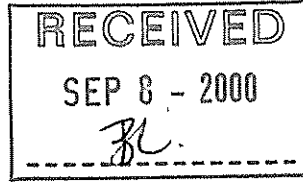




*By Hand Sept 8/2000*

Renewable Resources & Environment  
PO Box 1500  
Yellowknife, NT X1A 2R3

N-7392-7-A2-1



September 8, 1999

Your file / Votre référence

Our file / Notre référence

Chair and Members  
Mackenzie Valley Environmental Impact Review Board  
P.O. Box 938  
Yellowknife, NT X1A 2V7

**Technical Review - BHP Diamonds Inc. ("BHP") Beartooth, Pigeon and Sable Kimberlite Pipes**

For your consideration, the Department of Indian Affairs and Northern Development's (DIAND) final technical review of BHP's expansion proposal is attached. Our comments focus on land and water issues; comments related to wildlife and socio-economic issues will be addressed by other agencies, notably those of the GNWT.

It is our view that the project proposal will not likely cause significant adverse environmental impacts provided that the mitigation measures are implemented and monitoring as described by BHP and DIAND is carried out in the context of the regulatory process.

DIAND agrees with the mitigation and monitoring described in BHP's Environmental Assessment Report (April 2000) and its Information Request Responses (July and August, 2000). DIAND's specific technical concerns and recommended mitigation measures and/or monitoring are outlined in the attached technical review.

We recommend that all current environmental management plans be updated in accordance with the appropriate new or amended regulatory instruments and the BHP Environmental Agreement. It is anticipated that many of the recommendations suggested by DIAND would be effected through these updates.

We expect that issues related to security deposits will be finalized during the regulatory process and may necessitate amendments to the Environmental Agreement.

If you wish to discuss these comments further, please do not hesitate to call Mary Tapsell at (867) 669-2680.

Sincerely,

*lgw* David Livingstone  
Director  
Renewable Resources & Environment  
NT Region

**Technical Review - Dept. Indian Affairs and Northern Development  
BHP Expansion - Beartooth, Pigeon, Sable Project**

Attached are the following documents

Water related issues

- Technical templates numbered W-1 to W-14

Land related issues

- Technical templates numbered L-01-L-20

## DIAND - BHP Technical Review

### Number W-1

1. TOPIC (VEC affected) Surface Water Quality and Quantity

2. TOR reference (section #) 367-416

3. Environmental Assessment. Report reference (section # - BHP's report)

4.5 Water

4. ISSUES (describe the concerns in brief sentence)

Overall Effects on Surface Water Quality and Quantity

5. BOUNDARIES (Spatial and Temporal)

Spatial: Agree with BHP's spatial boundary.

Temporal: Agree with BHP's temporal boundary.

6. SUMMARY OF ISSUES (all issues related to the VEC)

QUANTITY: It is felt that the predictions made by BHP in this Environmental Effects Assessment with regard to impacts on Water Quantity are accurate. Many clarifications are noted on technical review sheets W-7 and W-8. It is anticipated that the regulatory phase will address many of the uncertainties which remain in the minds of reviewers.

QUALITY: It is felt that the predictions made by BHP in this Environmental Effects Assessment with regard to impacts on Water Quality are accurate. Further work is needed in many areas to better understand the nature of the effects of this mine expansion on water quality in the Lac de Gras and Yamba/Exeter Watersheds (see W-4 - 6, 9 - 14) . BHP must address the unresolved technical concerns noted in this review in order to best protect the water quality of this highly oligotrophic system. This should occur during the regulatory phase.

7. SIGNIFICANCE DETERMINATION / CONCLUSION

DIAND agrees with criteria BHP has established to determine significance for water for both project specific and cumulative impacts.

Overall, it is felt that the predictions made by BHP in this Environmental Effects Assessment with regard to impacts on Water Quality and Quantity are accurate.

8. RECOMMENDATIONS TO MVEIRB (Mitigation, monitoring, etc)

Specific concerns which will be raised in this technical review can be addressed through studies and monitoring plans which will accompany the regulatory phase of this development. These will be noted in the *Recommendations to the MVEIRB* Sections of the following Technical Review sheets. Recommendations are primarily made for requirements for the future Water Licence, revisions to the AEMP, and general environmental practices of BHP.

## DIAND - BHP Technical Review

### Number W-2

1. TOPIC (VEC affected) Surface Water Quality and Quantity

2. TOR reference (section #) 253-257, 259-262

3. Environmental Assessment Report reference (section # - BHP's report)

Spatial Boundaries 4.2.1.3,

Surface Water Quantity and Quality 4.2.2.6

BHP Conformity Response, July 2000

4. ISSUES (describe the concerns in brief sentence)

Acceptability of the spatial and temporal boundaries which BHP has chosen to use in this assessment.

5. BOUNDARIES (Spatial and Temporal)

Spatial: Agree with BHP's spatial boundary (see discussion below).

Temporal: Agree with BHP's temporal boundary.

6. SUMMARY OF ISSUES (all issues related to the VEC)

In one area it was felt that the spatial boundaries used were not specific enough. When making reference to the Sable Pipe Development, references are given to impacts on "nearby water bodies", "downstream water quality" and so forth. This obscures the fact that BHP will be developing the Sable Pipe with infrastructure in two separate drainage basins - the Exeter Basin and the Ursula Basin. Nowhere is this stated in the EA, it is only noted on a map in the Project Description. This was the only major omission in terms of boundaries.

7. SIGNIFICANCE DETERMINATION / CONCLUSION

DIAND agrees with the Spatial and Temporal Project Boundaries which BHP has established to determine significance for surface water quality for most project-specific impacts and cumulative effects.

8. RECOMMENDATIONS TO MVEIRB (Mitigation, monitoring, etc)

SNP Stations and AEMP Monitoring Stations should be established in appropriate locations to ensure that the Ursula Basin is monitored appropriately.

