Long Lake Containment Facility. Beartooth Lake will be dewatered into North Panda Lake until the water quality deteriorates. The remaining water will be pumped directly into the Long Lake Containment Facility. The dewatering process for Pigeon Pond and Beartooth Lake will be similar to that described for Sable Lake with the residual effects also predicted to be negligible.

Environment Canada expressed concern about high levels of TSS being discharged to the environment during the dewatering of the three lakes. Environment Canada suggests that the discharged water should be closely monitored and that mitigation place should be in place in the event that high TSS levels are encountered. DFO expressed similar concerns as Environment Canada.

Gartner Lee Limited noted that there was a lack of baseline data for the streams and lakes downstream of the three lakes to be dewatering. Baseline water quality, periphyton and benthic invertebrate data would allow BHP's prediction of negligible impacts to be tested.

4.6.1.3.2.1 Conclusion

The Review Board concludes, based on the analyses conducted, the evidence provided and BHP's proposed mitigation plans, that the proposed developments are not likely to cause a significant adverse impact on the aquatic environment.

4.6.1.3.2.2 Recommendation

The Review Board recommends that the Mackenzie Valley Land and Water Board consider the following:

22) That BHP employ real-time automatic monitoring for TSS during the dewatering of the lakes, instead of relying on grab samples.

23) That BHP collect baseline data from the downstream water bodies to test its prediction of negligible impacts.

4.6.1.3.3 Effects of Pit Dewatering

Pit water will be pumped out of the pits to one of the mine's containment facilities. The pit water from the Pigeon and Beartooth Pits will be pumped to the Long Lake Containment Facility and eventually released into Lac de Gras. The pit water from the Sable Pit will be pumped into Two Rock Lake and eventually released into the Exeter watershed.

BHP's summary conclusions of the environmental effects are listed below:

- Elevated nitrogen levels in discharge from the Long Lake Containment Facility due to existing project activities as well as the proposed Pigeon and Beartooth pipes would have the potential to temporarily increase nitrogen levels locally in Lac de Gras. The potentially elevated nitrogen levels would be for a period of approximately four years and are not expected to result in a biological effect in Lac de Gras.

- The discharge from the Long Lake Containment Facility will continue to have no more than background levels of phosphorus, and that BHP will not introduce phosphorus into Lac de Gras.

- The water quality criteria included in BHP's Type A Water Licence would continue to be met at the discharge from the Long Lake Containment Facility.

- No cumulative effects on Lac de Gras primary producers would result from the potential nitrogen loading from BHP combined with the nitrogen and phosphorus loading from Diavik.

- There is a potential for increases in nitrogen compounds that would be discharged from Two Rock Lake. BHP claimed that the release of nitrogen compounds did not have to be controlled, since the aquatic systems are phosphorus-limited, so the control of phosphorus would be sufficient to prevent effects on trophic status.

DIAND indicated that water treatment could become necessary with respect to water discharge from Two Rock Lake as contaminants from the Sable pit water that would not be filtered by the dyke system became more concentrated in Two Rock Lake.

Environment Canada indicated that effluent quality would be regulated under the water licence, including contingencies for water treatment in Two Rock Lake if the effluent quality was not appropriate for release. It was noted that the dilution capability afforded by the lake would degrade over time, and it could become necessary to use a flocculent to meet licence limits.

DFO expressed concern about potential water quality effects if the nitrogen is in the form of ammonia, which has related toxicity effects to aquatic life. DFO expressed a general concern that insufficient baseline data is available on potentially impacted water bodies. DFO indicated that the use of Sable sump water for road watering has the potential effect of elevated nutrients in this water entering streams at road crossings.

NRCan agreed with DFO and cited the possibility that discharged pit water could contain phosphorus derived from kimberlite in the pit walls and that this should be addressed. NRCan also indicated that BHP's Two Rock Lake retention and filtration treatment method did not address poor quality water because of total dissolved solids (TDS). It was also noted that there was no contingency for phosphorus treatment at the Sable pit.

The YDFN raised concerns that the pit water deposited into Long Lake from the Pigeon Pit could contain phosphorus derived from kimberlite in the pit walls. The YDFN wanted to know if it would add phosphorus to a system that is currently at natural background levels, and cause a change in the down stream effects. The YDFN also expressed concern about the effectiveness of the Two Rock Lake sedimentation and polishing pond at removing particulate kimberlite in pit water, especially since high aluminium levels in the Koala watershed have been attributed to aluminium-silicates.

The IEMA suggests that BHP have contingency plans in place in the event that the semi-pervious dike built in Two Rock Lake is not able to reduce Total Suspended Solids levels to acceptable concentrations for downstream release. The IEMA also suggests that the downstream aquatic effects monitoring in the Koala watershed should be expanded to include the downstream reaches in the Exeter watershed. These expansion plans should accompany BHP's water license application.

4.6.1.3.3.1 Conclusion

The Review Board concludes, based on the analyses conducted, the evidence provided and BHP's proposed mitigation plans that the proposed developments are not likely to cause a significant adverse impact on the aquatic environment.

4.6.1.3.3.2 Recommendation

The Review Board recommends that the Mackenzie Valley Land and Water Board consider the following:

24) That the existing Aquatic Effects Monitoring Program be expanded to include all potentially affected water bodies throughout the development, production, and post-production stages of the mine expansion, and that the AEMP expansion plans should accompany the application for the water license.

25) That BHP acquire and present additional information on expected quantity and quality of pit water from the Sable Pit and, subsequently, Two Rock Lake and demonstrate that pit water additions from the Pigeon and Beartooth Pits will not compromise existing discharge limits or loading to the Lac de Gras Watershed.

26) That the MVLWB establish limits for phosphorus loading.

27) That the MVLWB regulate for ammonia in effluent discharges to ensure that aquatic life is protected.

28) That BHP establish a monitoring site in Cell 2 of Two Rock Lake and that monitoring be conducted for pH, Total Suspended Solids, conductivity, metals, nitrates, nitrites, phosphates, and ammonia.

29) That BHP prepare a contingency plan to treat Two Rock Lake water if the effluent is not appropriate for discharge.

30) That BHP not use the Sable sump water for watering roads.

4.6.1.3.4 Effects on Surface Water Balance

BHP advised the Review Board that with more than one year of operating data available from the full-scale operation, its water balance had been recalculated to incorporate revised input parameters and the appropriate pit water volumes from the proposed development. BHP concluded that it would be possible to eliminate Cell D from Long Lake Containment Facility operational plan entirely by depositing more processed kimberlite in the abandoned pits, i.e., Panda Pit. This option would optimize the site reclamation plan.

BHP concluded that the effects of the proposed development at Sable, Pigeon and Beartooth pipes on hydrological conditions are expected to be strictly confined to local drainage basins of the Exeter and Koala watersheds and would not be detectable beyond their borders.

Environment Canada noted there were inconsistencies in the estimated water budget in the EAR but indicated that these problems were manageable as they resulted in conservative values for runoff and evaporation. Environment Canada noted though, that the inconsistencies raised additional concerns with the overall level of BHP's understanding of the area's hydrological regime. For example, the predicted clear water discharge from Long Lake in the mine water balance has tripled from the 1995 EIS to the 2000 EAR. This appears to be due to an unexpected increase in the estimated natural runoff component and a decrease in the annual accumulation of water in the storage facility.

The YDFN also noted that the stream feeding Bearclaw Lake may be affected by the Panda waste rock storage dump and wanted to know how that would affect the water balance of Bearclaw Lake.

4.6.1.3.4.1 Conclusion

The Review Board concludes, based on the analysis provided, the information about BHP's project design and its mitigation plans that the likely changes to the surface water balance will not cause a significant environmental effect. The Review Board notes the concerns regarding the proposed development's surface water budget effects. The Board concludes that these concerns are more suitably considered in future studies and monitoring plans that would accompany the regulatory phase of this development.

4.6.1.3.4.2 Recommendation

The Review Board recommends that the Mackenzie Valley Land and Water Board consider the following:

31) That BHP establish SNP Stations and Aquatic Effects Monitoring Stations in appropriate locations to ensure that the Ursula Basin is sufficiently monitored.

32) That BHP undertake a water balance study to predict changes to water quantities in downstream waters and to assist with on-site water management.

4.6.1.3.5 Effects on Ground Water Balance

BHP reported that its activities could have a potential effect on groundwater. These activities include lake dewatering, the mining of kimberlite where permafrost does not currently exist (*e.g.*, the talik zone below lakes) and the refilling of exhausted pits. BHP concluded that the results of previous groundwater modelling and the direct experience gained from operations and observations at the Panda Pit indicate that there would be no measurable effects on the surrounding lakes or the groundwater regime due to the proposed pits.

The KIA indicated that groundwater inflows would likely vary with pit size. The larger pit (Sable) would have more cross sectional area exposed, and so should have higher groundwater in-flows. The KIA asked if the runoff estimates had been corrected for differences in the lake density for each drainage area.

The Yellowknives Dene First Nation pointed out that the Sable pit is going to be mined below the permafrost level and it may cause a reduction in lake levels around the Pit because of groundwater movement. The Yellowknives Dene First Nation indicated that BHP should conduct hydrological baseline studies to determine which nearby lakes/ponds would likely be affected.

4.6.1.3.5.1 Conclusion

The Review Board considered the evidence available and concluded that the environmental impacts associated with effects to the ground water balances will not result in significant adverse environmental impacts.

4.6.1.3.5.2 Recommendation

The Review Board recommends that the Mackenzie Valley Land and Water Board consider the following:

33) That BHP to implement any mitigation measures aimed at reducing impacts on ground water balance as reported in its EA report or supporting documents.

4.6.1.3.6 Effects of Pigeon Diversion Channel

Based on the information provided in the design documents, the EAR, and information responses, it appears that experience gained in the construction of the Panda Diversion Channel is being applied to the Pigeon Stream Diversion. Before construction, BHP proposes to conduct extensive geotechnical testing in order to determine permafrost conditions and areas of lacustrine silt. This would be necessary to identify areas that could be susceptible to thermal or physical erosion.

BHP concluded that, with the construction of Pigeon Diversion Channel, there will be some transport of sediment towards Fay Lake. BHP also concluded that there is a potential for elevated levels of nitrogen and phosphorous entering Fay Lake. These changes could result in a minor increase in the biomass of primary producers, i.e., phytoplankton in Fay Lake. This has the potential to affect other aquatic life in Fay Lake.

DFO expressed concern that sediments and sediment associated parameters, such as phosphorus, will contaminant downstream water bodies as a result of upstream work. In particular, DFO recommended the use of silt curtain in Fay Lake to retain suspended solids that may enter Fay Lake upon the opening of the Pigeon Diversion Channel.

DFO also expressed concern that BHP has not proven that the Pigeon Diversion Channel will completely replace habitat lost in the Pigeon Stream, in accordance with DFO's "no net loss" objective. The fish habitat compensation plans would be finalized through DFO's own regulatory instruments. Although BHP's fish habitat compensation plans do not have to be finalized during the environmental assessment process, DFO does require that during the EA they are satisfied that the "no net loss" policy will be satisfied. DFO stated that, together with BHP, they are working towards this goal.

Environment Canada agreed with DFO's suggestion that sediment control measures, such as a silt curtain, be used to prevent sediment from entering Fay Lake. Environment Canada also expressed concern that very little baseline data is available for Fay Lake. Environment Canada suggests that monitoring of Fay Lake water and sediment quality should be conducted prior to and during activity in the area.

DIAND agrees with BHP that more extensive geotechnical testing is required prior to constructing the channel. DIAND also states that BHP should identify a threshold for phosphorus concentrations in Fay Lake that will be used to prevent pollution of downstream water bodies and resulting biological changes. BHP should also outline a contingency plan to address how it will react to any increase in primary producer biomass seen downstream of the diversion channel.

4.6.1.3.6.1 Conclusion

The Review Board concludes, based on the analysis provided and mitigation methods proposed, that the effects resulting from the Pigeon Diversion Channel will not cause a significant adverse impact on the environment.

4.6.1.3.6.2 Recommendation

The Review Board recommends that the Mackenzie Valley Land and Water Board consider the following:

34) That BHP continue to collect baseline data for Fay Lake in order to better quantify potential changes that could result from the construction of the stream diversion. This should include the establishment of a threshold phosphorus concentration in Fay Lake.

35) That BHP prepare a contingency plan to deal with an increase in primary producer biomass downstream of the diversion channel.

36) That BHP place silt curtains in Fay Lake before opening the Pigeon diversion channel, and that all receiving waters be monitored for changes once the channel is open.

37) That the BHP Aquatic Effects Monitoring Program be modified to include the Pigeon area and that a monitoring regime established for the Pigeon Diversion Channel.

38) That BHP continues negotiating with DFO to satisfy the "no net loss" objective.

4.6.2 Natural Environment

This section of the report includes vegetation and plant communities, aquatic habitat, fisheries resources, and wildlife and wildlife habitat. In order to keep this report within manageable limits, the Review Board did not discuss all Terms of Reference matters listed. Instead, this report of environmental assessment focuses on those matters that the Review Board feels warrants discussion. For any other matters, the Review Board was

satisfied with the Environmental Assessment Report and supporting documentation filed by BHP and expects all commitments will be fulfilled.

4.6.2.1 Effects on Vegetation and Plant Communities

BHP predicted that the proposed development would result in the direct loss of 494 ha of vegetation. Eighty-four percent of this area is representative of heath mat tundra, which is the most common vegetation unit in the claim block. The proposed development footprint represents 0.31% of the local study area and 0.15% of the BHP claim block. BHP indicated that selective reclamation efforts and natural revegetation would eventually restore some of the footprint area to characteristics similar to those of the local study area.

The GNWT reported concerns for the lack of specific goals for revegetation success. They felt that the use of terms such as "as suitable" or "where appropriate" lacked specificity They recommended that BHP establish specific (quantitative) goals against which success may be measured.

The IEMA questioned BHP's calculation of habitat loss. It felt that a truer picture of habitat loss would be to compare it against the amount of habitat available in some larger, ecologically relevant zone and not the claim block. They concluded that a negligible finding might still be correct, but the IEMA felt this conclusion should be validated by measurement in an ecologically relevant context

The IEMA also expressed concern about the growth of exotic plants in the area at the existing mine site. The YDFN echoed this concern indicating there were documented problems created for native plant species when species introduced from other regions competed for limited resources. These introduced species could eventually displace them.

4.6.2.1.1.1 Conclusion

The Review Board concludes, based on the analysis provided, that the effects on vegetation and plant communities will not cause a significant adverse impact on the environment.

4.6.2.1.1.2 Recommendation

39) The Review Board expects that BHP will implement its commitments as stated in the EAR and supporting documentation.

4.6.2.2 Aquatic Habitat

BHP described the proposed alterations to aquatic habitat, including alterations to lakes and streams. The effects of these alterations included the removal of fish, dewatering of lakes and loss of streams.

BHP described how the Pigeon Stream Diversion channel would be engineered to achieve No Net Loss of fisheries habitat and that additional stream habitat would be added to the system when Pigeon Pit is reclaimed as a lake and linked back into the system. BHP also indicated its intention to restore fish habitat (see Effects of Backfilling) in Beartooth Pit.

BHP suggested that the numbers and size of fish in Beartooth Lake, Big Reynolds Pond, Sable Lake and Two Rock Lake represented very small fraction of fish biomass in the BHP claim block lakes or in the Lac de Gras, Yamba/Exeter and Coppermine watersheds. BHP argued that combined, those lakes would not constitute a fishery as defined by the *Fisheries Act*. BHP concluded that the loss of fish populations from these lakes would therefore not have an effect on population genetics elsewhere in the Lac de Gras or Yamba/Exeter watersheds.

The IEMA indicated that in its opinion the "temporary" loss of productive fish habitat both during the operation and until it is effectively reclaimed is rightly a matter for consideration under the fish habitat compensation (No Net Loss) policy.

The YDFN wanted to know what the chances of ice jams, similar to the jam that occurred in the Panda Diversion Channel, occurring on the Pigeon and the Beartooth water diversion channels and the likely effects associated with such ice jams.

The Kitikmeot Inuit Association inquired if there are fish in Little Reynolds Pond and Pigeon pond, and if so, would they be harvested before mine development. The YDFN indicated that eliminating entire fish populations from genetically isolated lakes would reduce the region's genetic diversity of fish, which may not be ecologically healthy.

DFO advised that it has not been proven that Pigeon Diversion Channel could completely replace Pigeon Stream habitat lost, even if it was assumed that the constructed habitat would be of similar quality to that of the natural stream.

DFO wanted supporting information to demonstrate that hydrologic flows would be sufficient to maintain fish habitat in both parallel streams, and the construction of the diversion to mimic the course of "least resistance."

DFO also indicated there was no compensation planned for Little Reynolds and Big Reynolds streams by BHP because BHP included them in the original project compensation. DFO is seeking calculations from BHP to confirm this. DFO indicated there was no compensation for the "temporary" (>10 years) loss of Beartooth inflow and portion of outflow stream, and that the stream habitat compensation is insufficient as proposed. DFO also indicated the No Net Loss objective had not been satisfied with the proposed plan.

DFO indicated that it is not yet satisfied that acceptable fish habitat compensation can be achieved to offset the impacts identified in the EA report. They requested that BHP propose compensation and prove how it provides for no loss of fish habitat. DFO indicated that to date no mechanism has been proposed.

DFO also questioned BHP's fish habitat data and indicated that the proposed development would result in the complete loss of productive fish habitat in five (5) lakes (Sable, Two Rock, Beartooth, Pigeon Pond, and Big Reynolds Pond). It is DFO's conclusion that the proopsed development would also have a negative effect on fish habitat in other lakes and ponds. DFO provided as evidence that BHP's baseline data surveys showed the presence of juvenile fish which contradicts BHP's claim of 'a stream not supporting fish habitat'.

DFO also commented on the BHP's proposal that mined-out pits can be restored to productive fish habitat. It is not DFO's practice to accept flooded pits as acceptable habitat compensation, in part due to the potential for unacceptable water quality should the pits be filled with processed kimberlite. With the *Principle of No Net Loss* [7] DFO is requesting that BHP identify what contingency plans are in place for the reclamation of Beartooth Pit if, after it has been filled with fine tailings, it is found that it cannot be reclaimed as fish habitat. DIAND suggested that problems that could occur with the reclamation of the Beartooth pit be addressed with a detailed plan that should include alternate methods, should problems arise.

4.6.2.2.1.1 Conclusion

The Review Board notes that the evidence provided on this issue during the EA process is sparse and plagued with uncertainties. The Review Board notes that BHP is confident that it can mitigate for lost fisheries habitat through the reclamation of the Beartooth pit and the restoration of streams.

7 Policy for the Management of Fish Habitat, DFO, 1986

DFO is not confident that the Beartooth Pit can be restored as viable fish habitat due to potential unacceptable water quality. The Review Board notes that BHP did not provide alternatives or contingencies as a backup to the reclamation proposal should it prove not feasible.

In normal circumstances, the Review Board would make its determination of significance on the residual effects. In this case, the Review Board needs to ask, "What is the significance of the impacts in the event that mitigation does not prove out?". In reviewing the submissions, the Review Board concludes that there will not be a significant adverse impact to fish and fish habitat.

The Review Board also considered DFO concerns regarding compensation and that BHP should provide acceptable fish habitat compensation proposals before the expansion is approved. The Review Board must make its decisions according to the provisions of the *MVRMA*. Compensation is not a mitigation[8] provision under that Act. Therefore, the Review Board cannot support DFO's request.