**With this mitigation, no significant impacts to surface water quantity and quality are anticipated.**

## DIAND - BHP Technical Review

### Number W-3

1. TOPIC (VEC affected) Surface Water Quality and Quantity

2. TOR reference (section #) 563

3. Environmental Assessment. Report reference (section # - BHP's report)  
Cumulative Effects 4.9 (Surface Water Quality and Quantity 4.9.4.3)

4. ISSUES (describe the concerns in brief sentence)  
Cumulative effects on water quality and quantity.

5. BOUNDARIES (Spatial and Temporal)  
Spatial: Agree with BHP's spatial boundary.  
Temporal: Agree with BHP's temporal boundary.

6. SUMMARY OF ISSUES (all issues related to the VEC)  
BHP has evaluated the potential for cumulative effects with relation to water quality and quantity. They acknowledge the potential for elevated nitrogen inputs to Lac de Gras when effluent from Long Lake processed kimberlite and sewage containment area combines with effluent from Diavik's processing plant, but do not foresee any biological changes resulting.

7. SIGNIFICANCE DETERMINATION / CONCLUSION  
DIAND agrees with the criteria BHP has established to determine significance for surface water quality and quantity for cumulative effects.

8. RECOMMENDATIONS TO MVEIRB (Mitigation, monitoring, etc)  
It is recommended that BHP cooperate with Diavik, the Government, and other regulators to address the cumulative effects of total loadings of nutrients and metals into Lac de Gras watershed, and the resulting long term impacts on this oligotrophic system.

At this stage BHP should be able to make predictive statements with regard to quantities of nitrogen and phosphorous they expect to see in Lac de Gras over the course of their mine life, in combination with Diavik. It is understood that they have the monitoring and predictive data to examine the anticipated total loadings of contaminants into the Lac de Gras watershed. These can be addressed as part of Water Licence requirements and AEMP studies. Existing cumulative effects frameworks should be supported, and new initiatives should be pursued by BHP working in co-operation with Diavik.

**With this mitigation, no significant impacts to surface water quantity and quality are anticipated.**

## DIAND - BHP Technical Review

### Number W-4

1. TOPIC (VEC affected) Surface Water Quality and Quantity

2. TOR reference (section #) 353 - 355, 414

3. Environmental Assessment Report reference (section # - BHP's report)

Sable Waste Rock 2.2.3.3.1.1,

Further Work 2.2.3.3.1.4,

Waste Rock Storage and Drainage 4.5.1.5,

Sable Pipe Water Quality 4.5.2.2.4.

4. ISSUES (describe the concerns in brief sentence)

Initial static testing indicates the possibility of potentially acid generating waste rock from the Sable Pipe and, to a lesser extent, the Pigeon Pipe.

5. BOUNDARIES (Spatial and Temporal)

Spatial: Agree with BHP's spatial boundary.

Temporal: Agree with BHP's temporal boundary.

6. SUMMARY OF ISSUES (all issues related to the VEC)

Samples of waste rock from the new pipes have undergone static testing. Results from Sable and Pigeon indicate that some samples have an elevated sulphide content, and some rock types are acid generating.

As demonstrated by 1999 Seepage Survey results, the geochemistry of existing waste rock isn't fully understood by BHP. Elevated levels of ammonia and aluminum have been observed in water samples around the waste rock piles, as well as pH samples which have been more acidic than is allowed in the current water licence.

There will be 120.8 million tonnes of waste rock from the Sable pipe by closure. These waste rock piles will be adjacent to Ulu Lake and Horseshoe Lake, and runoff from the pile could potentially flow into these lakes should containment be ineffective.

7. SIGNIFICANCE DETERMINATION / CONCLUSION

In this situation, uncertainty exists as to the untested containment berm system. If the berm system proves ineffective around previously unaffected lakes, then residual effects on water quality in those lakes may occur. Other contingencies need to be developed by BHP.

Otherwise, DIAND agrees with criteria BHP has established to determine significance for surface water quality for other project-specific impacts and cumulative effects.

8. RECOMMENDATIONS TO MVEIRB (Mitigation, monitoring, etc)

In section 2.2.3.3.1.4 of the EIS, BHP has proposed additional work which it will undertake in order to improve waste rock management planning.

It is stated that the following will be completed for each of the three pipes:

- kinetic testing to address metal leaching potential;
- quantification of the amount, location, and scheduling of the different types of waste rock from each pit, and potential for segregation of this material during mining;
- methods for segregation of waste rock if kinetic testing indicates this is required;
- definition of the sampling program to identify potentially "reactive" (acid generating, metal leaching) rock, and development of segregation criteria; and
- provision for drainage water monitoring and collection, if required.

This work should be underway so that the preliminary results can be reviewed in the water licence application. Should the kinetic testing confirm the acid generating nature of some of this waste rock, it is recommended that BHP also investigate the potential for waste rock blending to reduce contaminated runoff. The potential interaction between Panda and Beartooth Waste Rock should be evaluated.

At the regulatory phase, a number of BHP's plans under the water licence will need to be modified to reflect the changes in operation, including their Acid/alkaline Rock Drainage (ARD) and Geochemical Characterization Plan, their Wastewater and Tailings Management Plan, their Waste Rock and Ore Storage Plan, and their Seepage Surveys. As well, the Aquatic Effects Monitoring Program will need to be adapted to recognize changes. Contingency plans for seepage around waste rock piles should be fully developed and tested so that there is no danger of exceeding regulated water licence limits.

**With this mitigation, no significant impacts to surface water quality are anticipated.**

## DIAND - BHP Technical Review

### Number W-5

1. TOPIC (VEC affected) Surface Water Quality and Quantity

2. TOR reference (section #) 289-291, 374-5, 396

3. Environmental Assessment Report reference (section # - BHP's report)

Waste Rock 2.2.3.3.3,  
Waste Rock Storage and Drainage 4.5.1.5,  
Accidents and Malfunctions, Waste Rock Runoff 4.10.2.2,  
Environmental Management Initiatives 5.4.4,  
Preliminary Design of Water Control Structures (EBA).

4. ISSUES (describe the concerns in brief sentence)

BHP is proposing to construct perimeter berms around waste rock piles to contain potential seepage/runoff from the piles, if needed.

5. BOUNDARIES (Spatial and Temporal)

Spatial: Agree with BHP's spatial boundary.

Temporal: Agree with BHP's temporal boundary.

6. SUMMARY OF ISSUES (all issues related to the VEC)

In addition to setting the waste rock pile 100m from water bodies, BHP states that the piles will be constructed to encourage early permafrost formation on the outer fringes using a perimeter berm system. It is proposed as a contingency plan to minimize the risk of runoff from the piles to unimpacted lakes. BHP has proposed to conduct a full scale test of this system around a portion of the Panda waste rock pile.

This system has not been used to date in other operations, and although BHP has examined a worst case scenario (4.10.2.2), DIAND believes further work is needed prior to the implementation of this process.

7. SIGNIFICANCE DETERMINATION / CONCLUSION

DIAND agrees with criteria BHP has established to determine significance for surface water quality and quantity in general for project-specific impacts and cumulative effects.

8. RECOMMENDATIONS TO MVEIRB (Mitigation, monitoring, etc)

BHP should define and clarify at what level of runoff they would consider that the perimeter berm system would be "needed", as there are inconsistencies in the information given between the EA and the August Information Request Responses. Thermal modelling and monitoring will be required over the mine life.

It is recommended that BHP share the results of their test fill monitoring and temperature data with regulators and the MVLWB as soon as it is available. Modelling should be done to examine the thermal effects of high volumes of runoff, possible waste rock "hot spots", and extreme climatic



conditions on permafrost formation within the berms.

BHP will need to address alternate contingency plans for control of runoff should the berm system prove ineffective. The water licence for this project will contain limits for water quality of any possible seepage.

**With this mitigation, no significant impacts to surface water quantity and quality are anticipated.**

## DIAND - BHP Technical Review

### Number W-6

1. TOPIC (VEC affected) Surface Water Quality and Quantity

2. TOR reference (section #) 371-372, 379-382, 396

3. Environmental Assessment. Report reference (section # - BHP's report)

Flow Diversion, Pigeon 4.5.4.2.3,

Flow Diversion and Water Containment 4.5.1.3

Residual Effects Water Quality 4.8.3.2.3

4. ISSUES (describe the concerns in brief sentence)

Mitigation of effects associated with the Pigeon Stream Diversion.

5. BOUNDARIES (Spatial and Temporal)

Spatial: Agree with BHP's spatial boundary.

Temporal: Agree with BHP's temporal boundary.

6. SUMMARY OF ISSUES (all issues related to the VEC)

BHP has identified that there may be impacts to Fay Lake during the Construction Phase of the Pigeon Stream Diversion. They have stated that there is potential for elevated levels of nitrogen and phosphorous which could result in a minor increase in the biomass of primary producers (ie. phytoplankton) in Fay Lake. This has the potential to impact aquatic life in Fay Lake.

7. SIGNIFICANCE DETERMINATION / CONCLUSION

DIAND agrees with criteria BHP has established to determine significance for surface water quality for the impacts of the Pigeon Stream Diversion.

8. RECOMMENDATIONS TO MVEIRB (Mitigation, monitoring, etc)

BHP has collected two water quality samples from Fay Lake so far, and should continue to collect baseline data for Fay Lake. This needs to be done in order to better quantify potential changes which may result from the construction of the Stream Diversion. In all cases, BHP should apply lessons learned from the Panda Diversion Channel.

It is agreed that additional work is needed prior to the construction of this structure, as was proposed in BHP's response to Environment Canada's July 4 IR, specifically:

- site specific topographic surveys;
- detailed geotechnical site investigations involving drilling and sampling of the natural soils to determine subsurface conditions, including permafrost conditions and measurement of ground temperatures;
- earthworks modelling to determine construction material quantities within the final design configurations; and
- preparation of final design reports, construction drawings, and construction specifications.

This above work should be well underway by the start of the regulatory phase, so reviewers can assess the preliminary results.

A threshold for phosphorous concentrations in Fay Lake should be identified by BHP where measures will begin in order to prevent pollution of downstream water bodies and resulting biological changes. As well, BHP should outline it's contingency plans to address what it will do if any increase in primary producer biomass is seen downstream of the Stream Diversion.

The AEMP should be modified to include the Pigeon area and a monitoring regime established for the Pigeon Stream Diversion.

**With this mitigation, no significant impacts to surface water quantity and quality are anticipated.**

## DIAND - BHP Technical Review

Number: W-7

1. TOPIC (VEC affected)	Surface Water Quality and Quantity (References/Ursula Lake)
2. TOR reference (section #)	235-236/367
3. Environmental Assessment. Report reference (section # - BHP's report)	Section 4.5.1.6 p.4-76 3 <sup>rd</sup> paragraph Section 4.5.2.1.4.1 p.4-85 3 <sup>rd</sup> paragraph
4. ISSUES (describe the concerns in brief sentence)	BHP states "Ursula Lake is believed to be large enough (~25 km <sup>2</sup> ) to accommodate water removal with minimal effects to the lake".
5. BOUNDARIES (Spatial and Temporal)	<p><u>Spatial</u>: Agree with BHP's overall spatial boundary of Ursula Lake; but need to back-up (i.e. substantiate) statement of '...minimal effects...' within a 25 km<sup>2</sup> area.</p> <p><u>Temporal</u>: Alternative measures should be examined if the estimated 25 years for refilling Sable Pit proves to not be suitable.</p>
6. SUMMARY OF ISSUES (all issues related to the VEC)	References and/or studies backing up this statement should be included. If BHP is proposing to refill Sable Pit via pumping from Ursula Lake, additional information is needed. Also contingency measures should be provided along with alternative plans should the spatial or temporal boundaries be exceeded.
7. SIGNIFICANCE DETERMINATION / CONCLUSION	DIAND agrees with criteria BHP has established to determine significance for surface water quality for the impacts of the Sable Pit restoration.
8. RECOMMENDATIONS TO MVEIRB (Mitigation, monitoring, etc)	Uncertainty exists with regard to the volumes and time required to fill Sable Pit, and the potential implications for the watershed. Mitigative measures and alternative plans should be considered in case the predicted filling period is insufficient to restore the Sable Pit, or has negative impacts on Ursula Lake. BHP should establish a water quantity station (i.e. hydrometric station) at the outlet of Ursula Lake to establish baseline information. The operation of this station should also continue during the period of refilling Sable Pit.
<b>With this mitigation, no significant impacts to the surface water quantity are anticipated.</b>	