4.6.2.2.1.2 Recommendation

The Review Board recommends that the following be considered in the regulatory process:

40) That BHP complete kimberlite toxicity testing on the kimberlite from the Sable, Beartooth, and Pigeon pits before filling of Beartooth Pit with fine kimberlite (i.e. fine tailings from the new pits) in order to demonstrate that processed kimberlite will not pose a threat to the aquatic system.

41) That BHP prepare a contingency plan for Beartooth Pit in the event that water quality in the Beartooth pit makes fish habitat impossible, the proper stratification of the lake does not occur, or that the water quality parameters in the reclaimed pit is not be suitable for fish habitat.

4.6.2.3 Wildlife and Wildlife Habitat

4.6.2.3.1 Loss of habitat and displacement from preferred habitat

BHP concluded that among of the primary effects on wildlife would be loss of habitat and displacement from preferred habitat for food or nesting and denning. BHP concentrated its analysis on caribou, furbearers, i.e., grizzly bears, wolves, wolverine, red and arctic foxes; and birds. They concluded that the most appropriate mitigation would be avoidance of important habitat and reclamation where habitat destruction could not be avoided.

BHP concluded that the loss of summer habitat and habitat effectiveness on caribou would persist throughout the development and operation phases. However, as the caribou used the BHP's proposed development area primarily during migration, the annual period during which caribou are affected would represent a few weeks per year. This impact would cease upon termination of operations.

BHP concluded that potential residual effects on grizzly bears include mine-related mortality and habitat disruption that amounts to approximately 32.7 km^2. The effects of the development were expected to apply to a portion of the regional population, persist for more than a decade, apply in an unpredictable, episodic manner for a few days each year; be reversible within 10 years post-operation, and possibly reduce the population size or ecosystem function. The location of the proposed development likely intersects the areas used by 2-3 adult females, 1-3 males and several subadults.

8 Mitigative or remedial measure means a measure for the contol, reduction or elimination of an adverse impact of a development on the environment, including a restorative measure.

BHP determined that the effect of habitat loss and disruption on arctic and red foxes was likely to apply to a few individuals of the local population. Further, these effects were expected to persist over more than one decade, apply continuously to resident individuals, be reversible in less than 10 years following operation, and not reduce the population size or ecosystem function.

The predicted effects on wolves and wolverines were more substantial. Habitat loss and disruption was the most likely effect and included disruption to den sites and loss of foraging opportunities. It was predicted to apply to a portion of the regional population, last for more than a decade, apply in a unpredictable and episodic manner for a few days each year, be reversible in 10 years post-operation, and possibly reduce the population size or ecosystem function.

The predicted effect on birds includes disruption to species nesting adjacent to the proposed development, and loss of nesting and feeding habitat. Surveys on the mine site, did not indicate a change in breeding density.

The Environment Canada was in general agreement with the findings of impacts on migratory birds. They, however, did express concern for some of the inferences made from the data. In particular, the use of breeding territory density vs. density of birds observed. Notwithstanding this, they did not find that this would change the assumptions about the impacts.

The YDFN also wondered about den re-use by grizzly bears. BHP responded by saying there has been no evidence of den re-use in five years of study.

4.6.2.3.1.1 Conclusion

The Review Board concludes, based on the evidence provided, that the effect of the proposed development is not likely to have a significant adverse impact on wildlife and wildlife habitat.

The Review Board would like to comment on the quality of the effects analysis. The Review Board noted that except for caribou much of the information presented was first reported in the 1995 BHP-EIS or part of the more recent Diavik comprehensive study. There appears to have been little change to this information to specifically reflect the proposed expansion project. The Review Board would have appreciated being informed about relevant results from the Wildlife Effects Monitoring Program. If data from this program was used in the environmental assessment process, that fact should have been brought to the Board's attention. As it stands, the accuracy of the impact predictions does not seem to be substantiated by empirical data.

4.6.2.3.1.2 Recommendation

42) The Review Board expects BHP to implement any mitigation measures aimed at reducing impacts on wildlife mentioned in its EA report or supporting documents. The Review Board also recommends that BHP, with the assistance of appropriate regulatory agencies and aboriginal organizations, consider expanding its wildlife monitoring to evaluate the accuracy of its predictions.

4.6.2.3.2 Effects of disruption, blockage, impediment, and sensory disturbance

BHP determined that wildlife would also be subject to physical and behavioural disturbances, e.g., barriers to movement, blasting.

Literature cited by BHP made reference to effects of traffic thresholds before behaviour was changed. In Prudhoe Bay, volumes of 10 to 15 vehicles per hour reduced that ability of calving and post-calving caribou to cross the road. Projected traffic for the Sable Road, not including non-haul traffic, was 8.3 vehicles per

hour. Notwithstanding this, BHP indicated that roads may also be beneficial. They provide insect relief and vantage points for predator detection. The existing roads at the mine site are preferred travel routes for caribou through the site.

BHP also reported on the effect of noise on caribou. They noted that caribou were most likely to be disrupted by trucks and people walking.

Grizzly bears may similarly affected by roads, concluded BHP. Literature cited indicated that bear movements may be altered, collision is a possibility, and there is likely displacement from habitat. BHP felt that it was likely that the bears would be initially wary but would habituate over time, e.g., two years.

The YDFN noted that there was the possibility of traffic volume exceeding 10 vehicles per hour. They also expressed concern about the measurement and documentation of effects on the caribou herd as opposed to its individual members and the associated monitoring.

The YDFN identified noise as source of concern with respect to bears and suggested that the development's zone of Influence around the pits be increased ten-fold as a worst-case scenario to incorporate blasting noise. Similar concerns were raised about the development's potential effect on wolves. The YDFN questioned the adequacy of the zone of influence for grizzly bears and wondered if it should be expanded to include disturbance from blasting. BHP responded by saying that blasting out to 30km is detectable by humans only at a low sound frequency. At 1000m, blasting sounded like thunder. It could not be ascertained how bears might respond, but caribou did not seem to react.

The GNWT noted that wildlife is also affected by low-level aircraft activity, and that such effects need quantification and analysis.

The GNWT questioned if BHP's proposed mitigation for road impacts could be substantiated in the absence of data such as existing caribou trails to reveal caribou use patterns. They also felt that BHP could have bolstered its EA report with satellite data on caribou movement and habitat. Overall, they felt that the conclusions in the EA report were inadequately supported by data analysis and presentation leaving uncertainty in a number of areas.

The GNWT concluded that, There is uncertainty in stating whether the roads and associated activity at Ekati™ would affect caribou migration. On balance, based on experience with the Central Arctic herd at Prudhoe Bay, changes during post-calving movements are possible at Ekati™. Both the oilfield and mine have activities associated with roads although Ekati™ has a simpler road complex and no pipelines. Traffic frequency is relatively similar although Ekati has more haul trucks. The caribou exposure at both the Prudhoe Bay oilfield and the Ekati™ mine includes postcalving cows which are the most responsive and for which, interruptions to foraging and other energetic changes can readily accumulate. Mitigation has the potential to reduce effects but monitoring is essential to determine the effectiveness of mitigation. Information gaps remain in the baseline knowledge about caribou use of the Ekati™ site which impedes the development of effective mitigation and thus increases the uncertainty about predicted effects. [9]

The IEMA also considered the effect of roads on caribou and bears. They, like others, noted that travel on the Sable road would likely reach thresholds reported to effect caribou movement and distribution. They recommended that daily traffic volume be recorded and that limits be placed on traffic volume during migration periods. They also said that road development should not take place during migration.

With respect to grizzly bears, IEMA thought the precautionary principle should be applied because they are a vulnerable species and the displacement of grizzly bears due to human activities is a tough and complex ecological question.

9 GNWT. 2000. Response to MVEIRB Information Request.

4.6.2.3.2.1 Conclusion

The Review Board determined that the operation of the Sable road, and its possible direct and indirect effects on wildlife is an important issue that warranted careful attention. The Review Board noted from the information provided by the GNWT Department of Resources, Wildlife and Economic Development, that there is no conclusive answer, and that the effect of the proposed development is an issue that will require on-going scrutiny. The Review Board concludes, based on the analysis provided, that effects on the wildlife will not cause a significant adverse impact.

4.6.2.3.2.2 Recommendation

The Review Board recommends the following:

43) That BHP limit traffic on the Sable access road from the Pigeon lease area, north to the Sable site during caribou migration periods to that described in the BHP EAR. That BHP establish a monitoring program for the road in collaboration with aboriginal organizations. Given the importance of caribou, it is essential that the study approach be scientifically sound, take advantage of traditional knowledge, and ensure adequate data collection for improving prediction confidence for future effects and cumulative effects assessments.

44) That BHP and the GNWT contribute resources, and the YDFN participate in adapting the existing wildlife effects monitoring program to address the issues identified by GNWT in its Technical Report to the Review Board.

4.6.3 Social, economic and cultural components

This portion of the report covers cultural and heritage resources; land and resource use; economy and human health. In order to keep this report within manageable limits, the Review Board did not discuss all Terms of Reference matters listed. Instead, this report of environmental assessment focuses on those matters that the Review Board feels warrants discussion. For any other matters, the Review Board was satisfied with the Environmental Assessment Report and supporting documentation filed by BHP and expects all commitments will be fulfilled.

4.6.3.1 Cultural and heritage resources

BHP has maintained active archaeological impact assessment and monitoring since the beginning of the development. In the EAR, It used heritage sites as an attribute to assess the residual effects of the proposed development. BHP also reported on the number of sites found since exploration and development on the Ekati™ property. Within its baseline studies report, they discuss the archaeological resources located in the areas to be developed and discuss proposed mitigation, e.g., avoidance, removal. BHP indicated that the proposed development would have an effect on the heritage site but that this would be offset by the knowledge gained.

The GNWT is satisfied with the techniques employed by BHP, but it goes on to say it is imperative that an heritage resource impact assessment be undertaken before development proceeds in these areas. [10]

10 Government of the Northwest Territories Technical Review of BHP's Environmental Assessment Report for the Sable, Pigeon and Beartooth Kimberlite Pipes, Ekati Mine. Sept. 2000

4.6.3.1.1.1 Conclusion

The Review Board concludes based on the evidence provided, that the effects on archaeological resources will not cause a significant adverse environmental effect.

4.6.3.1.1.2 Recommendation

The Review Board recommends:

45) That BHP complete a heritage resource impact assessment before proceeding with the proposed development. Should heritage sites be uncovered then an approved mitigation plan be completed and implemented before development proceeds.

4.6.3.2 Land and Resources Use

BHP reported on its employment and income benefits received by employees accommodates both traditional lifestyles and the wage economy. BHP also summarized the benefits of the 2/2 rotation. As reported in its IR response to a question posed by the GNWT, the 2/2 schedule was found to provide the best option for accommodating Aboriginal concerns on continued participation in traditional pursuits. They also reported that during the 1994 public hearings, community leaders asked BHP for a 2/2 rotation. BHP went on to report that during the first year of operation there was turn over rate of 10% which was taken as an early indication of the stability of the workforce. BHP is satisfied that the 2/2 rotational schedule is not restricting the time required by Aboriginal workers for traditional lifestyle pursuits.

BHP also discussed the loss of income-in-kind to hunters dependent on the Bathurst Caribou herd. Monitoring has not found that BHP's activities have affected the caribou migration or the harvesting of country food.

BHP also reported on modern Aboriginal use of the land. They noted that Inuit from Kugluktuk, Dogrib and Yellowknives Dene were traditional users of the BHP claim block. Land uses include winter and summer travel, short-term traditional camps, general hunting and trapping, and fisheries. They also noted barrenland and caribou water crossings, graves, place names and knowledge of wildlife dens.

BHP cited results from the NWT Bureau of Statistics 1994 Labour Force study that indicated that employed persons spend no less time on the land hunting and fishing than did unemployed persons, or those who are not in the labour force.

The GNWT questioned if BHP had details that would suggest the number of former and current employees who were and were not successful in adapting to the rotational work schedule because of a conflict between spending time with family and pursuing subsistence/traditional activity during their two weeks. None were provided by BHP.

Both the GNWT and Conscribe Enterprises Ltd. (Conscribe), consultant to the Review Board, questioned the lack of empirical data in BHP's reporting. With the exception of the article on Patrick Charlo, BHP offered no other supporting reports or information to indicate if there was successful adaption to the rotation and no impact to the traditional lifestyles.

BHP's review of Conscribe's work concluded that after one year of production there was no empirical evidence from monitoring of employment and income effects on community health and well being to support changing the EIA 1995 predictions.

4.6.3.2.1.1 Conclusion

The Review Board concurs with the GNWT and Conscribe that BHP should have attempted to provide more empirical evidence on the predicted socio-cultural consequences of the proposed development and provided information that would allow others to assess the reasonableness of mitigation measures. The Review Board also agrees with Conscribe that the adaptive management approach is laudable in its own right, but should not take the place of identifying and predicting socio-economic impacts in the EAR. The Review Board also recognizes the lack of evidence regarding the impacts of rotational work on families and communities, irrespective of their cultural origin. Therefore, the Review Board finds that it cannot concur with BHP's finding of negligible impacts because of the lack of empirical findings. It, however, cannot make findings of significance either for the same reason.

4.6.3.2.1.2 Recommendation

46) The Review Board recommends that BHP and the GNWT undertake a study to determine the impact of rotational work on Aboriginal and non-Aboriginal people working at BHP.

4.6.3.3 Economy

4.6.3.3.1 Revenues and costs

BHP analysed the impacts of the addition of the three pipes using gross domestic product, employment, labour income and government finances.

BHP predicted that the development would contribute $324 million annually to the NWT's Gross Domestic Product (GDP) and the development would contribute almost $81.9 million a year ($250 million over three years) in labour income alone.

Revenue to the federal government would increase by a net positive $108 million a year for the three years of the development. Territorial Government tax revenues would increase by a positive $33 million per annum. However, after accounting for the Formula Finance Grant claw-back, the territorial government effective increase from the proposed development is $6 million a year.

BHP also discussed territorial government expenditures as predicted in the 1995 BHP-EIS. BHP predicted a reduction in territorial government expenditures for social assistance payments of $1.4 million, $1.2 million in social housing payments, and $0.4 million savings in territorial government grants and other assistance, for a total of $5 million annually. The combined net effect to the territorial government of revenues and savings is $11 million per year.

The GNWT believes that the full differences between the socio-economic impacts of the mine as proposed in 1995, the socio-economic agreement, and the current proposal could not be adequately discerned from the data provided, and therefore, do not fully meet the requirements of the Terms of Reference. The GNWT recommended that BHP prepare new economic predictions based on the new mine life of 15 plus three years rather than the originally planned 25 year mine.

The GNWT noted that BHP's 1995 EIS and the EAR predicted that labour income in small local communities would increase significantly as a result of the development. They were, however, unable to confirm this in the absence of any analysis of what has occurred to date. Without this analysis, they could not confirm or modify the 1995 predictions and provide an empirical basis for predicting the anticipated impact in these communities of the three new pipes. The GNWT was unable to address the question of what impact the development has had and is expected to have in the small local communities.

4.6.3.3.1.1 Conclusion

The Review Board has reserved its discussion of conclusions for the end of the economy section.

4.6.3.3.1.2 Recommendation

The Review Board has reserved its discussion of recommendations for the end of the economy section.

4.6.3.3.2 Employment, local business opportunities

BHP predicted that mine employment and income benefits were among the effects of the 18,000 tpd mining operation. BHP reported that the 4,108 person years of direct, indirect and induced employment would be maintained for three years by the addition of the pipes. Aboriginal participation is expected to remain the same as predicted in 1995. That is, 950 direct person-years of employment.

BHP said that the opportunities for local, regional and territorial businesses would be maintained with the three pipes. An estimated $78.3 million annual purchasing rate, assuming 18,000 tpd, would be made through northern and Aboriginal businesses. BHP also confirmed continuing meeting the objectives of the Socio-Economic Agreement.

The GNWT cited its most recent data that indicated between the start of Ekati™ Mine construction in 1996 and 1999, the unemployment rate in small local communities increased from 29.2 per cent to 39.7 per cent, and there was almost a 50% variance between predicted and actual 1999 employment levels.

The GNWT also indicated that expenditures by BHP at the 9,000 t/d level have been almost five times higher than those predicted in 1995, and that BHP's employment predictions at the 18,000 t/d production level were uncertain. BHP advised that the estimated level of operating costs in 1999 of $88 million compared favourably to the inflation adjusted estimate of $67 million predicted in the 1995 EARP Report for 2000.

The GWNT noted that the addition of three years of mine life proposed by the development, for a total of an 18 year mine life was positive, but much shorter then the previously predicted 25-year mine life. Additionally, the GNWT noted that full consideration of the multi-generation consequences or irreversible nature of some potential cultural and human health effects could change the determination of significance.

The GNWT further indicated that there was uncertainty as to how the Ekati™ Mine would effect small local communities and that a possible result could be decreased economic diversification in the smaller communities. The GNWT has been attempting to secure benefits associated with the proposed development through secondary industry and economic diversification, BHP's support for the value-added industry and the maintenance of opportunities for long-term sustainable economic diversification.

The GNWT indicated that more thorough discussion of the relationship between traditional/subsistence activities and wage employment would have benefited the Board given that in the small local communities, economic benefits will be almost exclusively restricted to employment. The GNWT indicated that local purchases by BHP for 1999 show that 0.1 per cent of all northern purchases were made outside of Hay River and Yellowknife.

Lastly, although 'Project' under the Socio-economic Agreement has a broader meaning than the integrated project currently under review, the variance between predicted and reported person years is roughly 50%. In addition, purchase levels reported in the 1999 Socio-economic Report are almost five times higher than EIS predictions. The GNWT does not feel the explanation given for variances in employment and purchasing levels reduce the uncertainty associated with these issues. The Proponent was asked to discuss the

uncertainty of predictions regarding its mining operations and the range of values that may occur. Reviewers also provided a summary chart format they felt would afford them a clear understanding of the implications of the project under review. At this point in time, that summary information has not been provided.

The GNWT noted that the most recent available data from the small local communities indicated that the predicted decline in unemployment rates has thus far failed to materialize. Although it is too early to make firm conclusions, this suggests some uncertainty associated with the analysis of employment contained in the EIS. The 1995 EIS predicted 9,000 tpd employment levels of 664 jobs and 18,000 tpd employment levels of 932 jobs. From BHP's Annual Report on Northern and Aboriginal Employment, 1999 Operational Phase, the GNWT finds that report indicates 897.7 person-years were used in the first year of operation, representing a total of 1,492 people moving on- and off-site. The almost 50% variance between predicted and actual 1999 employment levels was not discussed in the context of employment predictions related to the development of the three new pipes. The GNWT concluded its analysis by saying it was unable to comment on the appropriateness and soundness of the BHP's measures because of the absence of a detailed methodology behind the derivation of the three measures: an interest factor, success rate and an improve factor.

4.6.3.3.2.1 Conclusion

The Review Board comes to several conclusions regarding the social and economic impacts of the development. The Review Board has low confidence in the employment and expenditure predictions because of the 50% variance between predicted and actual 1999 employment levels, a five-fold difference from predicted expenditures, and mine plan volatility. The Review Board also notes that there is a 40% difference in the mine life from 1996. The Review Board concludes that the employment and income effects of the development are subject to rapid and significant change and reminiscent of "boom and bust" cycles that happen in less than one generation but where effects, both positive and negative, last multi-generations. The Review Board, therefore, cannot agree with BHP's prediction that the impacts will not be significant because the effects will last more than one generation. The Review Board does, however, note that the development is having a net positive economic impact because expenditures are higher than predicted.