## DIAND - BHP Technical Review

Number: W-8

1. TOPIC (VEC affected)	Surface Water Quality and Quantity (Water Balance)
2. TOR reference (section #)	404; 376-378; and others.
3. Environmental Assessment. Report reference (section # - BHP's report)	Various sections highlighted with respective issues (i.e. # 4).
4. ISSUES (describe the concerns in brief sentence)	<p>- <b>EBA 2000: p. 2-5; Rescan memorandum dated Dec 7, 1999:</b> BHP should justify why they are still using a runoff coefficient of .65 of estimated precipitation when in actual fact this coefficient is low. Actual measurements indicate that precipitation is higher (pcp=estimated 345mm (table 2.2-4); pcp=actual 393mm (p. 3-7).</p> <p>- <b>EBA 2000, p. 2-5, Table 2.4-1:</b> Open-water days estimated to be 128 days. This estimate seems high. The range may be something like 105 to 124 days, e.g. at Salmita it is approximately 114 days (1992-1999).</p> <p>- <b>EBA 2000, p. 2-5:</b> Using 65% of the annual runoff to estimate the spring freshet. What is the justification for this ratio? Source? Results presented by BHP (e.g. Figure 3.3-3) seem to indicate that this value may also be on the low side.</p> <p>- <b>EBA 2000, p. 2-8, Table 2.5-1:</b> Could BHP now be in a position to give more accurate measurements of groundwater inflow? (i.e. currently estimated at 1000 m<sup>3</sup>/d).</p> <p>- <b>EBA 2000, p. 2-8, Table 2.5-1:</b> Why is 'Lake area direct precipitation' not estimated for Two Rock Lake during freshet, when it is given for the Bearclaw Lake catchment (Table 4.4-1, p. 4-4, EBA 2000) which is much smaller in area, i.e. Two Rock Lake area = 293500 m<sup>2</sup> and Bearclaw Lake area = 160100 m<sup>2</sup>?</p> <p>- <b>EBA 2000, Section 4.5, p. 4-6, last paragraph:</b> A hydrometric station should be put in place on Beartooth stream to allow baseline information to be collected in order to verify that pumping from Bearclaw Lake replicates natural flow volumes within Beartooth stream.</p> <p>- <b>Section 4.5.2.1.4.2, Lake Storage Changes, p. 4-86; and Section 4.5.5.1.4, p. 4-119:</b> How can evaporation amounts not be expected to change when the re-filled Sable Pit (and other reclaimed pits) has a greater surface area to the current Sable Lake?</p>
5. BOUNDARIES (Spatial and Temporal)	Agree with BHP's overall spatial and temporal boundaries, except they should re-visit evaporation rates that will be present from larger lake surface areas.
6. SUMMARY OF ISSUES (all issues related to the VEC)	N/A...individually listed in #4.

**7. SIGNIFICANCE DETERMINATION / CONCLUSION**

DIAND agrees with criteria BHP has established to determine significance for surface water quality and quantity in general for project-specific impacts and cumulative effects.

**8. RECOMMENDATIONS TO MVEIRB (Mitigation, monitoring, etc)**

BHP has been collecting climate and hydrometric data since around 1993, and they should now be using actual measured values for design purposes (e.g. precipitation/ discharge, etc).

It is believed that the changes during pit reclamation (e.g. change in storage capacities; dampening of flows; increased evaporation) could affect the overall hydrologic regime in the long term. Initial effects may be minimal, and long term ones may be difficult to assess. BHP is encouraged to further review relevant literature on these topics within the mining industry, or within the scientific/research community. It would be advantageous to explain further or in more detail the potential impacts of such alterations to the environment. Results of this research should be incorporated in the monitoring plans required at the regulatory phase.

**With this mitigation, no significant impacts to the surface water quantity are anticipated.**

## DIAND - BHP Technical Review

Number: W-9

1. TOPIC (VEC affected)	Surface Water Quality
2. TOR reference (section #) . N/a	
3. Environmental Assessment. Report reference (section # - BHP's report)	
Section:	4.5.1.7 - page: 4-76 to 4-79 4.5.2.2 - page: 4-86 to 4-91 4.5.3.2 - page: 4-97 4.5.4.2 - page: 4-104 to 4-108 4.5.5.2 - page: 4-119 to 4-122
4. ISSUES (describe the concerns in brief a sentence)	Information on what BHP sees as a warning level for phosphorous.
5. BOUNDARIES (Spatial and Temporal)	
<u>Spatial</u> :	Agree with BHP's spatial boundary.
<u>Temporal</u> :	Agree with BHP's temporal boundary.
6. SUMMARY OF ISSUES (all issues related to the VEC)	Additional information is needed on what BHP sees as a threshold for phosphorous contamination in surface waters. As it is the view of BHP that phosphorous levels need to be controlled to prevent impacts on water quality downstream of any of it's developments, a monitoring program needs to be incorporated into it's mine plan. This would allow for a warning system for treatment in the event that phosphorous levels become to high. As more and more nitrates enter into the system, this form of early warning program may help to avoid future problems, as seen on Kodiak Lake.
7. SIGNIFICANCE DETERMINATION / CONCLUSION	Based on existing data from Kodiak Lake, a threshold for phosphorous should be able to be determined by BHP. This could be used by BHP, for determining when treatment for phosphorous will be needed for any additional discharge. This would greatly assist in ensuring that Lakes are not impacted by nitrates already introduced into the receiving water bodies.
8. RECOMMENDATIONS TO MVEIRB (Mitigation, monitoring, etc)	As the control of ortho-phosphorous levels (not nitrate levels) will be used by BHP to control algal levels in the lakes, a threshold should be set to identify when discharge should be stopped and treatment started. This level should be incorporated into the regulatory phase of the project. With the problems encountered on Kodiak Lake, BHP should have some understanding of what levels of ortho-phosphate would warrant the stopping of discharge and the initiation of treatment.

In addition, BHP has made the statement that the phosphorous present in the pit water is apatite. It is assumed that Total Phosphorous was the method of analysis for the determination of the amount of phosphorous present in the pit water. The digestion method for total phosphorous may not be sufficient to extract apatite phosphorous from the sample, and the phosphorous present in the samples from the pit water may not include apatite. BHP must determine if the source of this phosphorous is apatite. The phosphorous present in the pit water may only be bound through surface adsorption which may be reversible. If it is found that the phosphorous is not apatite, then appropriate treatment of the pit water should be determined during the regulatory review.

**With this mitigation, no significant impacts to surface water quality are anticipated.**



## DIAND - BHP Technical Review

### Number W-10

1. TOPIC (VEC affected)	Surface Water Quality and Quantity
2. TOR reference (section #)	373
3. Environmental Assessment. Report reference (section # - BHP's report)	Section: 2.2.3.3.3 - Page 2-38 "To Provide a Buffer Zone for ammonia concentrations, the rock storage piles will be set back a minimum of 100 m from fresh water bodies. In addition, where a pile is near a freshwater body, it ..."
4. ISSUES (describe the concerns in brief sentence)	BHP is proposing to construct perimeter berms in order to control seepage from waste rock piles into the receiving environment.
5. BOUNDARIES (Spatial and Temporal)	<u>Spatial</u> : Agree with BHP's spatial boundary. <u>Temporal</u> : Agree with BHP's temporal boundary.
6. SUMMARY OF ISSUES (all issues related to the VEC)	It is not clear how BHP will control seepage from waste rock piles into the receiving environment if water quality does not meet discharge criteria ( ie. pH, metals, TSS, Ammonia, Nitrates). If hot spots form in the waste rock piles impeding permafrost formation, proof must be given that ammonia, nitrate and TSS levels in seepage from the piles will meet licence criteria by the time it reaches the receiving environment.
7. SIGNIFICANCE DETERMINATION / CONCLUSION	Runoff from waste rock piles may not meet discharge criteria. If there is runoff from the waste rock piles, it will be difficult to control due to the topography of the area and will enter directly into the receiving environment.
8. RECOMMENDATIONS TO MVEIRB (Mitigation, monitoring, etc)	BHP has stated that placement of control berms has not/can not be identified until the problem of seepage from the Sable Pit Waste Rock Pile occurs. There is a high possibility of some seepage into Ulu and Horseshoe Lake. The impacts of this seepage should be reversible, however the impacts of this may also be considered to be negligible to minor under the definitions set by Table 4.2-5 of the EIS. This is due to the fact that runoff will occur during the first few years of construction, until permafrost begins to form in the waste rock pile. Runoff from the site may be difficult to identify as this will be mostly during freshet/snowmelt, with much of the runoff occurring under the snow pack.  A detailed mitigation plan is needed prior to site development with a source for dyke materials and likely areas of runoff identified in the plan. In addition, monitoring along the shores of Horseshoe and Ulu Lakes should be identified during the regulatory phase. Monitoring should be done for Nitrates, Nitrites, Ammonia, Metals, pH, Total Suspended Solids and Conductivity.

Discharge requirements for waste rock seepage should be set keeping CCME requirements for the protection of freshwater life in mind.

**With this mitigation, no significant impacts to surface water quality are anticipated.**

## DIAND - BHP Technical Review

Number W-11

1. TOPIC (VEC affected)	Surface Water Quantity and Quality
2. TOR reference (section #)	389
3. Environmental Assessment. Report reference (section # - BHP's report)	Section 5.2.2.7 - "Locating facilities away from water bodies and controlling drainage will prevent the introduction of any soil/sediments into nearby water bodies."
4. ISSUES (describe the concerns in brief sentence)	More information is needed on how runoff from surface facilities will be controlled and where it will be directed if treatment is necessary.
5. BOUNDARIES (Spatial and Temporal)	<u>Spatial</u> : Agree with BHP's spatial boundary. <u>Temporal</u> : Agree with BHP's temporal boundary.
6. SUMMARY OF ISSUES (all issues related to the VEC)	The company has not indicated how it will control and treat surface runoff from site facilities. From past problems at the main camp site, surface runoff was collected and pumped to Long Lake for treatment, as it did not meet discharge criteria.
7. SIGNIFICANCE DETERMINATION / CONCLUSION	Runoff from site facilities must be addressed, by providing detailed maps of the site facilities, and should show how runoff will be controlled at these sites.
8. RECOMMENDATIONS TO MVEIRB (Mitigation, monitoring, etc)	A detailed map of Sable Pit Site Facilities was not provided by BHP at this time. A map should be produced detailing the source of runoff, how runoff will be controlled and where it will be collected. A monitoring station should be located at the collection site during the regulatory phase of the project. This station should monitor for pH, Total Suspended Solids, Conductivity, Metals, Nitrates, Nitrites, Phosphates (both total and ortho), and Ammonia. Water quality levels should be set keeping in mind the CCME Guidelines for the Protection of Aquatic Life.