The Board also notes the federal government's current fiscal arrangement with the GNWT with respect to revenues from the mine. The Review Board acknowledges the GNWT's efforts to diversify the economy, especially in communities as only 0.1% of the purchases for BHP take place outside of Hay River or Yellowknife. The economic benefit of the development is therefore primarily in the form of salaries which will cease in 17 years. The Review Board notes that the $6 million received annually is insufficient for the GNWT to put a great deal of effort of its own into economic diversification. The GNWT is, therefore, compelled to negotiate arrangements with BHP. The Review Board therefore concludes that the federal-territorial fiscal arrangement with respect to this development is having a significant adverse impact on GNWT's ability to diversify its economy.

4.6.3.3.2.2 Recommendation

47) The Review Board recommends that the GNWT, BHP, and other responsible parties begin planning, as soon a possible, for the eventual closure of the mine, and the resulting effects on employees to avoid the effects of a boom-bust cycle..

48) The Review Board recommends that the Government of Canada reconsider the Formula Financing Agreement and that the GNWT be provided additional revenues to support, and where necessary, expand its role in the management and mitigation of effects associated with development.

5 Abandonment and Restoration

5.1 Terrain and Vegetation

BHP noted that the most suitable material under consideration for reclamation purposes is lakebed sediment. The GNWT recommended that BHP make every effort possible to use this material for revegetation and restoration purposes to produce a productive landscape.

BHP indicated that other materials, including biosolids, organic soils and processed kimberlite, would also be considered. The extent to which these materials could be used would depend on the quantities available, the feasibility of excavating and stockpiling them, the results of revegetation studies, and site conditions appropriate for their use. Lakebed material, containing organic matter, could support wetland vegetation, and could potentially be used as top-dressing or mixed with other available substrate for reclamation at disturbed sites near the three pits. BHP stated that the high silt content of lake sediments enhanced soil compaction, and retarded root growth and that soil that is high in silt is subject to erosion by wind and water. However, mixing the sediment with coarser textured material like sand might improve its physical structure.

BHP's principal means of vegetation recovery of Land Development Units (LDUs) associated with the three pits would likely be through natural colonization. Those areas with physical characteristics suitable for establishment and support of vegetation would be scarified and seeded. Allowing some units to recover naturally while establishing vegetation in other units will direct the limited resources available (plant materials and soil amendments) to where they are most likely to be effective. No revegetation efforts would be planned for the waste rock storage areas, gravel roads, pads and dykes. The surface topography of those areas would be re-worked to create conditions more favourable for natural colonization.

DIAND suggested that progressive reclamation start as soon as the land is no longer required for the Sable or Pigeon mining purposes, as that method would enable reclamation as soon as activities needed for the mining operation ceased.

The GNWT calculated that based on an application rate of 0.3 metres of overburden, total surface area that could be covered is 1,630 hectares. Given that the predicted area of disturbance is 494 hectares, the amount of overburden, which could be salvaged for reclamation purposes, is significant. BHP had calculated that it could recover 16.3 million m^3 of overburden from the three new kimberlite pipes.

The GNWT noted that much of the discussion presented in the EA Report is qualitative and therefore does not provide specific goals (i.e. quantitative goals) for revegetation success. In addition, the GNWT requested that the Board require the annual reporting of habitat loss by BHP to include the three new kimberlite pipes.

5.1.1.1.1.1 Conclusion

The Review Board noted that in BHP's submission, the company is reviewing alternative reclamation methods. The Review Board recognizes that reclamation efforts are an ongoing adaptive process that requires monitoring by BHP and the responsible agencies.

5.1.1.1.1.2 Recommendation

The Review Board recommends the following:

49) That BHP work with the GNWT to establish specific goals for revegetation. These goals should be quantitative to allow future monitoring to determine a measure of success.

50) Given the substantial amounts of lake bottom sediments and overburden that can be salvaged, BHP should consider every possibility to use this material for revegetation and restoration purposes in order to produce a productive landscape.

51) BHP should actively reconsider the restoration and revegetation of the waste rock piles as part of its abandonment and restoration plan.

52) BHP should avoid the possible harmful effects of introducing non-indigenous plant species into the area during the reclamation by maximizing the use of local species.

53) That BHP should include the habitat loss due to these three new pipes as part of its annual reporting.

5.2 Reclaiming Mined out Kimberlite Pits

BHP proposes to reclaim all three pits such that natural hydrological regimes would be re-established within their respective watersheds. As part of the reclamation process, BHP is also attempting to address DFO's requirement that the development have "no net loss" on fish habitat by modifying the pits to create suitable aquatic habitat.

The first step in BHP's reclamation process for the pits is to select areas to be sloped back at a shallow angle to form beaches. Screened esker material and/or crushed granite would be used as substrate. Boulders would be placed at select locations to provide wave breaks and refuge areas for smaller fish. The upper pit walls would be modified and the pit flooded. The lakes will be monitored during flooding to determine any need for nutrient supplement or fish restocking.

Beartooth Pit will be partially backfilled with processed kimberlite and then filled with fresh water. BHP claimed that experience gained from the operation and monitoring programs associated with the Beartooth Pit reclamation would be of considerable value to planning for the reclamation of other mined-out pits to lake status. BHP has scheduled the backfilling of Beartooth Pit for the summers of 2008 and 2009. BHP proposed to place the processed kimberlite in Long Lake as a contingency in the event that backfilling of processed kimberlite in Beartooth was not feasible.

Sable Pit and Pigeon Pit would be filled as quickly as practical by pumping from Ursula Lake and Exeter Lake, respectively. BHP stated that backfilling Sable and Pigeon Pits is not being proposed because the distance from these pits to other pits makes this reclamation option uneconomical.

Environment Canada noted that the restoration filling of lakes should be conducted in such a way to avoid significantly affecting downstream flows and also pointed out that BHP did not have adequate data (i.e., stream flow out of Exeter) to support any proposed filling rates or determine effects. Environment Canada recommended the installation of hydrometric stations where BHP proposed to extract water for the purposes of restoration filling so that when they wish to fill the pits, appropriate withdrawal rates can be determined.

DIAND agreed with Environment Canada's recommendation and noted that if BHP proposed to refill the Sable Pit by pumping water from Ursula Lake, additional information was needed and contingency measures should be provided.

The YDFN wanted to emphasize that if BHP was not allowed to use water from the Ursula or other water bodies for reclamation purposes it would take 150-200 years to refill the pits and that such time frames warranted serious environmental management concerns.

DFO indicated that BHP's proposal to flood the Sable and Pigeon Pits to restore the lost aquatic habitat was questionable. DFO also states that BHP's proposal to place processed kimberlite in the Beartooth Pit needs to be assessed cautiously and critically. DFO claimed that BHP had not proven that the use of processed kimberlite would not result in water quality concerns and had also not adequately supported its proposition that the eventual lake would be "productive fish habitat" that would satisfy DFO's "no net loss" objective. In connection with the above comment, DFO indicated that BHP's assessment of the option of backfilling some pits with waste rock instead of processed kimberlite (and/or capping) was dismissive. DFO asserts that the creation of aquatic habitat associated with flooded pits is part of the reclamation of the mine site, not fish habitat compensation.

DFO stated that more study and modelling needed to be done on the toxicity of kimberlite. DFO also expressed concern about BHP's predictions about the meromictic lake and the remobilization of contaminants both in the eventual lake and downstream.

The YDFN echoed some of DFO's concerns indicating that the presence of fine processed kimberlite in the Beartooth Pit could affect the pit's suitability as fish habitat by causing poor water or sediment chemical quality.

The IEMA indicated that, given the experimental nature of the processed kimberlite backfilling and unresolved issues relating to kimberlite toxicity, it would be prudent to investigate the proposal as early as possible. This would allow the development of contingency plans in the event that backfilling of kimberlite is proven undesirable.

The IEMA recommended that the environmental feasibility of the approach be further documented as part of the water licence application for Beartooth pipe. The IEMA recommended that the water licence application include an updated geochemical characterization of slurry solids and pond water from the lower end of cell B in Long Lake, and the results of toxicity test work currently being undertaken in the impoundment facility.

NRCan indicated that kimberlite contains a certain amount of apatite, which, under certain conditions, could be a source of phosphorus. The phosphorus could leach from the processed kimberlite or from the pit walls. NRCan stated that increased phosphorous levels in runoff or discharge water could affect the trophic status of receiving water bodies.

The YDFN were concerned that a benthic invertebrate community, needed by some fish species for food, might not become established in the proposed Beartooth lake if conditions were not appropriate. The YDFN added that BHP had not conclusively determined whether or not processed kimberlite would change the pH of the water in the pit to alkaline conditions. The YDFN argued that if the processed kimberlite increased the pH, there was a likelihood of increasing the toxicity of ammonia (present as residues from blasting) in the water, or in sediments.

GLL concluded that the proposed utilization of mined-out open pits as locations for deposition of processed kimberlite or waste rock could be considered advantageous. GLL indicated that this approach to waste rock management has presented operational and environmental benefits at other mine sites where a series of open pits were developed. These benefits have included reduced operating costs, reduced reclamation costs, reduced risks associated with water retention dams, reduced area of impact due to elimination of the need for expanded tailings ponds or rock dumps, and reduced risk of ARD due to rapid underwater disposal of reactive materials. GLL suggested that BHP be encouraged to review the mine plan with the intent of incorporating any minor scheduling modifications that would increase the benefits of utilizing mined out open pits as storage locations for processed kimberlite or waste rock.

5.2.1.1.1.1 Conclusion

BHP is proposing an untested mitigation measure regarding placing processed kimberlite in mined out open pits. The Review Board notes that BHP is confident that it can mitigate for lost fisheries habitat (see section 4.6.2.2) through the reclamation of the Beartooth pit. Nothwithstanding BHP's confidence, the evidence provided was not conclusive. However, the Review Board notes that BHP did propose to place the processed kimberlite in Long Lake as a contingency in the event that backfilling processed kimberlite was unfeasible.

The Review Board concurs with the GLL suggestion that BHP be encouraged to review the mine plan with the intent of incorporating any minor scheduling modifications that would increase the benefits of utilizing mined out open pits as storage locations for processed kimberlite or waste rock.

The Review Board is aware that the Mackenzie Valley Land and Water Board will address specific issues related to licensing requirements including matters pertaining to toxicity test work and updated geochemical characterization of slurry solids and pond water from the lower end of cell B in Long Lake.

For the refilling of the Sable and Pigeon Pits with water, the Review Board concluded that, with appropriate hydrological data collection and analysis, this reclamation measure would not cause a significant adverse impact on the environment.

For the reclamation of Beartooth Pit by backfilling with processed kimberlite, the Review Board had to deviate from its usual decision-making process. Normally, the Review Board would make its determination of significance on the residual impacts to the environment. In this situation, as the mitigation was unproven, the Review Board also considered, "What is the significance of the impacts from backfilling a pit in the event that mitigation does not prove out?" In reviewing the submissions, and in particular, noting that there was no overwhelming concern expressed, and that BHP had proposed an alternative, the Review Board concludes that effects resulting from backfilling a pit with processed kimberlite will not cause a significant adverse impact on the environment.

5.2.1.1.1.2 Recommendation

The Review Board recommends that the Mackenzie Valley Land and Water Board consider the following:

54) BHP should address the issue of long-term monitoring of the pits flooding as it progresses over a 10-20 year period after closure to ensure that water quality is maintained.

55) Hydrometric stations be installed and properly operated at source water bodies which will be used for water sources for the infilling of the pits. The stations should be installed for several years in advance of the withdrawals.

56) That the YDFN, EC, and DFO be involved in and advised on the study to assess the toxicity of processed kimberlite and other potential environmental impacts of the presence of processed kimberlite in the reclaimed lake. This study should include an updated geochemical characterization of slurry solids and pond water from the lower end of cell B in Long Lake, along with the results of toxicity test work being undertaken in the impoundment facility.

57) That BHP continues negotiating with DFO to satisfy the "no net loss" objective.

5.3 Breaching of Dams and Dykes

BHP stated that water retention dykes at the Sable and Beartooth developments will be decommissioned at an appropriate time following completion of mining at those two pits. The exact timing will depend on water quality criteria. The method that will be used is to lower the water levels behind the dykes to slightly below the original lake levels by pumping. A segment of the dykes will be removed to the final elevation of the long-term outlet and a new weir will be constructed using erosion resistant cobbles and boulders. BHP would complete this work in dry conditions which would, in its opinion, eliminate any risk of rapid or uncontrolled discharge of turbid water.

DFO expressed its concern that the breaching of the Two Rock Lake containment structures has the potential to release accumulated sediment and associated parameters to downstream water bodies. They state that the potential releases of accumulated sediment and associated phosphorus have not been assessed.

DIAND indicated its concern that if the dams and dykes are not breached correctly, water may be discharged that does not meet water quality criteria (i.e. pH, TSS, phosphorus, metals, ammonia and nitrates). DIAND accepted BHP's proposed breaching method as appropriate mitigation to ensure no significant water quality impacts will occur. However, they suggest that BHP breaching procedure be incorporated into the water license during the regulatory process and that the water quality be monitored during and after the breachings to ensure that discharge criteria are maintained.

5.3.1.1.1.1 Conclusion

The Review Board concludes, based on the analysis provided and the information about BHP's mitigation plans, that the breaching of dams and dykes will not cause a significant adverse environmental effect.

5.3.1.1.1.2 Recommendation

The Review Board recommends that the Mackenzie Valley Land and Water Board consider the following:

58) That BHP's proposed mitigation measures for the breaching of dams and dykes be incorporated into the water license.

59) That BHP monitor water quality during and after the breaching of the dykes to ensure that discharge criteria are maintained. Appropriate contingency plans need to be prepared in the event that water of unacceptable quality is released to the environment.

6 Effects of the environment on the development

BHP, in its EAR, discussed the effects of the environment on the proposed development, specifically: climate trends and permafrost; frost action and ground movements; earthquake hazard; and pit wall stability.

BHP reported that it is currently operating and reporting on two frozen core dams on site. In its report, *Preliminary design of water control structures for Sable, Pigeon and Beartooth Developments*, it identified additional frozen core structures that would be designed according to detailed two-dimensional geothermal modeling to predict the time-temperature relationship within the dam and its foundations. There would be analysis for long-term mean annual temperature, climate change and unusually warm years. BHP also stated

that, like the existing structures, the new structures will be cabled to collect performance data to detect permafrost warming.

Where areas of frost action and ground movement have been identified, BHP will be removing the frost-shattered material and replace it with well-graded compact fill. No risk to structures is anticipated.

BHP stated that the development proposal is in a geologically stable and low seismic risk area. However, in accordance with the *Dam Safety Guidelines* published by the Canadian Dam Association, BHP would be required to assess the risk of earthquake damage as part of the final design of the water retaining structures,.

The freeze-thaw effects of seeping groundwater and changing permafrost conditions are features that are being considered in the pit wall design and slope stability.

The IEMA discussed the effects of climate change and frozen core berms. They suggested that a longer-term view would be valuable given the recent data on arctic warming trends. They did note that BHP and others have conducted some short-term (i.e. <50 years) computer modelling with respect to global warming effects.

NRCan suggested the BHP run seismic models for the occurrence of large earthquakes in the Canadian shield as a whole. They felt that was more consistent with the Canadian Dam Association guidelines.

Gartner Lee Ltd. suggested the placement of climate stations within the pits e.g., 420 bench of Panda, to collect data against shot-rock impact. It also suggested that the Pigeon diversion berm accommodate for runoff flow on the upslope side which is a source of heat.

6.1.1.1.1.1 Conclusion

The Review Board is satisfied with BHP's efforts and expects it to implement such measures as described in its EAR or supporting documents.

6.1.1.1.1.2 Recommendation

60) The Review Board recommends that the appropriate regulatory agencies take into account the effect of the environment on the development proposal during the regulatory phase.

7 Cumulative Effects

BHP used the process established in the *Cumulative Effects Assessment Practitioners Guide* from the Canadian Environmental Assessment Agency. Their assessment of effects covered:

- definition of cumulative effects consistent with terminology of the MVRMA;
- scoping of the assessment;
- analysis of the effects;
- identification of mitigation; and
- monitoring.

The valued ecosystem components (VECs) components that were considered for cumulative effects were those for which there was a residual effect identified as being minor or greater significance (see Findings: Definitions of Significance Section 4.3 of this report). Further, only those effects that have changed from the 1995 BHP-EIS and the Diavik Diamonds Project EA were addressed. In its conclusion, BHP analysed for cumulative effects for air quality, caribou/habitat and carnivores/habitat.

BHP concluded its analysis by finding that the best approach for addressing the potential cumulative effects of the Ekati™ Diamond Mine is through the continuation of its comprehensive environmental monitoring

programs. Monitoring would provide information on environmental baseline conditions and enable assessment of actual effects.

Environment Canada recommended that BHP participate in the regional cumulative effects management framework. As a participant in the framework, BHP would make the results of its monitoring programs available for any analysis that is conducted as a component of the framework.

DIAND discussed the cumulative effects of surface water quality and quantity. They recommended to the Review Board that BHP cooperate with Diavik, Government, and other regulators to address the cumulative effects of total loadings of nutrients and metals into Lac de Gras watershed. DIAND indicated that BHP should be able to make predictive statements with regard to quantities of nitrogen and phosphorous it expects to see in Lac de Gras over the course of the mine life, in combination with Diavik. DIAND concluded by recommending that existing cumulative effects frameworks should be supported, and new initiatives should be pursued by BHP working in co-operation with Diavik.

Gartner Lee Ltd., consultant to the Review Board, concluded that the analysis by BHP of cumulative effects on air quality, caribou and carnivores was both qualitative and quantitative in nature and based on the results of the original EIS and other work completed for Diavik. Where the cumulative effect was quantifiable, the magnitude of the effect was placed within its regional context. Where effects could not be quantified, BHP provided rationale for its conclusions. Gartner Lee Ltd. did, however, find that cumulative effects were not systematically or explicitly assessed according to the significance criteria and impact attributes established for the assessment. As a result, the overall conclusions regarding significance of the cumulative effects are difficult to interpret. Praxis, also consultant to the Review Board, concluded that the exclusion of socio-economic effects from the cumulative assessment for this development was reasonable.

The GNWT reported that BHP should have included in its analysis effects that it considered were negligible. They refer to the CEAA "Practitioner's Guide" and the statement that individual impacts may be insignificant but when taken together with other impacts, this may be significant. This, the Guide says, is a fundamental principle of understanding cumulative effects.

Based on the principle that negligible effects should have been included, the GNWT concluded, based on its analysis, that there may be difficulties with competition for recruiting people between the mines. They also questioned how BHP concluded that the effects on traditional and subsistence activities would be moderate and positive when there was no monitoring related to these activities.

The GNWT raised several concerns for cumulative impacts in relation to the effects of Sable Road on wildlife, in particular, grizzly bear and wolves. They noted that Misery and Sable roads may be a barrier to wildlife movement, but they note that no analysis is offered to address the cumulative impact of Sable road on resident bears. The GNWT continued by noting that it was likely that BHP would require additional road and pit development, and may use the Sable road beyond the predicted 11 years. As this was a possibility, they felt that the BHP could act proactively and collect data towards cumulative effects assessment.

The GNWT also commented on the cumulative effects to caribou. They observed that BHP did not discuss the uncertainties or limitations behind its data. They recommended that BHP refine its approach to cumulative effects assessment to account for the low prediction confidence of some effects.

7.1.1.1.1.1 Conclusion

The Review Board concludes, based on the evidence provided, that the cumulative effects are not likely to have a significant adverse impact.

The Review Board would like to comment on the quality of the effects analysis. The Review Board noted that BHP and many reviewers proposed on-going monitoring or participation in the Cumulative Effects

Assessment and Management Framework (CEAMF) as mitigation. While this is commendable and follow-up and monitoring is an essential part of any environmental assessment, the Review Board is however bound by the MVRMA and what constitutes a mitigative measure. Initiatives such as monitoring and participation in the CEAMF do not qualify as mitigation under the MVRMA.

The Review Board would have been better assisted by reviewers if there had been additional effort on a review of the cumulative effects and discussion of mitigation measures proposed by BHP. The Review Board would like to commend the efforts of the GNWT in this matter. Its evaluation was of substantial assistance and the Review Board appreciated the pains taken to point out areas where there was uncertainty in the data and where additional work would be beneficial.

7.1.1.1.1.2 Recommendation

The Review Board recommends the following:

61) That DIAND and EC jointly initiate an evaluation of the cumulative effects of total loadings of nutrients and metals into Lac de Gras watershed, and that the resulting long term effects on this oligotrophic system. BHP and Diavik, and others, as requested, shall assist DIAND and EC by providing the monitoring and predictive data needed to examine the anticipated total loadings of contaminants into the Lac de Gras watershed.

62) That BHP to implement any mitigation measures aimed at reducing cumulative impacts as reported in the EAR and supporting documents. The Review Board also recommends that BHP, with the assistance of appropriate regulatory agencies and aboriginal organizations, consider expanding its socio-economic and wildlife monitoring to evaluate the accuracy of its cumulative effects predictions.

8 Summary of Recommendations

The Review Board recommends the following:

1) That BHP should continue to incorporate pollution prevention measures and best adaptive management practices consistent with the approaches described in their environmental management plans as described in the EAR.

2) That BHP use CAAQO "desirable objectives" in management planning regarding fugitive dust emissions.

3) That BHP continue with its air quality monitoring program, particularly the TSP sampling during the summer months and that BHP consider measuring inhalable particulates and SO_2 during thermal inversions.

4) That BHP's climate reports include proper documentation of calibration procedures, error analysis, interpretation, and identify the corrections as part of its QA/QC procedures.

5) That BHP analyze data in a manner suitable to interpret seasonal trends or occurrences, and reported in a format that demonstrates relevance to conclusions being drawn and provides credibility to the EA process.

6) That BHP incorporate discussions of climate change as part of the reporting procedures.

7) That BHP provide the results of its greenhouse gas emissions control initiatives to the IEMA and to the environmental protection agencies of the federal government and the Government of the Northwest Territories.

8) That regulators responsible for managing air quality, review BHP's current air quality-monitoring program with a view to improving its design and adding a source of contamination characterization program.

9) That BHP provide its climate reports to the Review Board and the Independent Environmental Monitoring Agency so that the regulatory authorities may validate the conclusion of the EAR, and determine if BHP is meeting its 1995 EIS predictions.

10) The Review Board expects BHP to implement any mitigation measures aimed at reducing impacts on terrain as mentioned in its EA report or supporting documents.

The Review Board recommends that the Mackenzie Valley Land and Water Board consider the following:

11) That the existing Aquatic Effects Monitoring Program be expanded to include all potentially affected water bodies throughout the development, production, and post-production stages of the mine expansion, and that the AEMP expansion plans should accompany the application for the water license.

12) That BHP prepare a map detailing the potential sources of runoff from the development, how runoff will be controlled and where it will be collected, and that a monitoring station be located at the collection sites during the regulatory phase of the project. Water collected at these stations would be tested for pH, Total Suspended Solids, conductivity, metals, nitrates, nitrites, phosphates.

13) That BHP complete the characterization of acid drainage from the Panda Waste Rock pile and an assessment of the proposed frozen perimeter berms before approval of any further waste rock storage at the Panda Waste Rock pile. BHP should complete the full-scale test of the proposed berm design and provide the MVLWB with the results.

14) That BHP proceed with its intended waste rock management planning for each of the three pipes. This includes the following work:

- Kinetic testing to address metal leaching potential;
- Quantification of the amount, location and scheduling of the different types of waste rock from the pit, and potential for segregation of this material during mining;
- Potential and methods for segregation of this material if so indicated by kinetic testing results. Alternatively, if there is no significant metal leaching, this material can possibly be disposed of with other waste rock types that may contain sufficient alkalinity to buffer the acidity;
- Definition of the sampling program during mining to identify potentially "reactive" (i.e. generate acidity and/or leach metals) rock and development of criteria for segregation; and
- Provision for drainage water monitoring and collection, if required.

15) The Review Board recommends that the potential interaction between Panda Pit and Beartooth Pit waste rock be evaluated.

16) That BHP provide the preliminary results of its waste rock sampling program identifying potentially acid generating and metal leaching rock as part of its water licence application.

17) That BHP's discharge requirements for waste rock and surface drainage, at a minimum, be consistent with the Canadian Council of Ministers of the Environment (CCME) requirements for the protection of freshwater life.

18) That BHP complete its studies to evaluate the effectiveness of tundra soils and organics at filtering suspended solids, heavy metals and nitrogen from runoff water.

19) That BHP develop and test contingency plans for dealing with waste rock and surface drainage so that there is no danger of exceeding regulated water license limits.

20) That BHP modify its plans under its water license to reflect the proposed changes in operation, including the Acid/alkaline Rock Drainage (ARD) and Geochemical Characterization Plan, the Wastewater and Tailings Management Plan, the Waste Rock and Ore Storage Plan, and the Seepage Surveys. The waste rock management plan needs to address the management of all rock that is generated by the expansion. This plan shall describe operating procedures and how all rock will be managed during construction, mining, and post-closure phases of the project. Rock chemistry data should be provided in support of any decisions as they relate to the plan.

21) That BHP does not use the waste rock from the proposed pits for construction purposes such as roads and water retention/diversion structures until such time as the waste rock is proven to not have acid generating or metal leaching potential.

The Review Board recommends that the Mackenzie Valley Land and Water Board consider the following:

22) That BHP employ real-time automatic monitoring for TSS during the dewatering of the lakes, instead of relying on grab samples.

23) That BHP collect baseline data from the downstream water bodies to test its prediction of negligible impacts.

The Review Board recommends that the Mackenzie Valley Land and Water Board consider the following:

24) That the existing Aquatic Effects Monitoring Program be expanded to include all potentially affected water bodies throughout the development, production, and post-production stages of the mine expansion, and that the AEMP expansion plans should accompany the application for the water license.

25) That BHP acquire and present additional information on expected quantity and quality of pit water from the Sable Pit and, subsequently, Two Rock Lake and demonstrate that pit water additions from the Pigeon and Beartooth Pits will not compromise existing discharge limits or loading to the Lac de Gras Watershed.

26) That the MVLWB establish limits for phosphorus loading.

27) That the MVLWB regulate for ammonia in effluent discharges to ensure that aquatic life is protected.

28) That BHP establish a monitoring site in Cell 2 of Two Rock Lake and that monitoring be conducted for pH, Total Suspended Solids, conductivity, metals, nitrates, nitrites, phosphates, and ammonia.

29) That BHP prepare a contingency plan to treat Two Rock Lake water if the effluent is not appropriate for discharge.

30) That BHP not use the Sable sump water for watering roads.

The Review Board recommends that the Mackenzie Valley Land and Water Board consider the following:

31) That BHP establish SNP Stations and Aquatic Effects Monitoring Stations in appropriate locations to ensure that the Ursula Basin is sufficiently monitored.

32) That BHP undertake a water balance study to predict changes to water quantities in downstream waters and to assist with on-site water management.

33) That BHP to implement any mitigation measures aimed at reducing impacts on ground water balance as reported in its EA report or supporting documents.

34) That BHP continue to collect baseline data for Fay Lake in order to better quantify potential changes that could result from the construction of the stream diversion. This should include the establishment of a threshold phosphorus concentration in Fay Lake.

35) That BHP prepare a contingency plan to deal with an increase in primary producer biomass downstream of the diversion channel.

36) That BHP place silt curtains in Fay Lake before opening the Pigeon diversion channel, and that all receiving waters be monitored for changes once the channel is open.

37) That the BHP Aquatic Effects Monitoring Program be modified to include the Pigeon area and that a monitoring regime established for the Pigeon Diversion Channel.

38) That BHP continues negotiating with DFO to satisfy the “no net loss” objective.

The Review Board recommends the following:

39) The Review Board expects that BHP will implement its commitments as stated in the EAR and supporting documentation.

The Review Board recommends that the following be considered in the regulatory process:

40) That BHP complete kimberlite toxicity testing on the kimberlite from the Sable, Beartooth, and Pigeon pits before filling of Beartooth Pit with fine kimberlite (i.e. fine tailings from the new pits) in order to demonstrate that processed kimberlite will not pose a threat to the aquatic system.

41) That BHP prepare a contingency plan for Beartooth Pit in the event that water quality in the Beartooth pit makes fish habitat impossible, the proper stratification of the lake does not occur, or that the water quality parameters in the reclaimed pit is not be suitable for fish habitat.

The Review Board recommends the following:

42) The Review Board expects BHP to implement any mitigation measures aimed at reducing impacts on wildlife mentioned in its EA report or supporting documents. The Review Board also recommends that BHP, with the assistance of appropriate regulatory agencies and aboriginal organizations, consider expanding its wildlife monitoring to evaluate the accuracy of its predictions.

43) That BHP limit traffic on the Sable access road from the Pigeon lease area, north to the Sable site during caribou migration periods to that described in the BHP EAR. That BHP establish a monitoring program for the road in collaboration with aboriginal organizations. Given the importance of caribou, it is essential that the study approach be scientifically sound, take advantage of traditional knowledge, and ensure adequate data collection for improving prediction confidence for future effects and cumulative effects assessments.

44) That BHP and the GNWT contribute resources, and the YDFN participate in adapting the existing wildlife effects monitoring program to address the issues identified by GNWT in its Technical Report to the Review Board.

45) That BHP complete a heritage resource impact assessment before proceeding with the proposed development. Should heritage sites be uncovered then an approved mitigation plan be completed and implemented before development proceeds.

46) The Review Board recommends that BHP and the GNWT undertake a study to determine the impact of rotational work on Aboriginal and non-Aboriginal people working at BHP.

47) The Review Board recommends that the GNWT, BHP, and other responsible parties begin planning, as soon a possible, for the eventual closure of the mine, and the resulting effects on employees to avoid the effects of a boom-bust cycle..

48) The Review Board recommends that the Government of Canada reconsider the Formula Financing Agreement and that the GNWT be provided additional revenues to support, and where necessary, expand its role in the management and mitigation of effects associated with development.

The Review Board recommends the following:

49) That BHP work with the GNWT to establish specific goals for revegetation. These goals should be quantitative to allow future monitoring to determine a measure of success.

50) Given the substantial amounts of lake bottom sediments and overburden that can be salvaged, BHP should consider every possibility to use this material for revegetation and restoration purposes in order to produce a productive landscape.

51) BHP should actively reconsider the restoration and revegetation of the waste rock piles as part of its abandonment and restoration plan.

52) BHP should avoid the possible harmful effects of introducing non-indigenous plant species into the area during the reclamation by maximizing the use of local species.

53) That BHP should include the habitat loss due to these three new pipes as part of its annual reporting.

The Review Board recommends that the Mackenzie Valley Land and Water Board consider the following:

54) BHP should address the issue of long-term monitoring of the pits flooding as it progresses over a 10-20 year period after closure to ensure that water quality is maintained.

55) Hydrometric stations be installed and properly operated at source water bodies which will be used for water sources for the infilling of the pits. The stations should be installed for several years in advance of the withdrawals.

56) That the YDFN, EC, and DFO be involved in and advised on the study to assess the toxicity of processed kimberlite and other potential environmental impacts of the presence of processed kimberlite in the reclaimed lake. This study should include an updated geochemical characterization of slurry solids and pond water from the lower end of cell B in Long Lake, along with the results of toxicity test work being undertaken in the impoundment facility.

57) That BHP continues negotiating with DFO to satisfy the “no net loss” objective.

58) That BHP’s proposed mitigation measures for the breaching of dams and dykes be incorporated into the water license.

59) That BHP monitor water quality during and after the breaching of the dykes to ensure that discharge criteria are maintained. Appropriate contingency plans need to be prepared in the event that water of unacceptable quality is released to the environment.

60) The Review Board recommends that the appropriate regulatory agencies take into account the effect of the environment on the development proposal during the regulatory phase.

The Review Board recommends the following:

61) That DIAND and EC jointly initiate an evaluation of the cumulative effects of total loadings of nutrients and metals into Lac de Gras watershed, and that the resulting long term effects on this oligotrophic system. BHP and Diavik, and others, as requested, shall assist DIAND and EC by providing the monitoring and predictive data needed to examine the anticipated total loadings of contaminants into the Lac de Gras watershed.

62) That BHP implement any mitigation measures aimed at reducing cumulative impacts as reported in the EAR and supporting documents. The Review Board also recommends that BHP, with the assistance of appropriate regulatory agencies and aboriginal organizations, consider expanding its socio-economic and wildlife monitoring to evaluate the accuracy of its cumulative effects predictions.

9 Decision of the Review Board

The Review Board has been guided by the principles outlined in sections 114 and 115 of the MVRMA throughout this environmental assessment. These include the need to protect the environment from significant adverse impacts, and to protect the social, cultural and economic well-being of residents and communities in the Mackenzie Valley. Having considered the views and concerns of the participants in this process, and the evidence on the public registry, the Review Board made its decision according to section 128 of the Mackenzie Valley Resource Management Act.

On completion of the environmental assessment, the Review Board shall:

where the development is not likely in its opinion to have any significant adverse impact on the environment or to be a cause of significant public concern, determine that an environmental impact review of the proposal need not be conducted;

where the development is likely in its opinion to have a significant adverse impact on the environment,

I. *order that an environmental impact review of the proposal be conducted, subject to paragraph 130(1)(c), or*

II. *recommend that the approval of the proposal be made subject to the imposition of such measures as it considers necessary to prevent the significant adverse impact;*

where the development is likely in its opinion to be a cause of significant public concern, order that an environmental impact review of the proposal be conducted, subject to paragraph 130(1)(c); and
where the development is likely in its opinion to cause an adverse impact on the environment so significant that it cannot be justified, recommend that the proposal be rejected without an environmental impact review.

The Review Board recommends approval of the proposed development subject to the imposition of measures it considers necessary to prevent significant adverse effects 128(1)(b)(ii). The Review Board concludes that the fiscal arrangement between the federal government and the territorial government with respect to the BHP development is having a significant adverse impact on the GNWT's ability to diversify its economy in order to avoid a boom-bust cycle.

In addition to the imposition of the measures provided in the Review Board's recommendations throughout the Report of Environmental Assessment and summarised in the previous section, the Review Board fully expects BHP to discharge all the commitments and undertakings given in its environmental assessment report and supporting documentation.

Dated at Yellowknife, Northwest Territories on February 7, 2001.

MACKENZIE VALLEY ENVIRONMENTAL IMPACT REVIEW BOARD.

G. Lennie
Chairman

10 Attachments

10.1 Overview of Comments from the Public, First Nation and Government

10.1.1 Government Advisors

Government advisors to the Review Board were identified at the outset of the EA. The Review Board's staff worked with a committee of EA coordinators representing their respective governments, agencies and departments to coordinate expert input. The Review Board in the preparation of its Report of Environmental Assessment considered the comments received. In addition to being summarized below, comments specific to particular issues are dealt with in relevant sections of the report of environmental assessment

Government of the Northwest Territories

The Government of the Northwest Territories (GNWT) by letter dated September 8, 2000 conveyed its technical review of BHP's Environmental Assessment Report for the Sable, Pigeon and Beartooth Kimberlite Pipes, and subsequent responses to Information Requests in July and August 2000. The Departments of Finance, Education, Culture and Employment, Health and Social Services, Resources, Wildlife and Economic Development, Transportation and the Northwest Territories Bureau of Statistics conducted the review. The GNWT is responsible for the health and welfare of its citizens and shares responsibility for managing and protecting the environment with the federal government and consequently, has reviewed the environmental assessment from this perspective.

The GNWT's technical review of the EAR, including subsequent responses to requests for additional information concluded that no significant adverse social, economic or environmental effects were likely to occur with the implementation of effective mitigation measures. However, the GNWT has several concerns with the environmental assessment. Comments specific to particular issues are dealt with in relevant portions of the Environmental Assessment section.

Environment Canada

Environment Canada (EC) in its letter of September 7, 2000 concluded that environmental issues had been adequately addressed by BHP in the environmental assessment. Environment Canada identified unresolved details and provided its Department's recommendations. Environment Canada concluded that should the BHP Diamonds Inc. expansion development be approved, it could be developed and operated in an environmentally sustainable manner provided that BHP:

Fisheries and Oceans Canada

Fisheries and Oceans Canada (DFO), in its letter of December 8, 2000 and its presentation of September 26, 1999 indicated that its main concern would be the Loss of Fish Habitat and fish populations as a result of the proposed development. DFO cited the loss of productive fish populations, the complete loss of productive fish habitat in 5 small lakes, and negative effects on fish habitat in other lakes, ponds, and streams. DFO also indicated that if the Review Board approved the development, BHP would request DFO to authorize the destruction of this fish habitat under S.35 of the *Fisheries Act*, and DFO would require habitat compensation to achieve no net loss of fish habitat. DFO indicated it was dissatisfied with the mitigation and compensation proposed by BHP, but that it would continue to participate in discussions with BHP about these issues.

BHP's assertion that the mined-out open pits will be restored to "productive fish habitat" is questionable. There are many unanswered issues that need to be resolved before we can conclude that this is a doable objective. While we are certainly interested in the potential results of such an experiment, at this time, DFO is not convinced that reclaimed pits will be adequate to achieve no net loss of fish habitat

Department of Indian Affairs and Northern Development

DIAND provided its comments by letter dated September 8, 2000. DIAND indicated that BHP's development proposal would not likely cause significant adverse environmental effects provided that mitigation measures are implemented and monitoring as described by BHP and DIAND is carried out in the context of the regulatory process. DIAND agreed with the mitigation and monitoring described in BHP's EAR and its Information Request Responses. DIAND's specific technical concerns and recommended mitigation measures and/or monitoring are outlined in the relevant portions of the report of environmental assessment.

DIAND recommend that all current environmental management plans be updated in accordance with the appropriate new or amended regulatory instruments and the BHP Environmental Agreement.

Natural Resources Canada

Natural Resources Canada in its letter of September 5, 2000 indicated that in its opinion, the EAR was well organized and comprehensive and that its concerns focused primarily on groundwater quality in the pits and the seismicity parameters used in modeling. Although the proposed development was in a region of very low seismicity, NRCan recommended that BHP use an updated model for designing containment structures. Specific technical concerns and recommended mitigation measures and/or monitoring are outlined in the relevant portions of the report of environmental assessment.

10.1.2 Public

Kitikmeot Inuit Association

The Kitikmeot Inuit Association's review of BHP's EAR dated September 29, 2000 and its presentation to the Review Board on September 26, 2000 focused on water issues identified in the Environmental Assessment Report, as they were the major concerns of Kitikmeot residents. The issues generally related to the potential effects that construction and operation of the proposed mining facilities would have on the Exeter Lake and Lac de Gras watersheds and associated downstream waters. Other areas of focus included climate and air quality, fish / aquatic habitat, wildlife, and socio-economic / cultural issues. Additional comments on the October 1999 Project Description, and the Preliminary Design of Water Control Structures were also provided. The KIA found the EAR to be very well written and edited. Comments specific to particular issues are dealt with in relevant sections of the environmental assessment report.

Independent Environmental Monitoring Agency

The Independent Environmental Monitoring Agency by letter dated September 15, 2000 and by presentation on September 26, 2000 conveyed its review of the BHP EAR. The Agency found the EAR generally well written and presented and the proposed treatment of most subjects adequate. The Agency's comments focus mainly on information inadequacies that had not been satisfied in either the EAR or responses to its Information Requests. Comments specific to particular issues are dealt with in relevant portions of the Environmental Assessment section.