**With this mitigation, no significant impacts to surface water quality are anticipated.**

## DIAND - BHP Technical Review

Number: W-12

1. TOPIC (VEC affected) Surface Water Quality and Quantity

2. TOR reference (section #) 426-428, 432-437

3. Environmental Assessment. Report reference (section # - BHP's report)

Section 5.6.6.4 - " The pit will be partially infilled by temporarily directing the discharge of processed kimberlite from the plant into the pit over two summer seasons. The processed kimberlite ..."

4. ISSUES (describe the concerns in brief sentence)

Abandonment and Restoration Strategies of the Beartooth pit.

5. BOUNDARIES (Spatial and Temporal)

Spatial: Agree with BHP's spatial boundary.

Temporal: Agree with BHP's temporal boundary.

6. SUMMARY OF ISSUES (all issues related to the VEC)

With the "principle of no net loss" (Policy for the Management of Fish Habitat, DFO, 1986), in mind BHP should identify what contingency plans are 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.

7. SIGNIFICANCE DETERMINATION / CONCLUSION

A detailed contingency plan must be in place for the reclamation of Beartooth Pit, keeping in mind the principle of no net loss of fish habitat.

Problems which may occur with the reclamation of the Beartooth pit need to be addressed with a detailed plan which should include alternate methods, should problems arise.

8. RECOMMENDATIONS TO MVEIRB (Mitigation, monitoring, etc)

Kimberlite Toxicity for the Sable, Beartooth, and Pigeon Pit was not done. Toxicity testing on kimberlite from these pits should completed, prior to the filling of Beartooth Pit with fine kimberlite from the processing plant (ie fine tailings from the new pits). Although this issue was initially brought up during conformity, it will need to be revisited during the regulatory review. If toxicity testing is not done on kimberlite from the new pits, then information needs to be provided which proves toxicity of the kimberlite from the new pits is similar/falls between the characteristics of the kimberlite from the Fox and Panda Pits.

A contingency plan for the filling of Beartooth Pit is also required, in the event that water quality in the Beartooth pit makes the reclamation of the pit as fish habitat impossible. Should proper stratification of the lake not occur, or should water quality parameters in the reclaimed pit not be suitable for fish habitat, BHP should clearly identify what alternative reclamation methods can be utilized.

**With this mitigation, no significant impacts to surface water quality are anticipated.**

## DIAND - BHP Technical Review

Number: W-13

1. TOPIC (VEC affected)            Surface Water Quality and Quantity

2. TOR reference (section #) .    582-585

3. Environmental Assessment. Report reference (section # - BHP's report)

Section: 5.5.7.1 Page: 5-24

“Various retention dams, dykes, diversion berms and diversion stream will be constructed to control water flows at Sable, Pigeon and Beartooth. After pit operations have ceased, dams at Sable and Beartooth will be breached...”

4. ISSUES (describe the concerns in brief sentence)

Water quality needs to be protected when Dams and Dykes are breached at closure.

5. BOUNDARIES (Spatial and Temporal)

Spatial: Agree with BHP's spatial boundary.

Temporal: Agree with BHP's temporal boundary.

6. SUMMARY OF ISSUES (all issues related to the VEC)

Clarification is needed in the abandonment and restoration plan on how water quality will be maintained after dams and dykes have been breached.

7. SIGNIFICANCE DETERMINATION / CONCLUSION

If dams and dykes are not breached correctly during abandonment and restoration, water may be discharged which does not meet water quality criteria (ie. pH, TSS, phosphorous, metals, ammonia, nitrates).

8. RECOMMENDATIONS TO MVEIRB (Mitigation, monitoring, etc)

The response given by BHP needs to be incorporated into the licence during the regulatory phase, to ensure that these breaching methods are followed. Monitoring of the water quality during and after the breaching of the dykes should be done to ensure that discharge criteria are maintained.

**With this mitigation, no significant impacts to surface water quality are anticipated.**

# DIAND - BHP Technical Review

## Number W-14

1. TOPIC (VEC affected) Surface Water Quantity and Quality

2. TOR reference (section #) 394 - 395

3. Environmental Assessment. Report reference (section # - BHP's report)

Section: 4.5.1.2 Page: 4-71

"It is expected that the quality of pit water from Sable, Pigeon, and Beartooth pits will be similar to the water quality that has been observed in the existing Panda Pit. Elevated concentrations..."

4. ISSUES (describe the concerns in brief sentence)

Clarification on the ability of filtration dykes in Two Rock Lake to treat Sable pit water.

5. BOUNDARIES (Spatial and Temporal)

Spatial: Agree with BHP's spatial boundary.

Temporal: Agree with BHP's temporal boundary.

6. SUMMARY OF ISSUES (all issues related to the VEC)

Additional information is needed on why a filtration dyke system will address all water quality issues for Sable Pit water, but a land treatment system is proposed for Fox Pit water. The same Panda pit water data was used in the assessment of both sites. BHP should consider if a filtration dyke system for Sable pit water will adequately address conductivity levels in excess of 8080  $\mu\text{S}/\text{cm}$  and ammonia levels of 202 ppm. These values are based on water samples taken from Panda Pit water on April 9, 2000, and exceed the CCME guideline for the protection of freshwater aquatic life for ammonia (2.2 ppm).

It is unclear how a filtration dyke system will work at Sable Pit if the only viable alternative to land treatment at the Fox site is a water treatment plant. BHP must clarify what the dilution factors are expected to be at Two Rock Lake for the pit water introduced, and if this dilution factor will degrade with each year of discharge. There is concern that discharge from the second cell of Two Rock Lake may not meet discharge criteria, during the final years of production at Sable Pit.