At the Review Board's request, the agency submitted a *BHP Environmental Agreement Compliance Report*[11]. The agency compliance reported concluded that BHP's environmental management, compliance had, to date, been good, and improving, and that BHP had made efforts to comply with the terms of its authorizations, as evident from the available inspection reports. Overall BHP had responded well to facing the challenges of being the first operating diamond mine in the north. In the agency's opinion more

11 Independent Environmental Monitoring Agency, February 1, 2000. The BHP Environmental Agreement Compliance Report. Yellowknife.

opportunities exist for creating better partnerships with Aboriginal Peoples, especially with respect to incorporating traditional knowledge into environmental plans and programs.

Yellowknives Dene First Nation

The Yellowknives Dene First Nation (YDFN) in its letter of September 25, 2000 and its subsequent presentation on September 26, 2000 communicated its views of BHP's proposed development. The YDFN written submission addressed concerns respecting climate change effects; water balances; fish/water quality; pit reclamation; air quality; eskers; archaeology; caribou; grizzly bears; water birds; raptors; and, all weather road concerns. The YDFN presentation on September 26, 2000 addressed issues regarding land claims, its impact and benefits agreement with BHP, mine employment and the Lupin winter road. The YDFN indicated they could not support the proposed development unless its issues were addressed.

The Yellowknives Dene First Nation Chief's expressed concern about the existing Impacts and Benefits Agreement with BHP, the extent of its application. That is, if it applied to the whole claim block or was specific to the project description considered by the BHP panel. The YDFN also expressed concern about the proposed development in the context of on-going treaty negotiations, BHP' s human resource management practices, and winter road access and use issues.

Lutsel K'e Dene First Nation

Representatives of the Lutsel K'e Dene First Nation made a series of presentations, and cited concerns with BHP's human resource management, the impact and benefit agreement, with community social and economic issues, and with environmental effects of development. The sustainability of industrial resource development and its effect on the environment and people was cited, as was the need for a precautionary approach to all development. The presentations reflected on the significant changes Dene people had experienced over the last two hundred years and the feeling of alienation they felt as their traditional lands were used to generate wealth for others. The presentations conveyed the importance of all parts of the environment, communication, resource benefits sharing, and the cultural and economic value placed on tradition.

Northern Organization for Responsible Development

The Northern Organization for Responsible Development (NORD) at the September 26, 2000 public meeting expressed concern about the length of time it was taking to complete the EA, the lack of guidelines, and its support for responsible development.

Diavik Diamond Mines Inc.

Diavik Diamond Mines Inc. (DDMI) at its presentation on September 26, 2000 indicated that from a socio-economic perspective the potential effects associated with including the proposed development were well within the extent of the effects resulting from a 25 year mine life. Diavik submitted that the socio-economic effects arising from BHP's proposal to substitute mining reserves should be viewed as having been assessed. Further, DDMI submitted that the socio-economic effects are being appropriately managed within the scope of the regulatory instruments that are in place to ensure that the mitigation measures previously identified are implemented. DDMI believed that the socio-economic benefits were positive and that there were currently mitigative measures in place to address adverse socio-economic effects. DDMI urged the Review Board to consider the proposed development favourably and to refer it to the regulatory process as soon a practically possible.

North Slave Metis Alliance

The North Slave Metis Alliance submitted that they were not provided the resources to assess the effect the proposed development would have on the land and the people. The NSMA submitted that the MVEIRB's

duty to consult fell very short of what was required. It was suggested that the MVEIRB "get with the times" and bring its consultation processes in line with case law or potentially have the courts do it for the Review Board. The NSMA also submitted that BHP had not developed an acceptable process to incorporate the knowledge of elders into their plans in any meaningful way and that they looked forward to developing such a process.

Chris O'Brien

Mr. O'Brien asked the Review Board if the Department of Fisheries and Oceans had provided its views on the regional effect of the loss of lakes, streams and ponds, and the possibility of establishing limits or thresholds.

Secondary Diamond Cutting Council

Ms. Hillary Jones of the Secondary Diamond Cutting Council submitted that access to rough diamonds from the Ekati™ Diamond Mine was contributing to the development of additional community-centered employment opportunities for northerners. She cited that the opportunities were tangible community economic development opportunities that might not otherwise have existed without the access to the diamonds. Ms. Jones cited that continued access to rough diamond was key to the stability and development of the new secondary diamond cutting enterprises and the stream of benefits flowing from them.

Fred Turner

Mr. Turner commended BHP for its contribution to the northern economy and the employment opportunities it was providing. Mr. Turner suggested that the mine could provide tangible benefits lasting well after the mine's closure. He suggested that improved road infrastructure could contribute to the north's development and provide a lasting benefit.

10.1.3 Peer Reviews

The Review Board arranged for independent reviews of the environmental assessment; the conclusions were that BHP had prepared an accurate and acceptable environmental assessment suitable for the Review Board.

Praxis Inc.

Kerrie Hale of Praxis Inc. concluded that in is her professional opinion the economic analysis in BHP's EAR provided information that was sufficient, both in terms of extent and accuracy, for the Board to reach a decision as to the economic benefits of the proposed development.

Gartner Lee Limited (GLL)

GLL concluded that there were no major physically related environmental issues that could not be mitigated by an appropriate on-site environmental management system. GLL noted that the available baseline information for the three proposed open pit developments was limited. This was of particular importance regarding the Sable pit development since surface drainage from the development would flow into a "new" creek that does not currently receive mine discharge.

GLL generally considered BHP's proposed utilization of mined-out open pits as locations for deposition of process kimberlite or waste rock to be advantageous. GLL cited that the benefits of that management approach for other mine operations have included reduced operating costs, reduced reclamation costs, reduced risks associated with water retention dams, reduced area of impact due to elimination of the need for

expanded tailings ponds or rock dumps, and reduced risk of ARD due to rapid underwater disposal of reactive materials.

Conscribe

Conscribe concluded that The EAR provided very limited information on the community level effects of the Ekati^{TM} Mine, and offered few predictions about community level effects of the proposed development. For the NWT as a whole, BHP provided some information on social and economic conditions, and considerable information on the significant overall employment and business benefits of the existing mine. The argument that mining the three additional pipes would permit these benefits to continue for another three years was clearly presented. However, there was very little about the ways in which the Ekati^{TM} Mine was already affecting life in the communities, and few predictions offered on how mine expansion/continuance (mining the three pipes) would affect community life in the future. In other words, in terms of its treatments of social effects, the EAR was inadequate but should have attempted harder to predict the socio-cultural consequences of mining the three pipes, and should have provided information that would allow others to assess the reasonableness of its predictions.

10.2 Consultation Summary

Date	Document	Recipient	Sent by
Nov. 25/98	Applications for land lease amendments and a type 'B' water license	IEMA MVLWWG MVEIRB	Scott Williams, Manager, Environment and Resource Management – BHP
Dec. 15/98	Written dialogue on upcoming BHP proposed pipes	H. Klein, MVEIRB	Mary Tapsell, INAC
Jan. 8/99	CBC Media Inquires about BHP development projects	Lee Selleck	
April 14/99	Preliminary screening notice	MVEIRB	Shannon Pagotto, DIAND
April 14/99	Notice of meeting of MVEIRB	Shannon Pagotto, DIAND	L. Azzolini, MVEIRB
April 16/99	Referral letter with attachments	MVEIRB	NWT Water Board
April 26/99	E-mail regarding environmental assessment: Sable, Pigeon, Beartooth Open Pits and Related Infrastructure	John Witteman, BHP	MVEIRB
April 27/99	Telephone message regarding environmental assessment	Heidi Klein	Judy Adams, CBC Radio
April 27/99	The proponents' large format maps of the area of the proposed activity	MVEIRB	NWT Water Board
April 27/99	Note to file regarding conversation between Heidi Klein and Judy Adams, CBC	File	Heidi Klein
May 3/99	E-mail from INAC regarding concerns BHP has about misinformation about their application to mine 3 more pipes	Kate Hearn	MVEIRB
May 4/99	Letter enclosing copies of the project description and colour maps of the proposed extension along with an explanation about the development	MVEIRB	Scott Williams, BHP
May 7/99	Letter enclosing project description prepared for environmental screening	Treaty 8	Scott Williams, BHP
May 7/99	Letter enclosing project description prepared for environmental screening	Hamlet of Kugluktuk	Scott Williams, BHP
May 7/99	Letter enclosing project description prepared for environmental screening	North Slave Metis Alliance	Scott Williams, BHP
May 7/99	Letter enclosing project description prepared for environmental screening	Dogrib Treaty 11 Council	Scott Williams, BHP
May 7/99	Letter enclosing correspondence to various groups according to terms of agreement	MVEIRB	Scott Williams, BHP
May 11/99	Letter requesting MVEIRB's guidelines for consultation	Heidi Klein	Scott Williams, BHP
May 12/99	Letter to BHP stating that MVEIRB's intention to undertake an environmental assessment of their proposed development	John Witteman, BHP Scott Williams Denise Burlingame Chris Hanks Gordon Wray Jim McCaul Stephen Harbicht Stephen Traynor Julie Dahl Shannon Pagotto	MVEIRB

Date	Document	Recipient	Sent by
May 12/99	Letter to stating that the MVEIRB intends to undertake an environmental assessment of the BHP Beartooth, Pigeon, and Sable Kimberlite pipe development proposal	Various government officials	MVEIRB
May 12/99	Letter stating that an environmental assessment of a development may impact transboundary considerations.	Nunavut Impact Review Board (NIRB)	MVEIRB
May 12/99	E-mail request for addition to MVEIRB's distribution list for documents relating to BHP's license application	Heidi Klein	Matt, IEMA
May 13/99	E-mail requesting explanation of "expertise" the EIRB may be requesting from DIAND managers	Heidi Klein	Marie Adams, BHP Environmental Scientist, DIAND
May 13/99	E-mail correspondence between INAC employees and MVEIRB stating they are getting a legal opinion on who the minister is as defined in the MVRMA and stating who the contact person will be for the EA	Heidi Klein	Marie Adams
May 14/99	Letter with a copy of the 1995 EIS prepared for the EARP Review of the NWT Diamonds Project	Heidi Klein	Scott Williams, BHP
May 19/99	Letter outlining point of contact in DIAND with respect to Environmental Assessments	Heidi Klein	Mary Tapsell, Manager, Environment & Conservation, INAC
May 21/99	Letter enclosing copies of the baseline studies used in the development of the Project Description.	Heidi Klein	Scott Williams, BHP
May 25/99	Letter making amendment to project description for Sable, Pigeon and Beartooth Kimberlite pipes.	Heidi Klein	Scott Williams, BHP
May 26/99	Letter requesting copies of BHP's application for a water license	Louie Azzolini	Julie Prystupa
June 14/99	Cover letter enclosing cover letters sent to Nongovernmental Agencies and Local Government regarding project description	Heidi Klein	Scott Williams, BHP
June 23/99	Newspaper notice regarding MVEIRB's environmental assessment site visit to BHP and Diavik	Public	Louie Azzolini
June 23/99	Letter telling of the date for the Board's visit to BHP's Ekati mine site and who will be included in the visit.	John Witteman, BHP	Heidi Klein
July 2/99	Cover letter and work plan and direction on the preparation of a development description for the BHP Ekati Diamond Mine Development of the Sable, Pigeon and Beartooth Kimberlite Pipes	BHP and governmental distribution list	Heidi Klein
July 5/99	Letter naming attendees to the BHP site visit	Denise Burlingame, Senior Public Affairs Officer, BHP	Gordon Stewart, MVEIRB
July 5/99	Letter naming attendees to the BHP site visit	Air Tindi	Gordon Stewart
July 26/99	Letter sending information on the transboundary provisions in the MVRMA. Attention is drawn to specific sections of	Dr. J. Ahmad, Director of Operations NIRB	Heidi Klein

Date	Document	Recipient	Sent by
	the Act. In addition, interim guidelines are enclosed.		
June 22/99	Letter outlining offer to include MVEIRB as part of the Inter-Agency Coordinating Team (IACT) for the Ekati Diamond Mine, IACT's mandate, and next scheduled meeting	Heidi Klein	Marie Adams, DIAND
July 27/99	Fax cover letter and attachment indicating a tentative meeting date to consider the two environmental assessments – the gas wells and pipeline tie-in and the BHP Ekati Diamond Mine Expansion	Distribution List	Louie Azzolini
July 29/99	Letter thanking INAC for their invitation and assistance to BHP mine site	Darren Unrau	Louie Azzolini
July 30/99	E-mail regarding cooperative agreement between NIRB and MVEIRB	Joe Ahmad	Heidi Klein
August 5/99	Fax including copies of distribution lists and accompanying letters and agendas regarding environmental assessments of BHP Ekati Diamond Mine expansion and Fort Liard Gas Pipelines	Tina Markovic, BHP	Louie Azzolini
Aug. 5&6/99	Fax log sheets, letter identifying experts and work plan for BHP's environmental assessment for the Ekati Mine expansion	Governmental agencies	MVEIRB
Aug. 6/99	Fax log and letter stating meeting dates for experts, regulatory authorities, designated regulatory agencies and federal and territorial governments	Distribution list	MVEIRB
Aug. 9/99	Letter declining having a representative on IACT at this time	Marie Adams	Heidi Klein
Aug. 10/99	Trip Report on trip to BHP mine site	File	Louie Azzolini
	Project Description		
Aug. 11/99	E-mail advising of attendance at meetings on August 24/25/99.	MVEIRB	George McCormick
Aug. 12/99	E-mail advising attendance at meetings on Aug. 24/25 as expert advisor	MVEIRB	Kathleen LeClair
Aug. 16/99	E-mail advising attending Aug. 25 meeting	MVEIRB	Julie Dahl
Aug. 16/99	E-mail stating no need to send notices and requesting an adjustment to mailing list	MVEIRB	Julie Dahl
Aug. 20/99	E-mail listing attendees for the meetings	MVEIRB	Kelly Robertson, GNWT
Aug. 23/99	E-mail stating Natural Resources Canada's initial comments on the BHP expansion project and the Fort Liard Gas Pipeline Development	MVEIRB	John Ramsey, NRCan
Aug. 23/99	Letter outlining DIAND's suggestions on Scope of Project and Assessment for the Ranger Oil Project and the BHP expansion project.	MVEIRB	Mary Tapsell
Aug. 25/99	BHP – Ekati Diamond Mine Additions to Kimberlite Resources Sable, Pigeon and Beartooth Pipes	MVEIRB	BHP
Aug. 29/99	E-mail outlining items to follow up from	Louie Azzolini	Julie Prystupa, GNWT

Date	Document	Recipient	Sent by
	meeting		
Aug. 30/99	E-mail clarifying e-mail address and point three of note of Aug. 29/99	Julie Prystupa	Louie Azzolini
Aug. 29/99	Thank you letter for participation at the BHP environmental assessment pre-consultation meeting on August 25/99, attached tables and request for supplemental information from BHP on their development description	Distribution List	MVEIRB
Sept. 3/99	Confirmation and details for three community visits.	Tina Markovic	Louie Azzolini
Sept. 3/99	E-mail outlining GNWT's additional information requirements for the project description	Julie Prystupa	Louie Azzolini
Sept. 5/99	E-mail attaching list identifying some of the deficiencies with the project submitted by BHP Feb. 19999	Louie Azzolini	Anne Wilson
Sept. 3/99	Faxed letter responding to request for additional recommendations to be considered for the environmental assessment of the BHP expansion project following the meeting of Aug. 25/99	Mary Tapsell, INAC	Louie Azzolini
Sept. 10/99	E-mail advising the date schedule for the Yellowknife community visit is Sept. 28/99	Louie Azzolini	Tina Markovic, BHP
Sept. 1/99	Letter to the minister congratulating him on his appointment and highlighting two key issues facing BHP at this time	Honourable Robert Nault	James R. Rothwell, President, BHP
Sept. 8/99	Fax cover and attachment	MVEIRB	David Livingstone, Director, Renewable Resources & Environment
Sept. 13/99	E-mail forwarding Natural Resources Canada (NRCan)'s comments on BHP's expansion following meeting of Aug. 25/99	Louie Azzolini	John Ramsay, Senior EA Officer
Sept. 16/99	Cover letter summarizing government's input to the MVEIRB's request for comments regarding BHP's expansion and tables relating to the scope of the assessment.	Tina Markovic, BHP	Louie Azzolini
Sept. 7/99	E-mail with attachment listing the contacts from the GNWT'' internal working group for environmental assessment	Louie Azzolini Tina Markovic	Julie Prystupa, GNWT
Sept. 16/99	E-mail attaching letter summarizing government's input to the MVEIRB request for comments regarding the submitted development description and a summary of the Review Board's work plan milestones.	Distribution list	Louie Azzolini
Sept. 20/99	MVEIRB's EA Information Update and fax log sender sheets	Distribution List	MVEIRB
Sept. 21/99	Trip Report on trip to Fort Resolution	File	Louie Azzolini
Sept. 22/99	Fax cover and trip report on Fort Resolution	Maurice Boucher, FREWC	Louie Azzolini

Date	Document	Recipient	Sent by
	Fort Resolution Environmental Working Committee (FREWC) Final Report for the Interim Resource Management Assistance (IRMA) Program 1997-98	File	FREWC
July 22/99	Letter requesting simultaneous copies on all environmental matters related to the BHP project be went to IEMA	Hall Mills, Manager IEMA	MVEIRB
Sept. 2/99	Letter stating hours that the MVEIRB's public registry is open and stating that they cannot provide any Public Registry access or information privileges that cannot be consistently provided to everyone	Alexandra Thomson, IEMA	Louis Azzolini
Aug. 23/99	Letter and suggestions on Scope of Project and Assessment for the Ranger Oil project and the BHP expansion project.	MVEIRB	Mary Tapsell
Sept. 24/99	E-mail sending 96A above.	MVEIRB	Mary Tapsell
Sept. 23/99	Note to file following L. Azzolini's meeting with Chris Hanks and Tina Markovic from BHP on September 23/99.	File	Louie Azzolini
Sept. 29/99	E-mail stating which communities BHP will be visiting.	Louie Azzolini	Tina Markovic, BHP
Sept. 28/99	Note to file on the Lupin Winter Road and a meeting which was held with DIAND	File	Louie Azzolini
Sept. 30/00	Agenda for BHP Community Consultation in Lutsel K'e, NT	Information	BHP
Sept. 30/99	Trip report on trip to Lutsel K'e with attached agenda.	File	Louie Azzolini
Sept. 30/99	Trip report on trip to Dettah with table summarizing the comments noted at the Land and Environment Meeting.	File	Louie Azzolini
Sept. 20/99	Letter confirming Dogrib Treaty 11 Council's consent to meet with BHP representatives.	John Bekale, Senior Aboriginal Affairs Advisor, BHP	Grand Chief Joe Rabesca, Chief Henry Gon, Chief Charlie Nitsiza and Chief Joseph Judas
Sept. 28/99	Letter attaching letter from Dogrib Treaty 11 Council regarding the October 7, 1999 Dogrib regional meeting and BHP's agenda for the regional visit	Louie Azzolini	Tina Markovic
Oct. 7/99	Letter requesting information regarding the two development proposals	Stephen Traynor, DIAND	Heidi Klein
Oct. 5/99	Trip report on trip to Lutsel K'e	File & Lucy Sanderson	Louie Azzolini
Oct. 6/99	Trip report on trip to Dettah	File	Louie Azzolini
Oct. 5/99	Trip report on trip to Rae-Edzo	File	Louie Azzolini
Oct. 10/99	Flight schedule for Lutsel K'e	Louie Azzolini	Tina Markovic
Oct. 14/99	Trip report on meeting with Treaty 11 Representatives, Ted Blondin and Zabey Nevitt	File	Louie Azzolini
Oct. 14/99	Trip report on trip to Lutsel K'e	File	Louie Azzolini
Oct.	Fax sent regarding trip to Lutsel K'e	File	Louie Azzolini
Oct. 4/99	Letter amending word "Approved" regarding BHP's planned expansion	Louie Azzolini	Stephen Traynor, INAC
Oct. 14/99	Letter explaining BHP's position in	Louie Azzolini	Tina Markovic, BHP