7. SIGNIFICANCE DETERMINATION / CONCLUSION

Water Quality issues may arise with respect to discharge from Two Rock Lake. As contaminants from the Sable pit water which will not be filtered by the dyke system become more concentrated, treatment may become necessary.

8. RECOMMENDATIONS TO MVEIRB (Mitigation, monitoring, etc)

A monitoring site should be located in Cell 2 of Two Rock Lake. Monitoring should be done for pH, Total Suspended Solids, Conductivity, Metals, Nitrates, Nitrites, Phosphates (both total and ortho), and Ammonia. Water quality levels should be set keeping in mind the CCME guidelines for the protection of Aquatic Life.

**With this mitigation, no significant impacts to surface water quality are anticipated.**

Number L-07

1. **TOPIC (VEC affected)**  
Land - Physical Environment
2. **TOR reference (section #) .**  
Section 3.1.2 Description of the Existing Environment  
Lines 250 & 251
3. **Environmental Assmt. Report reference (section # - BHP's report)**  
Section 3.9.1.6, 3.9.1.7., 3.9.2.7., 3.9.3.7., 3.9.4.7.
4. **ISSUES (describe the concerns in brief sentence)**  
Assess existing infrastructure and government revenues, cost for impacts to Crown land from the project.
5. **BOUNDARIES (Spatial and Temporal)**  
Spatial/Temporal: "Do you agree with the spatial and temporal boundaries set by BHP are adequate? If not, what would be appropriate and why?"  
Yes.
6. **SUMMARY OF ISSUES (all issues related to the VEC)**  
Use of existing infrastructure and revenues, costs will essentially remain the same for the current Ekati™ mine and other Territorial infrastructure utilized in this operations.
7. **SIGNIFICANCE DETERMINATION / CONCLUSION**  
negligible
8. **RECOMMENDATIONS TO MVEIRB (Mitigation, monitoring, etc)**

Number L-08

1. **TOPIC (VEC affected)**  
Land - Physical Environment
2. **TOR reference (section #)** .  
Section 3.1.3 Spatial Boundaries  
Lines 254 to 257
3. **Environmental Assmt. Report reference (section # - BHP's report)**  
Section 4.2.1.3 & 4.9.5
4. **ISSUES (describe the concerns in brief sentence)**  
Determine whether the spatial boundaries include all aspects of the proposed development and its impacts.
5. **BOUNDARIES (Spatial and Temporal)**  
Spatial/Temporal: "Do you agree with the spatial and temporal boundaries set by BHP are adequate? If not, what would be appropriate and why?"  
Yes
6. **SUMMARY OF ISSUES (all issues related to the VEC)**  
The spatial boundaries include all lands utilized in the proposed development.
7. **SIGNIFICANCE DETERMINATION / CONCLUSION**  
negligible
8. **RECOMMENDATIONS TO MVEIRB (Mitigation, monitoring, etc)**



Number L-09

**1. TOPIC (VEC affected)**

Land - Physical Environment

**2. TOR reference (section #) .**

Section 3.1.4 Temporal Boundaries  
Lines 258, 259 to 297

**3. Environmental Assmt. Report reference (section # - BHP's report)**

Section 4.2.2, 4.9.5

**4. ISSUES (describe the concerns in brief sentence)**

Assess the temporal boundaries of the development in relation to Land management principles and policies, including Abandonment and Restoration issues and risks.

**5. BOUNDARIES (Spatial and Temporal)**

Spatial/Temporal: "Do you agree with the spatial and temporal boundaries set by BHP are adequate? If not, what would be appropriate and why?"

Yes.

**6. SUMMARY OF ISSUES (all issues related to the VEC)**

All development activities, with the exception of the flooding, replacement of fish habitat and site decommissioning of the Sable pit will occur within current lease time frames for the main Ekati™ mine site lease. The Pigeon pipe would be a separate lease, for a term reflective of the direct land activity, which is currently identified as 10 yrs.

The use of the Sable road and Sable Pipe area will be based upon the development/ mining (10 yrs.) and A&R period (< 25 yrs) activities.

Reference L-14 for further information on A&R issues.

**7. SIGNIFICANCE DETERMINATION / CONCLUSION**

negligible

**8. RECOMMENDATIONS TO MVEIRB (Mitigation, monitoring, etc)**

Number L-10

1. **TOPIC (VEC affected)**  
Land - Physical Environment
2. **TOR reference (section #)** .  
Section 3.1.7 Land Use  
Lines 294, 295 to 297, 298, 301, 302, 303, 304, 305, 306, 307
3. **Environmental Assmt. Report reference (section # - BHP's report)**  
Section 3.1.7  
IR response for recreational use
4. **ISSUES (describe the concerns in brief sentence)**  
Identify if the proposed development has the potential to conflict with other uses of the land, whether directly or indirectly.
5. **BOUNDARIES (Spatial and Temporal)**  
Spatial/Temporal: "Do you agree with the spatial and temporal boundaries set by BHP are adequate? If not, what would be appropriate and why?"  
Yes.
6. **SUMMARY OF ISSUES (all issues related to the VEC)**  
There are no crown land leases directly impacted by the proposed development and use of this area by the public for recreation and traditional use is minimal. There are a number of commercial tourism operations in the vicinity, however, none are directly impacted by the Development. Winter road facilities from Tibbet Lake to the mine site are existing and usage amounts will be under what has previously been assessed and approved.
7. **SIGNIFICANCE DETERMINATION / CONCLUSION**  
negligible
8. **RECOMMENDATIONS TO MVEIRB (Mitigation, monitoring, etc)**