Date	Document	Recipient	Sent by
	reference to its consultation with Dogrib people of Treaty 11		
Oct. 14/99	Letter presenting their report and expressed misgivings BHP's reluctance to consult	Heidi Klein	Clem Paul, NSMA
Oct. 14/99	Letter stating facts about connection between Barney Masuzumi and BHP	Heidi Klein	Chris Hands, Senior Environmental Specialist, BHP
Oct. 15/99	Trip report of BHP meeting with NSMA Board of Directors	File, NSMA	Roland Semjanovs
Oct. 17/99	E-mail requesting update and further information regarding BHP EA update	Louie Azzolini & Distribution List	Marie Adams
Oct. 18/99	Response to Marie Adams questions regarding BHP EA	Distribution List	Louie Azzolini
Oct. 18/99	EA Information Update	Distribution List	MVEIRB
Oct. 19/99	Note to File regarding Lupin Winter Road	File	Louie Azzolini
Oct. 19/99	Trip Report on trip to Dettah for a meeting of the Yellowknives Dene Land and Environmental Committee	File	Louie Azzolini
Oct. 19/99	Notice of meeting between BHP Diamonds Inc. and Yellowknife community	Louie Azzolini	Tina Markovic, BHP
Oct 20/99	Fax of notice about Yellowknife community meeting with BHP	Louie Azzolini	Gloria R. Irani, Public Affairs Assistant, BHP
Oct. 21/99	Letter regarding representation from the Akaitcho territory on MVEIRB	Rosy Bjornson, Akaitcho territory Tribal Council	Louie Azzolini
Oct. 22/99	Fax asking if the trip report is correct	Rachel Crapeau, Lands & Environmental Committee for the Yellowknives Dene	Louie Azzolini
Oct. 20/99	Letter asking for GNWT's assistance for consultant to do EA	Mark Cleveland, Deputy Minister, Education, Culture and Employment, GNWT	Scott Williams, Manager, Environment and Resource Planning, BHP
Oct 22/99	E-mail asking about number of copies of BHP's PD report are required from responsible authorities	Responsible Authorities & Louie Azzolini	Tina Markovic, BHP
Oct. 22/99	E-mail asking for a copy of the project description requirements that were sent to BHP	Louie Azzolini	Julie Dahl, Arctic Habitat Coordinator, DFO
Oct. 20/99	E-mail regarding NRCan's review of "approved" Terms of Reference for the development proposals	MVEIRB	John Ramsey, NRCan
Oct. 25/99	Report on meeting of BHP with Yellowknife Community	File	Louie Azzolini
Oct. 25/99	E-mail regarding community meetings between various communities and BHP	Zabey Nevitt	Louie Azzolini
Oct. 29/99	Letter with questions regarding the preparation of two major documents for the MVEIRB	MVEIRB	Scott Williams, BHP
Oct. 29/99	E-mail with questions regarding further information regarding review	Louie Azzolini	Marie Adams, INAC
Oct. 1/99	Letter confirming understanding of the approach reached about procedures and process established for the Project	Gordon Lennie, Chairman, MVEIRB	Tina Markovic, BHP

Date	Document	Recipient	Sent by
	Description Report		
Nov. 1/99	Newspaper ads informing of BHP's filing of development description	News North, the Hub	MVEIRB
Nov. 2/99	Letter enclosing copy of May 11/99 letter	Louie Azzolini	Chris Hanks, BHP
Nov. 3/99	Letter acknowledging receipt of letter and requesting meeting	Scott Williams, BHP	Heidi Klein, MVEIRB
Nov. 2/99	Trip report for trip to Gameti (Rae Lakes)	File	Louie Azzolini
Nov. 4/99	Fax of trip to Gameti	Zabey Nevitt, Dogrib Treaty 11 Council	Louie Azzolini
Nov. 3/99	E-mail regarding copies of the PD reports	Louie Azzolini	Tina Markovic
Nov. 3/99	E-mail asking for confirmation of time for Dettah meeting	Louie Azzolini	Tina Markovic
Nov. 2/99	Trip report of trip to Dettah	File	Louie Azzolini
Nov. 4/99	Fax of trip report	Rachel Chapeau, Yellowknives Dene First Nations	Louie Azzolini
Nov. 4/99	E-mail stating distribution numbers for BHP Development Descriptions	Distribution List	Louie Azzolini
Nov. 8/99	Note regarding conversation between L. Azzolini and Clem Paul, NSMA	File	Louie Azzolini
Nov. 8/99	Letter accompanying extra copies of Project Description report	Louie Azzolini	Tina Markovic
June 29/99	Letter accompanying new poster and document mentioned in text of Project Description	MVEIRB	Chris Hanks, BHP
Nov. 10/99	E-mails regarding clarification of requests for additional information	Louie Azzolini	Tina Markovic, BHP
Nov. 8/99	Fax regarding BHP's draft Terms of Reference	Distribution List	R. Semjanovs
Nov. 9/99	Fax regarding Ekati Extension Terms of Reference	MVEIRB	Mike Vaydik, NWT Chamber of Mines
Oct. 14/99	Letter addressing concerns NSMA has about the Work Plan for the BHP Diamonds Inc. Ekati Diamond Mine Expansion EA	Heidi Klein, Executive Director, MVEIRB	Clem Paul, President, NSMA
Nov. 15/99	Letter including report on Pre-Consultation phase of Community Consultation for the BHP Sable, Pigeon and Beartooth EA	Gordon Lennie, Chair, MVEIRB	Tina Markovic, BHP
Nov. 12/99	E-mail notice of correction in BHP draft Terms of Reference	Distribution	Louie Azzolini
Nov. 15/99	Letter accompanying CD copies of Project Description report	Louie Azzolini	Tina Markovic, BHP
Nov. 15/99	Recommended inclusions for Terms of Reference for BHP Project Description	Louie Azzolini	Jack Rowe, Mayor, Hay River
Nov. 15/99	Letter enclosing errata sheets for Revision 3 Sable, Pigeon and Beartooth Project Description and letters sent to Aboriginal Groups.	Gordon Lennie, MVEIRB	Tina Markovic, BHP
Nov. 17/99	Letter acknowledging receipt of Terms of Reference	Roland Semjanovs, MVEIRB	Vicki Losier, A/Executive Assistant, NWT Water Board
Nov. 15/99	E-mail regarding communities and organizations provided with BHP's DD	Mary Tapsell	Louie Azzolini
Nov. 18/99	E-mail regarding Fort Resolution's request for copy of BHP's DD	Mary Tapsell	Louie Azzolini

Date	Document	Recipient	Sent by
Nov. 19/99	EA Information Update	Distribution List	MVEIRB
Nov. 18/99	Fax of trip report to Public Information Session in Wekweti	Nadine Neemeh	Louie Azzolini
Nov. 20/99	Note to file including trip reports to November 20, 1999 assembled into one summary document	File	Louie Azzolini
Nov. 22/99	Fax acknowledging receipt of comments on the BHP extension draft terms of reference	Jack Rowe, Mayor, town of Hay River	Louie Azzolini
Nov. 22/99	Letter accompanying copies of BHP's "Annual Report – Ekati Diamond Mine Environmental Agreement"	Louie Azzolini	Tina Markovic, BHP
Nov. 22/99	Media Release announcing November 30 deadline for comments on BHP's Ekati extension development draft terms of reference	Distribution List	MVEIRB
Nov. 24/99	E-mail asking to be included in distribution list	Louie Azzolini	Tasha Stephenson
Nov. 26/99	E-mail requesting feedback from meetings	Louie Azzolini	Tina Markovic, BHP
Nov. 3/99	Letter announcing upcoming workshops regarding monitoring of fish and wildlife	MVEIRB	Scott Williams, BHP
Nov. 26/99	E-mail telling of dates of GNWT submissions	MVEIRB	Leslie Green, Environmental Assessment Analyst, RWED
Nov. 26/99	E-mail explaining difficulty in getting review done in timeframe and asking for an extension in time	Louie Azzolini	Marie Adams, DIAND
Nov. 26/99	Note to file regarding e-mail and conversations with Leslie Green and Marie Adams	File	Louie Azzolini
Nov. 30/99	Letter enclosing selective list of environmental management plans and engineering reports.	Gordon Lennie, MVEIRB	Tina Markovic, BHP
Nov. 29/99	Note to file regarding Health Canada's comments on Draft Terms of Reference for BHP's proposed extension	File	Louie Azzolini
Nov. 30/99	Fax with Agency's comments of the MVEIRB's draft Terms of Reference for the Beartooth, Pigeon and Sable Expansion Project	Louie Azzolini	Alexandra Thomson, Manager, IEMA
Nov. 30/99	Letter commenting on the draft Terms of Reference issued by MVEIRB to BHP Diamonds Inc.	Gordon Lennie, MVEIRB	Mike Vaydik, General Manager, NWT Chamber of Mines
Nov. 30/99	Letter outlining comments to assist MVEIRB in finalizing the terms of reference	Gordon Lennie, MVEIRB	Scott Williams, BHP
Nov. 30/99	E-mail reporting NRCan's comments on the Terms of Reference and Project Description	Louie Azzolini	John Ramsey, NRCan
Dec. 1/99	Letter commenting on Draft Terms of Reference for BHP's three pipe expansion project	Louie Azzolini	Tasha Stephenson, DFO
Dec. 1/99	Letter with comments on draft Terms of Reference on BHP's proposed	Gordon Lennie, MVEIRB	Leslie Green, RWED, GNWT

Date	Document	Recipient	Sent by
	development of Sable, Pigeon and Beartooth Kimberlite pipes		
Nov. 30/99	Comments on the draft Terms of Reference – Sable, Beartooth, Pigeon pipes – BHP Ekati Mine development expansion	MVEIRB	Marie Adams, DIAND
Nov. 30/99	Letter stating comments on the draft Terms of Reference for BHP's proposed development of the Sable, Pigeon and Beartooth Development	Gordon Lennie, MVEIRB	Murray Swyripa, DIAVIK
Nov. 23/99	Letter stating views on the draft EA Terms of Reference	Gordon Lennie, MVEIRB	Dave Nickerson
Nov. 24/99	Letter acknowledging receipt of his letter	Dave Nickerson	Louie Azzolini
Dec. 1/99	Note to file noting delay in Environment Canada's comments to Draft BHP EA terms of reference	File	Louie Azzolini
Nov.30/99	Faxed comments by the Snare Lakes Band Manager on note of travel	Louie Azzolini	Nadine Neemeh
Dec. 1/99	Letter acknowledging receipt of her letter regarding Draft terms of reference	Tasha Stephenson, DFO	Louie Azzolini
Dec. 1/99	Letter acknowledging receipt of his letter regarding Draft terms of reference	Scott Williams, BHP	Louie Azzolini
Dec. 1/99	Letter acknowledging receipt of his letter regarding Draft terms of reference	Mike Vaydik, NWT Chamber of Mines	Louie Azzolini
Dec. 1/99	Letter acknowledging receipt of his letter regarding Draft terms of reference	Red Petersen, IEMA	Louie Azzolini
Dec. 1/99	Letter acknowledging receipt of his letter regarding Draft terms of reference	John Ramsey, NRCan	Louie Azzolini
Dec. 1/99	Letter acknowledging receipt of his letter regarding Draft terms of reference	Murray Swyripa	Louie Azzolini
Dec. 1/99	Letter acknowledging receipt of her letter regarding Draft terms of reference	Leslie Green, RWED	Louie Azzolini
Dec. 1/99	Letter acknowledging receipt of her letter regarding Draft terms of reference	Marie Adams, INAC	Louie Azzolini
Dec. 4/99	Fax acknowledging receipt of comments regarding Draft terms of reference	Anne Wilson, Environment Canada	Louie Azzolini
Dec. 1/99	Note to file regarding arrangements to meet with Dogrib Treaty 11 staff on Board community meetings planned for February	File	Roland Semjanovs
	Public Notice regarding information session	Residents of Wha Ti	MVEIRB
Dec. 10/99	Trip report on trip to Wha Ti	File	Louie Azzolini
Dec. 7/99	Letter responding to questions regarding – addressing the Review Board, General Assessment Guidelines including cumulative Effects, and Criteria for Assessing Public Concern	W. Scott Williams, BHP	Heidi Klein, MVEIRB
Dec. 6/99	Letter thanking Board for Open House	Gordon Lennie, MVEIRB	Scott Williams, BHP
Dec. 15/99	Fax attaching BHP's terms of reference	Distribution List	MVEIRB
Dec. 15/99	E-mails attaching BHP's terms of reference	Distribution List	MVEIRB
Dec. 15/99	E-mail requesting copies of terms of reference	MVEIRB	Anne Wilson,
Dec. 17/99	Letter in response to NSMA's earlier letter	Clem Paul, NSMA	Heidi Klein, MVEIRB

Date	Document	Recipient	Sent by
	and giving additional information		
Dec. 17/99	EA Information Update	Distribution List	MVEIRB
Dec. 20/99	E-mail stating number of copies needed of EAR	Tina Markovic	Louie Azzolini
Dec. 20/99	Letter asking why communities are asked for concerns and they are not included in report.	Louie Azzolini	Jack Rowe, Mayor Town of Hay River
Dec. 21/99	Letter addressing concerns of Town of Hay River over BHP Terms of Reference	Jack Rowe, Mayor Town of Hay River	Heidi Klein, MVEIRB
Dec. 21/99	Note to file regarding meeting with Tasha Stevens (Stephenson) regarding holding a group meeting of interested regulatory bodies and experts	File	Louie Azzolini
Dec. 24/99	E-mail stating vacation	Louie Azzolini	Tina Markovic, BHP
Dec. 25/99	E-mail correcting phone number	Louie Azzolini	Tina Markovic, BHP
Dec. 24/99	Letter seeking clarification on Final Terms of Reference and requesting comments to go before the Review Board	Gordon Lennie, MVEIRB	Scott Williams, BHP
Jan. 6/00	Notice of receipt of letter seeking clarification	Tina Markovic, BHP	Louie Azzolini
Jan. 14/00	Faxed letter responding to BHP's clarification request – final terms of reference	W. Scott Williams, BHP	Heidi Klein, MVEIRB
Jan. 5/00	E-mail regarding copies needed of final EA report	Marie Adams, DIAND	Louie Azzolini
Jan. 6/00	E-mail explaining need for and including note on use of IRs for the BHP environmental assessment	Distribution List	Louie Azzolini
Jan. 20/00	Letter attaching a copy of a memorandum from Mr. Hanks that records the response to BHP's publication notification on proposed expansion	Louie Azzolini	Tina Markovic, BHP
Jan. 26/00	E-mail asking for confirmation of final number of EA reports required	Louie Azzolini	Tina Markovic
Jan. 26/00	E-mail attaching draft BHP Terms of Reference and Environmental Assessment Report	Distribution List	Louie Azzolini
Jan. 24/00	Letter discussing meeting held with Dogrib leadership.	Louie Azzolini	Tina Markovic, BHP
Jan. 31/00	Letter of thanks for allowing BHP employees to sit in on the public portion of the Board's Jan. 29/2000 meeting	Gordon Lennie, MVEIRB	Tina Markovic, BHP
Feb. 2/00	Letter acknowledging receipt of Jan. 31/00 letter	Tina Markovic, BHP	Louie Azzolini
Feb. 1/00	Letter with attached compliance report for BHP's proposed Beartooth, Pigeon and Sable Extension Project	Gordon Lennie, MVEIRB	Red Pedersen, Chairperson, IEMA
Feb. 2/00	Letter acknowledging receipt of IEMA's compliance report	Red Pedersen	Louie Azzolini
Feb. 9/00	E-mails regarding information requests and response to e-mail regarding their use.	Distribution List	Louie Azzolini
Feb. 12/00	E-mails attaching BHP's comments on e-mail and the draft checklist	Louie Azzolini	Tina Markovic, BHP
Feb. 11/00	Letter thanking MVEIRB for the	Louie Azzolini	Tina Markovic

Date	Document	Recipient	Sent by
	opportunity to provide feedback on the draft checklist for their terms of reference		
Feb. 14/00	E-mails with comments and suggestions for the draft BHP terms of reference checklist template	Distribution List	Anne Wilson,
Feb. 11/00	E-mails regarding comments on the Ekati environmental checklist.	Distribution List	Doug Soloway, Transport Canada
Feb. 10/00	E-mails containing comments on the checklist table and the Information Request for the Draft BHP terms of reference	Distribution List	Catherine Badke, Health Canada
Feb. 10/00	E-mails with comments regarding IR format and necessity of meeting	Distribution List	Anne Wilson,
Feb. 9/00	E-mail thanking sender for reminder	Louie Azzolini	Tasha Stephenson
Feb. 23/00	E-mail requesting clarification on BHP expansion project and ToR checklist/table	Louie Azzolini	Greg Cook, INAC
Feb. 23/00	E-mail response to above request	Greg Cook	Louie Azzolini
Feb. 18/00	Letter advising of change of personnel	Heidi Klein	Elaine McIvor
Feb. 24/00	E-mail responding to earlier e-mail on BHP expansion project and ToR checklist/table	Louie Azzolini	Greg Cook, INAC
Mar. 3/00	E-mail inquiring if attachments could be opened.	Greg Cook	Louie Azzolini
Mar. 6/00	E-mail stating desire to update on the status of BHP's EAR	Distribution List	Tina Markovic, BHP
Mar. 15/00	E-mail with attachment reply to BHP conformity and IR	Louie Azzolini	Greg Cook
Mar. 15/00	Letter with comments on the MVEIRB's draft conformity table and information request formats for the BHP Ekati Mine expansion EAR	Louie Azzolini	Greg Cook
Apr. 4/00	E-mail confirming number of copies of EA Report required by various agencies and organizations	Louie Azzolini	Tina Markovic, BHP
Apr. 7/00	E-mail with questions on the IR and checklist/table on BHP's project	Louie Azzolini	Greg Cook
Apr. 7/00	E-mail answering questions from above e-mail	Greg Cook	Louie Azzolini
Apr. 13/00	E-mail giving quick update on the BHP environmental assessment	Distribution List	Louie Azzolini
Apr. 13/00	E-mail giving change in personnel	Louie Azzolini	Catherine Badke, Health Canada
Apr. 18/00	E-mail with information requests	Louie Azzolini	Tina Markovic, BHP
Apr. 18	E-mail answering questions from the above e-mail	Tina Markovic	Louie Azzolini
Apr. 11/00	Faxed letter with attached agenda informing of a meeting to discuss the results of BHP's 1999 Waste Rock Area Seepage Survey	Distribution List	Alexandra Thomson, Manager, IWMA
Apr. 21/00	E-mail outlining the next steps in the BHP EA	Distribution List	Tina Markovic, BHP
Apr. 27/00	Letter submitting copies of the EAR for Sable, Pigeon and Beartooth Kimberlite Pipes	Gordon Lennie	J.D> Excell, President, BHP
Apr. 27/00	EA Information Update #5	Distribution List	MVEIRB
Apr. 28/00	E-mail regarding delivery of BHP's	Distribution List	Louie Azzolini

Date	Document	Recipient	Sent by
	Environmental Assessment Report		
Apr. 28/00	E-mail with attachments of BHP's EA Report	Distribution list	Louie Azzolini
May 3/00	Letter discussing the idea of coordination with the Mackenzie Valley Land and Water Board for the purposes of the BHP EA	Ken Weagle	Heidi Klein
May 4/00	E-mail issuing invitation to visit Ekati mine site	Louie Azzolini	Tina Markovic, BHP
May 4/00	E-mail stating that EA reports have gone out to stakeholders	Louie Azzolini	Tina Markovic, BHP
May 1/00	Letter stating that copies of the EA were given out and a meeting held with NSMA	Gordon Lennie	Tina Markovic, BHP
May 8/00	E-mail of introduction and request for EAR	Louie Azzolini	Tim Byers, Winnipeg, MN
May 9/00	E-mail forward above e-mail to BHP	Tina Markovic, BHP	Louie Azzolini
May 9	E-mail responding to e-mail in #305	Tim Byers	Louie Azzolini
May 8/00	E-mail stating that the EAR was distributed	Distribution List	Louie Azzolini
May 8/00	E-mail expressing thanks for EAR	Louie Azzolini	Tasha Stephenson
May 9/00	E-mail attaching distribution list for EAR and stating dates for site tour	Louie Azzolini	Tina Markovic, BHP
May 9/00	E-mail asking to receive clarification on the public review process for EAR for BHP	Louie Azzolini	Tim Byers
May 9/00	E-mail responding to above e-mail	Tim Byers	Louie Azzolini
May 12/00	Note to file regarding GNWT BHP EA Co-ordinators meeting	File	Louie Azzolini
May 12/00	E-mail to decide date and time for a meeting	Louie Azzolini	Greg Cook
Apr. 27/00	Memo to News North with ad for BHP assessment and copy of ad	News North/Public	Roland Semjanovs
May 16/00	E-mail asking how many copies of CD ROM with the 3 reports are needed	Louie Azzolini	Tina Markovic, BHP
May 17/00	E-mail telling how to get in touch with her	Louie Azzolini	Maria Ooi, Health Canada, Ottawa
May 17/00	Letter enclosing copies of the CD ROM for the three reports	Louie Azzolini	Tina Markovic, BHP
May 17/00	E-mail discussing the review and a brief meeting	Louie Azzolini	Greg Cook
May 18/00	Fax to radio stations containing a public service announcement	Local radio stations/ public	Roland Semjanovs
May 17/00	Note to file regarding DAIAN BHP EA Co-ordinator and local experts meeting	File	Louie Azzolini
May 19/00	E-mail confirming time and place of meeting with a draft agenda	Louie Azzolini	Leslie Green, RWED
May 20/00	Letter listing government reviewers and a table listing BHP's terms of reference	Distribution List	Leslie Green
May 23/00	Letter attaching a record of a meeting held on May 19, 2000 to clarify MVEIRB's expectations	Distribution List	Leslie Green
May 24/00	Fax of Notice of dates for the environmental assessment of BHP Diamonds Inc. expansion at Ekati	Jack Kaniak, KIA	Louie Azzolini
May 15/00	Letter stating their opinion.	Louie Azzolini	Bill Aho, President

Date	Document	Recipient	Sent by
			Northwest Territories Construction Association
May 26/00	Letter acknowledging receipt of above letter	Bill Aho	Louie Azzolini
May 24/00	Letter enclosing CD-ROM of BHP Proposed Development	Maurice Boucher, Fort Resolution Environment Committee	Louie Azzolini
May 24/00	Letter expressing concerns about the BHP EAR – Review Process	Gordon Lennie, MVEIRB	Tina Markovic, BHP
May 24/00	Letter stating date of public meeting in Yellowknife	Gordon Lennie, MVEIRB	Tina Markovic, BHP
May 25/00	Letter requesting a meeting	Grand Chief Joe Rabesca, Dogrib Treaty 11 Council	Heidi Klein, MVEIRB
May 30/00	Letter discussing time lines for completing the BHP EA	Larry Aknavigak, Chair NIRB	Louie Azzolini
May 30/00	E-mail reminding with conformity reports are due	Doug Soloway & Tasha Stephenson	Louie Azzolini
May 30/00	Request for information	MVEIRB	Martin Lacroix, Hydrologist, Water Resources Division, DIAND
May 24/00	Request for information	MVEIRB	Bart Blais, Water Management and Planning DIAND
May 24/00	Request for information	MVEIRB	Bart Blais, DIAND
May 24/00	Request for information	MVEIRB	Bart Blais, DIAND
May 31/00	Conformity Check on BHP's EAR	MVEIRB	Tim Byers, Byers Environmental Studies
May 31/00	Letter outlining comments on conformity of BHP's EAR	Gordon Lennie, MVEIRB	Independent Environmental Monitoring Agency
May 31/00	E-mail attaching EC's conformity analysis	Louie Azzolini/Gordon Stewart	Anne Wilson
May 31/00	Fax containing conformity analysis from NRCan	Louie Azzolini	John Ramsay, NRCan
May 31/00	Letter explaining and attaching conformity check for BHP Expansion	Louie Azzolini	Kathryn Emmett, Director, Policy Legislation and Communications, GNWT
June 1/00	E-mail attaching letter regarding submission and copy of conformity table	Louie Azzolini	Greg Cook, INAC
May 31/00	Fax containing comments of the EAR assessment of BHP's project	Louie Azzolini	Peter Bonev, Environmental Officer, Transport Canada
May 31/00	Letter outlining DFO's conformity analysis	Heidi Klein	Pete Cott, A/Arctic Habitat Coordinator, DFO
May 31/00	E-mails concerning conformity reports	Louie Azzolini	Greg Cook
June 1/00	E-mail requesting that the Review Board forward the initial IR's to BHP electronically	Louie Azzolini	Tina Markovic, BHP
June 1/00	Letter attaching copies of BHP's	Louie Azzolini	Tina Markovic, BHP

Date	Document	Recipient	Sent by
	"Summary Report – Environmental Agreement Annual Report 1999 and Environmental Impact report 2000"		
June 1/00	E-mail extending congratulations and requesting a meeting	Distribution List	Louie Azzolini
June 2/00	E-mail accepting meeting date and asking for clarification from the Review Board	Louie Azzolini	Tina Markovic, BHP
June 2/00	E-mail and response regarding a future meeting date and change of e-mail address	Tina Markovic, BHP	Louie Azzolini
June 2/00	Letter submitting conformity reports from government reviewers, the public and the Yellowknives Dene First Nation	Tina Markovic, BHP	Louie Azzolini
June 5/00	E-mail with draft agenda of meeting – BHP EA	Distribution List	Louie Azzolini
June 5/00	E-mail attaching draft conformity table	John Ramsay, NRCan	Louie Azzolini
June 5/00	E-mail with agenda of meeting and attaching conformity table	Distribution List	Louie Azzolini
June 5/00	E-mail attaching draft conformity table	Alexandra Thomson	Louie Azzolini
June 15/00	E-mail outlining arrangements for visit to Ekati site	Louie Azzolini	Tina Markovic, BHP
June 5/00	Letter with attached Day Visitor Authorization Form	Heidi Klein	Tina Markovic, BHP
June 6/00	E-mail – Subject – Welcome to Narmin Rahemtulla but no body	Distribution List	Louie Azzolini
June 6/00	E-mail outlining changes to conformity	Louie Azzolini	Greg Cook, INAC
June 6/00	E-mail discussing telephones and corrections to conformity table	Louie Azzolini	Zoe Posynick, RWED
June 6/00	E-mail requesting Health Canada's participation in teleconference	Louie Azzolini	Maria Ooi, Health Canada
June 6/00	E-mails concerning Conformity Tables and BHP's meeting	Louie Azzolini	Tina Markovic, BHP
June 6/00	E-mail noting inconsistencies in roll-up	Louie Azzolini	Christa Domchek
June 6/00	E-mail regarding cursory look at conformity report	Louie Azzolini	Alexandra Thomson, Manager IEMA
June 6/00	Letter accepting invitation to meeting with MVEIRB	Gordon Lennie, MVEIRB	Alexandra Thomson
June 7/00	Letter attaching a report on the conformity analysis prepared by MVEIRB staff	Tina Markovic, BHP	Louie Azzolini
June 8/00	Letter stating changes in personnel	Heidi Klein	RWED
June 12/00	Trip report regarding Yellowknife Public Meeting	File	Louie Azzolini
June 12/00	Letter responding to MVEIRB's conformity analysis report	Gordon Lennie	Tina Markovic
June 14/00	Letter giving comments on the EA Process and coordination of the Review of the BHP EA	Louie Azzolini	Greg Cook, Environment & Conservation Division, DIAND
June 13/00	E-mail asking if MVEIRB had received writer's fax	Louie Azzolini	Tim Byers
June 14/00	E-mail acknowledging receipt of above mentioned fax	Tim Byers	Louie Azzolini
June 15/00	Information Request – BHP Expansion	MVEIRB	Marcy Bast, Department of

Date	Document	Recipient	Sent by
			Transportation, GNWT
June 15/00	Information Request Update	Distribution List	Louie Azzolini
June 19/00	EA Information Update #7	Distribution List	MVEIRB
June 19/00	Fax attaching letter of request to post BHP EA report and put in web pages	Tina Markovic, BHP	Roland Semjanovs
June 20/00	E-mail including EA Update NO. 7	Distribution List	Louie Azzolini
June 21/00	E-mail updating community visits and consultation	Louie Azzolini	Tina Markovic, BHP
June 22/00	E-mail with conformity questions	Louie Azzolini	Zoe Posynick
June 21/00	E-mail regarding adding to EA Update list	Louie Azzolini	Tim Byers
June 22/00	E-mail regarding discussion on conformity regarding migratory birds	Louie Azzolini	Anne Wilson, Environment Canada
June 22/00	Letter regarding conformity decision which states that the conformity phase will remain open	Tina Markovic, BHP	Lennie Gordon, MVEIRB
June 23/00	E-mails attaching copies of 4 new GNWT Information Requests	Louie Azzolini	Zoe Posynick
June 23/00	E-mail requesting clarification regarding conformity table	Heidi Klein	Tina Markovic, BHP
June 23/00	Letter attaching minutes to Yellowknife Public Meeting	Louie Azzolini	Tina Markovic, BHP
June 27/00	E-mail attaching June 9 EA Coordinators meting notes	Distribution List	Louie Azzolini
June 27/00	E-mail correcting Information Request deadlines	Louie Azzolini	Brett Hudson, RWED
June 27/00	E-mail making corrections to June 9 meeting note	Distribution List	Louie Azzolini
June 27/00	Notes to file regarding meeting with NSMA members and MVEIRB	File	Louie Azzolini
June 27/00	E-mail requesting 3 new GNWT information requests	Louie Azzolini	Zoe Posynick
June 28/00	Letter containing comments on the EA process and consideration of Leslie Pipe in the current assessment of the Proposed Development of the Sable, Beartooth and Pigeon Kimberlite Pipes	Gordon Lennie, MVEIRB	David Livingstone, Director, Renewable Resources & Environment, DIAND
June 27/00	Letter regarding conformity decision on the EAR for the BHP Beartooth, Pigeon and Sable Kimberlite Pipes	MVEIRB	Steve Harbicht, Head, Assessment & Monitoring, EPB
June 29/00	E-mails attaching 5 new GNWT information requests	Louie Azzolini	Zoe Posynick
June 27/00	Letter requesting public hearings for BHP's expansion project	MVEIRB	Charlie Evalik, President, Kitikmeot Inuit Association
June 29/00	Letter thanking IEMA staff for attendance at a meeting	Red Peterson, Chair, IEMA	Heidi Klein, MVEIRB
June 29/00	Letter attaching Review Board's initial information requests	Tina Markovic, BHP	Heidi Klein, MVEIRB
June 29/00	Letter attaching the Review Board's initial information request for GNWT	Kathryn Emmett, RWED	Heidi Klein, MVEIRB
June	E-mail attaching NRCan's first round of	Louie Azzolini	John Ramsay, NRCan

Date	Document	Recipient	Sent by
30/00	Information Requests		
June 30/00	E-mail attaching IR's on air quality and geology issues	Louie Azzolini	Anne Wilson, Environment Canada
July 4/00	Letter responding to item 4 from a sent letter addressing the Leslie kimberlite pipe	Gordon Lennie	J.D. Excell, President, Ekati Diamond Mine
July 4/00	Letter stating that the Leslie Pipe will not be mined under the present mine plan	Gordon Lennie	J.D. Excell
July 5/00	Fax letter acknowledging receipts of above two letters	J.D. Excell	Louie Azzolini
July 5/00	Letter acknowledging receipt of letter requesting public hearings	Charlie Evalik, President, Kitikmeot Inuit Association	Louie Azzolini
July 7/00	Letter advising that the Yellowknives Dene First Nation Land & Environment Committee feel the need for a public meeting to air their concerns	Gordon Lennie	Rachel Ann Crapeau, Chair, Land & Environment Committee, Yellowknives Dene First Nation
July 7/00	Letter acknowledging receipt of above mentioned letter	Rachel Ann Crapeau	Louie Azzolini
July 5/00	E-mail on information request regarding caribou sent to BHP and GNWT	Executive MVEIRB	Kathryn Emmett, GNWT
July 10/00	E-mail regarding line numbers from ToR.	Louie Azzolini	Tina Markovic, BHP
July 13/00	E-mail stating that INAC is satisfied that Leslie pipe is no longer a concern	Louie Azzolini	Greg Cook, INAC
July 13/00	BHP's ability to respond to IR's in a timely fashion	Louie Azzolini	Tina Markovic, BHP
July 7/00	NSMA's request for public hearing and technical meetings, BHP Diamond Inc. expansion of Ekati	Heidi Klein	Clem Paul, President
July 12/00	Comments on the environmental assessment process and consideration of Leslie Pipe in the current assessment of the proposed development of the Sable, Beartooth and Pigeon Kimberlite Pipes	Gordon Lennie	David Livingstone, Director, Renewable Resources & Environment, INAC
July 14/00	Acknowledging receipt of above mentioned fax from NSMA	Clem Paul, President	Louie Azzolini
July 18/00	Letter stating conformity decision on the environmental assessment report of BHP Diamonds Inc. (BHP) Beartooth, Pigeon and Sable Kimberlite Pipes (Proposed Development) – Leslie Kimberlite Pipe	Tina Markovic, BHP	Heidi Klein, MVEIRB
July 18/00	E-mail stating that BHP had delivered its response to the conformity decision and attachment.	Distribution List	Louie Azzolini, MVEIRB
July 17/00	Letter in response to items 1,3,and 5 in BHP's letter of June 22, 2000	Gordon Lennie	Tina Markovic, BHP
July 17/00	Handwritten memo stating who got and how many they got of copies of BHP's conformity response	Louie Azzolini	Tina Markovic
June 22/00	"COPY" of letter outlining the Review Board's consideration of non-conforming items on the EAR for the BHP expansion and provision of their views	Tina Markovic, BHP	Gordon Lennie, MVEIRB

Date	Document	Recipient	Sent by
July 18/00	Letter acknowledging receipt of June 22 letter regarding EAR	Tina Markovic, BHP	Louie Azzolini
July 19/00	Fax of Notice of Public Meeting re: BHP-EA	News North, Yellowknifer	Roland Semjanovs
July 19/00	E-mail requesting an extension to the IR submission deadline.	Louie Azzolini	Tasha Stephenson, DFO
July 20/00	Invoice for technical services	MVEIRB	Pido Productions Ltd.
July 20/00	Letter requesting information on visual and aesthetic resources	Tina Markovic, BHP	Heidi Klein, MVEIRB
July 20/00	E-mail with attached Review Board Information Requests.	Distribution List	Louie Azzolini
July 20/00	Letter regarding information needs expressed by the Review Board	Distribution List	Heidi Klein, MVEIRB
July 13/00	Letter responding to caribou information request.	Kathryn Emmett, Director, Policy, Legislation & Communications, RWED	Heidi Klein, MVEIRB
July 20/00	Letter requesting an extension of the deadline for the GNWT to provide an analysis of BHP's environmental assessment information	Heidi Klein, MVEIRB	Kathryn Emmett, Director, Policy, Legislation & Communications, RWED
July 20/00	E-mail attaching pdf file on BHP's Conformity Response submitted to the Review Board	Louie Azzolini	Tina Markovic, BHP
July 21/00	Letter attaching 25 copies of the IR's made by the government	Louie Azzolini	Tina Markovic, BHP
July 21/00	Fax attaching 6 Information requests from the Independent Environmental Monitoring Agency	Louie Azzolini	Robin Staples, IEMA
July 24/00	Letter with 4 Information requests prepared by Water Resources Division	Louie Azzolini	Elaine McIvor, Environmental Scientist, Environment & Conservation NT Region
July 24/00	Letter with information request prepared by Lands Administration Division	Louie Azzolini	Elaine McIvor
July 24/00	E-mail requesting that RA's get the text provided which was inadvertently omitted.	Louie Azzolini	Tina Markovic, BHP
July 24/00	Letter stating surprise and displeasure with date chosen for public meeting and reasons for it.	Gordon Lennie	J.D. Excell, President, Ekati Diamond Mine
July 24/00	Letter acknowledging receipt of above mentioned letter	J.D. Excell, President	Louie Azzolini
July 26/00	E-mail outlining tour made to Ekati site by different Inuit organizations.	Louie Azzolini	Tina Markovic, BHP

Date	Document	Recipient	Sent by
July 25/00	E-mail requesting an extension to the July 28th deadline for information requests for the BHP EAR.	Louie Azzolini	Matt Bender, Regulatory Officer, Mackenzie Valley Land and Water Board
July 28/00	Letter approving request for Information Requests submission deadline	Christa Domchek, Fish Habitat Biologist, DFO	Heidi Klein, MVEIRB
July 21/00	Letter stating they have concluded that BHP is a vital part of the Yellowknife economy	Mr. Lennie	Rod Lowen, Owner/Manager F093 Fountain Tire, Yellowknife
July 21/00	Letter stating it is their belief that the BHP operation is environmental responsible in the region.	Mr. Lennie	Brian W. Hesje, President, Fountain Tire, Edmonton, AB
Aug. 1/00	Letter acknowledging receipt of above mentioned letter.	Brian W. Hesje	Louie Azzolini
Aug. 1/00	Letter acknowledging receipt of above mentioned letter.	Rod Lowen	Louie Azzolini
July 31/00	Letter stating the Review Board's decision regarding the August 30 Public Meeting	J.D. Excell	Louie Azzolini
July 31/00	E-mail stating the Review Board had agreed to postpone the August 30 meeting	Distribution List	Louie Azzolini
July 31/00	E-mail requesting Board's rationale for not meeting with communities	Louie Azzolini	Tim Byers
Aug. 1/00	E-mail stating August 30 meeting had been postponed	Tim Byers	Louie Azzolini
Aug. 1/00	E-mail regarding change in BHP work plan	Louie Azzolini	Anne Wilson,
Aug. 1/00	E-mail discussing second round of IR's	Distribution List	Tina Markovic, BHP
Aug. 3/00	Letter responding to RWED Caribou Information Request Response Date	Kathryn Emmett	Heidi Klein
Aug. 4/00	Letter requesting six Information Requests prepared by Water Board	Louie Azzolini	Elaine McIvor, INAC
Aug. 4/00	Letter attaching responses concerning major environmental issues related to the Ekati mine expansion and the EAR	Louie Azzolini	Karl Lauten, Manager, Regulatory Reviews, Mackenzie Valley Land and Water Board
Aug. 8/00	Letter regarding cumulative effects and the BHP expansion proposal.	Stephen Burgess, CEAA	Heidi Klein
Aug. 7/00	E-mail requesting highlighting and summarizing of documents in Public Record	Louie Azzolini	Jane McMullen
Aug. 8/00	E-mail asking dates for the postponed meeting	Jane McMullen	Louie Azzolini
Aug. 7/00	Letter requesting workplan update	Gordon Lennie	Scott Williams, BHP

Date	Document	Recipient	Sent by
Aug. 9/00	Letter acknowledging receipt of above mentioned letter.	Scott Williams	Louie Azzolini
Aug. 11/00	E-mail ensures Scott Williams is informed of the outcome of Review Board's meeting in her absence.	Louie Azzolini	Tina Markovic, BHP
Aug. 11/00	E-mail stating vacation time and replacement people who will answer questions related to the assessment	Distribution List	Tina Markovic, BHP
Aug. 4/00	Meeting notes on BHP EA Work Plan Phase Three Amendment Meeting	File	Louie Azzolini
Aug. 11/00	E-mail passing on thoughts from Dettah regarding meetings	Louie Azzolini	Tim Byers
Aug. 14/00	Letter attaching copies of three dimensional representation of the proposed BHP development	Gordon Lennie	Denise Burlingame, Senior Public Affairs Officer, BHP
Aug. 16/00	E-mail with attached Excel spreadsheet containing IR's	Core BHP EA Contacts	Louie Azzolini
Aug. 18/00	E-mail regarding BHP EAR Conformity Sign-Off by Government Advisors	Distribution List	Louie Azzolini
Aug. 17/00	E-mail asking for responses by Friday, August 25/00 as to whether or not the July Conformity Response conforms with the Terms of Reference.	Distribution List	Louie Azzolini
Aug. 9/00	Letter outlining consultation and fiduciary obligations	Clem Paul, President, NSMA	Heidi Klein, Executive Director, MVEIRB
Aug. 17/00	E-mail responding to request regarding points being in conformity	Louie Azzolini	Elaine McIvor, INAC
Aug. 18/00	Letter attaching 40 hard cop and 40 CDs of the Information Requests and Responses	Gordon Lennie	Scott Williams
Aug. 21/00	Letter acknowledging receipt of second round of IR's	Tina Markovic	Louie Azzolini
	Media Release	Media	Louie Azzolini
Aug. 23/00	E-mail stating participation and ascertaining correct recipient.	Louie Azzolini	Jim Slater
Aug. 23/00	E-mail responding to above mentioned e-mail	Jim Slater	Louie Azzolini
Aug. 23/00	E-mail outlining her understanding of the process to date for BHP review	Louie Azzolini	Elaine McIvor, INAC
Aug. 23/00	E-mail expressing thanks for clarification in above mentioned e-mail	Elaine McIvor, INAC	Louie Azzolini
Aug. 31, 00	Fax providing Kitikmeot Inuit Association's comments on the proposed BHP expansion	Louie Azzolini	Charlie Evalik, President, KIA
Aug. 25/00	E-mail reminding recipients about conformity.	Distribution List	Louie Azzolini

Date	Document	Recipient	Sent by
Aug. 29/00	E-mail stating DIAND feels BHP has provided them sufficient information to their raised non-conformities.	Louie Azzolini	Elaine McIvor
Aug. 30/00	E-mail regarding impact of temporary shut down	Louie Azzolini	Anne Wilson
Aug. 28/00	E-mail closing off one phase of the review	Louie Azzolini	Anne Wilson
Aug. 28/00	E-mail responding to "A Reminder, A Request, and a Notice"	Louie Azzolini	Nick Lawson
Aug. 28/00	Letter regarding Conformity Assessment and Responsible Minister status for BHP's Expansion Project	Louie Azzolini	Tasha Stephenson, DFO
Aug. 30/00	E-mail stating absence from office and who to contact	Louie Azzolini	Elaine McIvor
Aug. 31/00	E-mail regarding Amended Phase Three Work Plan	Louie Azzolini	Tina Markovic, BHP
Sep. 1/00	E-mail stating Review Board's EA Update No. 9 was available on web site	Distribution List	Louie Azzolini
Sep. 1/00	E-mail with attached Information Requests the Review Board wanted prepared.	Distribution List	Louie Azzolini
Aug. 31/00	EA Information Update #9		MVEIRB
Aug. 26/00	Fax re: DIAND's concerns about timeframes for technical review	Chair & Board Members MVEIRB	David Livingstone, Director, Renewable Resources & Environment, DIAND
Aug. 31/00	Fax requesting clarification on certain aspects of the review process	Heidi Klein, MVEIRB	Charlie Catholique, Chair, Wildlife Lands and Environment Committee, Lutsel K'e Dene First Nation
Aug 31/00	E-mail requesting purpose and procedures for upcoming meeting	Louie Azzolini	Nick Lawson
Sep. 1/00	Letter confirming receipt of above mentioned letter	Charlie Catholique	Louie Azzolini
Sep. 1/00	Letter thanking GNWT for its cooperative and timely responses to the Review Board's requests	Kathryn Emmett, Director, Policy, Legislation & Communications, RWED	Heidi Klein, MVEIRB
Sep. 1/00	Letter stating the Review Board had met and adopted the amended BHP environmental assessment work plan	Tina Markovic, BHP	Heidi Klein, MVEIRB
Sep. 5/00	E-mail acknowledging receipt of letter and NRCAN's technical comments.	John Ramsey	Louie Azzolini
Sep. 18/00	E-mail attaching IEMA's technical comments on BHP's EAR.	Distribution List	Louie Azzolini

Date	Document	Recipient	Sent by
Sep. 06/00	E-mail seeking response to sixth of six requests made	Louie Azzolini	Zabey Nevitt, manager IEMA
Sep. 7/00	Memo enclosing discs for the EA report and for the IR's	Stephen Morison	Heidi Klein
Aug. 30/00	E-mail stating costs to conduct a peer review of BHP's current EA	Louie Azzolini	Peter Boothroyd, President, Conscribe Enterprises Ltd.
Sep. 8/00	E-mail asking for a change of name and discussion on upcoming info session	Louie Azzolini	Anne Wilson
Sep. 8/00	E-mail attaching Environment Canada's submission as well as KIA's	Distribution List	Louie Azzolini
Sep.11/00	E-mail stating absence and who to contact for digital copies of GNWT's material	Louie Azzolini	Nick Lawson
Sep.11/00	Fax regarding responsible minister status and conformity assessment for BHP's Expansion Project	Louie Azzolini	Brenda Woo, Health Canada, Edmonton, AB
Sep. 11/00	E-mail with attached BHP EA technical reports	Distribution List	Louie Azzolini
Sep. 11/00	Letter regarding technical review closure	Gordon Lennie	Tina Markovic, BHP
Sep. 11/00	Fax regarding attendance at public meeting and expressing concerns about limited amount of information received	Louie Azzolini	Brenda Parlee, Coordinator Wildlife Lands & Environment Committee Lutsel K'e Dene Band
Sep. 12/00	E-mail regarding BHP EA Technical Reports	Louie Azzolini	Marie Adams, INAC
Sep. 13/00	E-mail thanking DFO for information and asking if anyone else is going to speak at upcoming meetings	Tasha Stephenson, DFO	Louie Azzolini
Sep. 15/00	Letter summarizing technical comments on BHP's EAR for the BHP mine expansion	Gordon Lennie	Red Pedersen, Chairperson, IEMA
Sep. 15/00	Letter stating wish to make a presentation at upcoming meeting	Gordon Lennie	Dr. Stephen F. Prest, President, Diavik
Sep. 15/00	Fax acknowledging receipt of technical comments from IEMA	Zabey Nevitt	Louie Azzolini
Sep. 15/00	Letter stating intention to make a presentation at the public hearings	Heidi Klein	Douglas B. Witty, Public Affairs, N.O.R.D.
Sep. 16/00	Letter acknowledging receipt of above mentioned letter.	Douglas B. Witty	Louie Azzolini
Sep. 14/00	Letter with attached BHP's response to information request.	Gordon Lennie	Tina Markovic
Sep. 16/00	Letter acknowledging receipt of above mentioned letter on intent to present at upcoming meeting and telling who else will be presenting	Dr. Stephen F. Prest	Louie Azzolini

Date	Document	Recipient	Sent by
Sep. 14/00	Advertising Insertion Order	News North	Roland Semjanovs
Sep. 13/00	E-mail attaching meeting notes, IR and IR responses	Brenda Parlee	Louie Azzolini
Sep. 15/00	E-mail with draft public meeting format and schedule for Sept. 26 meeting	Distribution List	Louie Azzolini
Sep. 15/00	E-mail stating that conformity is closed	Distribution List	Louie Azzolini
Sep. 15/00	Letter stating that BHP is in conformity and the conformity component of the work plan and the environmental assessment is closed	Tina Markovic	Heidi Klein
Sep. 15/00	E-mail attaching technical comments in a summary table	Distribution List	Louie Azzolini
Sep. 15/00	Fax of Press Release of Review Board Meeting	Distribution List	Louie Azzolini
Sep. 18/00	E-mail requesting rules of the meeting	Louie Azzolini	Tina Markovic
Sep. 3/00	Letter attaching Environment Canada's technical comments and recommendations on the BHP Proposed Expansion	Chairman, MVEIRB	Stephen Harbicht, Head, Assessment and Monitoring, Environmental Protection Branch
Sep. 8/00	Letter attaching GNWT RWED's technical review of BHP's EAR for the Sable, Pigeon and Beartooth Kimberlite Pipes, Ekati Mine	Gordon Lennie, MVEIRB	Kathryn Emmett, Director, Policy, Legislation and Communications, RWED
Sep. 8/00	Letter attaching DIAND's technical review – BHP Diamonds Inc. Beartooth, Pigeon and Sable Kimberlite Pipes	Chair and Members, MVEIRB	David Livingstone, Director, Renewable Resources & Environment, NT Region
Sep. 5/00	Letter attaching Natural Resources Canada (NRCan)'s technical comments on BHP's EAR for the Sable, Pigeon and Beartooth Kimberlite Pipes – Northwest Territories	Louie Azzolini	John Ramsey, Senior EA Officer, Office of Environmental Affairs, Natural Resources Canada
Sep 1/00	Fisheries & Oceans Canada Technical Review Comments re: BHP's EAR for Sable, Pigeon and Beartooth Kimberlite Pipes	MVEIRB	Unknown
Sep. 18/00	Memo regarding notice of advance registrants for the Sept. 16 Public Meeting on the Proposed BHP Sable, Beartooth and Pigeon Kimberlite Pipe Development	Tina Markovic, BHP Distribution List	Louie Azzolini, MVEIRB
Unknown	MVEIRB request for information	Unknown	MVEIRB
Sep. 18/00	Letter expressing concerns over the length of time the BHP proposal for Sable, Pigeon and Beartooth pipes was taking and outlining impact on business &	Heidi Klein	Dale Vance, Coldwell Banker, Yellowknife

Date	Document	Recipient	Sent by
	industry		
Sep. 20/00	E-mail concerning rule and procedures for public meetings	Louie Azzolini	John Donihee
Sep. 19/00	Letter with GNWT's responses to the MVEIRB's request for information.	Heidi Klein	Kathryn Emmett, Director, Policy and Communications, RWED
Sep. 15/00	Letter stating Lutsel K'e Dene Band would like to make a formal presentation at Sept. 26 meeting	Heidi Klein	Brenda Parlee, Coordinator, Wildlife Lands and Environment Department, Lutsel K'e Dene Band
Sep. 20/00	Letter outlining Braden-Burry Expediting Ltd's interest in having the BHP's Ekati Diamond Mine Resources at Sable, Pigeon and Beartooth application reviewed in a timely manner by the MVEIRB	Gordon Lennie	Bernadette Stewart, P. Eng., President, BBE
Sep. 22/00	Memo outlining procedures for handling and treating material received under confidential cover on Sept. 1, 2000	Review Board Members	MVEIRB
Sep. 21/00	Letter clarifying of fish habitat compensation requirements and the EAR of BHP's expansion	Louie Azzolini	Pete Cott, A/Area Chief, Habitat – Western Arctic, DFO
Sep. 21/00	Letter offering comments on BHP's application for Sable, Beartooth and Pigeon.	MVEIRB	Douglas B. Witty, President Canada North Distributors Limited
Sep. 22/00	Fax letter acknowledging receipt of above-mentioned letter.	Douglas B. Witty	Louie Azzolini
Sep. 25/00	Paper summarizing most of the concerns and questions that the Yellowknives Dene First Nations Land & Environment Committee have in regards to the proposed BHP Ekati mine extension plans.	MVEIRB	Rachel Crapeau, Alfred Baillargeon, Lawrence Goulet, and the Committee
	Notes of Public Meeting, Tuesday, September 26, 2000		
Sep. 25/00	Letter responding to Question 8 in the GNWT Presentation on Heritage Sites	Gordon Lennie	Scott Williams, Manager, Environment and Resource Planning, BHP
Sep. 26/00	Letter responding to the DFO technical review comments on BHP's EA for the Sable, Pigeon and Beartooth Kimberlite Pipes (April 2000)	Gordon Lennie	Scott Williams, Manager, Environment and Resource Planning, BHP
Sep. 25/00	Public Service announcement for public meetings to be held on Sept. 26, 2000	CBC Radio, CJCD Radio, CKLB Radio	Roland Semjanovs, MVEIRB
Sep. 26/00	NORD's presentation – September 26, 2000 BHP's Ekati Diamond Mine addition at Sable, Pigeon and Beartooth		

Date	Document	Recipient	Sent by
Sep. 26/00	Presentation to the MVEIRB	Public Meeting	Diavik Diamond Mines, Inc
Sep. 26/00	Speaking notes – DFO Canada Summary of Technical Review comments re: BHP's EAR for Sable, Pigeon and Beartooth Kimberlite Pipes (April 2000)	Public Meeting	DFO
Sep. 25/00	Letter expressing support for a timely and favourable review of BHP Diamonds' application submitted to MVEIRB for the continual development of the Ekati diamond mine	Gordon Lennie, Chairman	John Zigarlick, Chairman & CEO, Nuna Logistics
Sep. 28/00	Letter acknowledging receipt of above mentioned letter.	John Zigarlick	Louie Azzolini
Sep. 26/00	Letter expressing their belief that there is no benefit to withholding the required permits to allow for the development of the three additional kimberlite pipes.	Louie Azzolini	Jack Rowe, Mayor, Town of Hay River
Sep. 28/00	Letter acknowledging receipt of above mentioned letter	Jack Rowe, Mayor	Louie Azzolini
Sep. 25/00	Memo regarding cumulative IR and their treatment	Louie Azzolini	Heidi Klein
Sep. 27/00	E-mail stating when BHP would be submitting responses	Louie Azzolini	Tina Markovic, BHP
Sep. 26/00	Letter attaching Final Report: Technical Review of the Physical Environment Described in the EA Documentation for the Proposed Expansion of the BHP – Diamet Minerals Ltd. Ekati Diamond Mine	Louie Azzolini	S. R. Morison, Manager Northern Canada, Gartner Lee Limited
Unknown	Socio-economic peer review of BHP EAR	MVEIRB	Unknown
Unknown	BHP EA Peer Review: Economic Analysis	MVEIRB	Praxis, Inc.
Sep. 29/00	Letter responding to Ms. Klein's memorandum dated September 25, 2000	Gordon Lennie	Scott Williams, Environment and Resource Planning Manager, BHP
Sep. 29/00	Letter responding from the public meeting on September 26, 2000 between a Board member and a presenter from the mining industry discussing balancing a company's interest in profit against its interests in designing a longer mine life	Gordon Lennie, Chair	Kate Hearn, Director, Mineral Resources, INAC
Sep. 29/00	Letter attaching copy of draft notes from the public sessions held September 26, 2000 with some suggested editing.	Gordon Lennie, Chairperson	Tasha Stephenson, Habitat Management Biologist, DFO
Sep. 29/00	Letter responding to BHP's Sept. 26, 2000 response to DFO's Technical Review comments on the EAR of BHP's Expansion project	Gordon Lennie, Chairperson	Ron Allen, Area Director, Western Arctic, DFO
Sep. 29/00	Note to file acknowledging closure of the BHP Public Registry	To File	Louie Azzolini

Date	Document	Recipient	Sent by
Sep. 26/00	Letter re: response to GNWT Socio-Economic Question 4 and Recommendations	Gordon Lennie, Chairperson	Scott Williams, Manager, Environment and Resource Planning, BHP
Sep. 28/00	Letter thanking the Yellowknives Dene First Nation for their hospitality and assistance in holding the public meeting on Sept. 26/00	Chief Liske and Chief Edijercon, Yellowknives Dene First Nation	Gordon Lennie, Chairman, MVEIRB
Sep. 29/00	Letter re: agency's response to Board's question from the public meeting concerning caribou reactions to vehicles on the Sable Road	Gordon Lennie	Red Pedersen, Chair, Independent Environmental Monitoring Agency
Sep. 26/00	BHP Responses to Yellowknives Dene Comments on the Proposal	MVEIRB	BHP
Sep. 29/00	Letter thanking the MVEIRB for the opportunity to discuss their project during the Sept. 26 meeting	Gordon Lennie, MVEIRB	Jim Excell, President, Ekati Diamond Mine
Oct. 10/00	Memo clarifying on information on the public registry so as not to cross the bounds.	Louie Azzolini	Heidi Klein

10.3 Milestone Dates in the Environmental Assessment Process

BHP submitted its Environmental Assessment Report (EAR) to the Review Board on April 27, 2000. The Board distributed the EAR and undertook public notification of having received the EAR and provided a timetable for completing the EA. Milestone dates for completing the environmental assessment changed twice. There are over 500 consultation related documents on the public register. The Review Board's initial work plan established the following milestone dates.

Wednesday, May 31, 2000 at 5:00 P.M. as the last day for receiving comments on whether the BHP Environmental Assessment Report conforms to the Review Board's Terms of Reference.
Later part of June for public meetings, if they are required.
Friday, August 18, 2000 at 5:00 P.M. as the last day for government departments to complete and submit Technical Reports.
Friday, September 1, 2000 at 5:00 P.M. as the day the Review Board's Public Registry file on the BHP closes.

In May 2000, public notifications regarding the EAR and of opportunities for involvement in the Environmental Assessment continued and scoping undertaken to determine if a public forum was warranted. Government Reviewers began conformity and technical analysis of the EAR and submitted completed Conformity Reports on May 31, 2000. Technical analysis of the Environmental Assessment Report initiated and ran concurrent to the conformity analysis.

In June 2000, the Review Board made several EAR Conformity Rulings. Public notification activities continued, and a detailed implementation schedule was implemented with government reviewers to facilitate the Information Request process. Scheduled dates were as follows:

Government Information Requests issued by June 30, 2000.
BHP responded in three weeks taking the process to July 21, 2000.
Government submitted its next Information Requests (if needed) by July 28, 2000. Review Board extended that date to August 4.
BHP to respond by August 11, 2000.
Government to submit its technical reports by August 18, 2000.
BHP to submit information on the Public Registry until September 1, 2000.

In July 2000, BHP submitted its Conformity Response document and responded to the first round of Information Requests issued by government reviewers. Public notification continued. The Review Board amended its August 30 public meeting on July 28 and an updated work plan was prepared to accommodate the change in schedule.

In August, the Review Board adopted its amended work plan and set the following dates.
August 18 was acknowledged as the day BHP responded to the second round of Information Requests.
September 8 was set as the date for government Technical Reviews.
September 15 was set as the last day for parties to notify the Review Board if they intended to make a presentation, and for submitting any documents that would be used at the public meeting.
August 30 Public Meetings rescheduled at BHP's request to September 26
September 29 the Public Registry closed.