Number L-11

<p>1. <b>TOPIC (VEC affected)</b> Land - Physical Environment</p> <p>2. <b>TOR reference (section #)</b> . Section 3.2.2 Terrain Line 335</p> <p>3. <b>Environmental Assmt. Report reference (section # - BHP's report)</b> Section 2.3.4.</p> <p>4. <b>ISSUES (describe the concerns in brief sentence)</b> Assess alternatives to the disposal of waste rock by backfilling mined out pits.</p> <p>5. <b>BOUNDARIES (Spatial and Temporal)</b> Spatial/Temporal: "Do you agree with the spatial and temporal boundaries set by BHP are adequate? If not, what would be appropriate and why?" Yes.</p> <p>6. <b>SUMMARY OF ISSUES (all issues related to the VEC)</b> Along with the change in the mine plan for Ekati™, the proposed development provides new opportunities for the use of mined out open pits to dispose of waste rock and/or processed kimberlite. Where opportunity exists, the disposal of waste rock into mined out pits is preferred from a land management perspective.</p> <p>Section 2.3.4. of the EAR details BHP's examination of this option, and confirms the proposed use of the Beartooth pit for the disposal of processed kimberlite. However, the use of the Beartooth pit and the Koala North test pit for the disposal of waste rock from underground and surface operations in the vicinity has not been explored. For example, for approximately a 1.5 yr period (starting in 2008) during the mining of Koala pipe, the Beartooth pit will be available for the disposal of waste rock.</p> <p>7. <b>SIGNIFICANCE DETERMINATION / CONCLUSION</b> Minor</p> <p>8. <b>RECOMMENDATIONS TO MVEIRB (Mitigation, monitoring, etc)</b> Opportunities to use mined out pits for the disposal of waste rock as well as processed kimberlite should be monitored continually and actively researched during changes to the overall mine plan with the appropriate changes being made to the Waste Rock and Ore Management Plan and the Wastewater and Processed Kimberlite management Plan.</p>
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Number L-12

1. **TOPIC (VEC affected)**  
Land - Physical Environment
2. **TOR reference (section #) .**  
Section 3.2.6 Wildlife and Wildlife habitat  
Line 452
3. **Environmental Assmt. Report reference (section # - BHP's report)**  
Section 4.6.1.1. to 4.6.1.3.
4. **ISSUES (describe the concerns in brief sentence)**  
Assess the implications of the operational and final condition of Crown land in relationship to barriers to wildlife vis a vis Crown land management principles and policies.
5. **BOUNDARIES (Spatial and Temporal)**  
Spatial/Temporal: "Do you agree with the spatial and temporal boundaries set by BHP are adequate? If not, what would be appropriate and why?"  
Yes.
6. **SUMMARY OF ISSUES (all issues related to the VEC)**  
Development, construction and final A&R activities shall ensure the safety of wildlife, the protection of wildlife habitat and the minimization of impact to the land environment where ever possible. Upon final reclamation activities, the condition of the land shall not present any barriers to wildlife use.
7. **SIGNIFICANCE DETERMINATION / CONCLUSION**  
negligible
8. **RECOMMENDATIONS TO MVEIRB (Mitigation, monitoring, etc)**  
On going monitoring of impacts to wildlife and wildlife habitat needs to continue and be implemented for the new development. Use of this information would be utilized in determining the details of final A&R activities.

Number L-13

**1. TOPIC (VEC affected)**

Land - Physical Environment

**2. TOR reference (section #) .**

Section 3.3.2 Land and Resource use  
Lines 473 to 474, 476 and 477

**3. Environmental Assmt. Report reference (section # - BHP's report)**

Section 3.8.8., 4.7.9., 4.9.6.2.  
IR response from BHP on recreational use

**4. ISSUES (describe the concerns in brief sentence)**

Assess the impacts of the proposed development on other land users/uses.

**5. BOUNDARIES (Spatial and Temporal)**

Spatial/Temporal: "Do you agree with the spatial and temporal boundaries set by BHP are adequate? If not, what would be appropriate and why?"

Yes.

**6. SUMMARY OF ISSUES (all issues related to the VEC)**

Reference Technical Analysis sheet L10  
The impacts appear to be minimal, given the remoteness of the area, low number of other land users and none directly impacted by the proposed development.

**7. SIGNIFICANCE DETERMINATION / CONCLUSION**

Negligible

**8. RECOMMENDATIONS TO MVEIRB (Mitigation, monitoring, etc)**

Number L-14

**1. TOPIC (VEC affected)**

Land - Physical Environment

**2. TOR reference (section #) .**

Section 3.3.5 Government  
Lines 515 to 520

**3. Environmental Assmt. Report reference (section # - BHP's report)**

Section 2.1.1.4., 4.7.4  
IR dated July 24/00 by Buddy Williams  
IR response dated August, 2000 from BHP

**4. ISSUES (describe the concerns in brief sentence)**

Based upon the risk factor at various stages of the project, assess the impact of the proposed development on security deposits requirements, Abandonment and restoration costs.

Assess the proposed quarry operation in relation to quarry royalties for Crown land. [By way of BHP's August IR response, BHP has withdrawn its intention to use the Ursula esker. ]

**5. BOUNDARIES (Spatial and Temporal)**

Spatial/Temporal: "Do you agree with the spatial and temporal boundaries set by BHP are adequate? If not, what would be appropriate and why?"

Yes.

**6. SUMMARY OF ISSUES (all issues related to the VEC)**

The proposed development will require an assessment of Abandonment and restoration costs for the Pigeon and Sable Pipes along with the access infrastructure. In conjunction with this assessment, the change in mine plan and the addition of an additional pipe to the existing Ekati™ mine, the A&R costs must be re-evaluated for an actual A&R figure for the entire mine area and operation, along with security deposit scheduling and amounts.

Use of land for the Pigeon and Sable pipes, Sable Road and any other infrastructure (ie. Pipelines) requiring long term tenure will be subject to the fees, as prescribed in the Territorial Land Regulations or the Federal Real Property Regulations. These fees will be determined through the preparation of the appropriate tenure documentation.

**7. SIGNIFICANCE DETERMINATION / CONCLUSION**

negligible

**8. RECOMMENDATIONS TO MVEIRB (Mitigation, monitoring, etc)**

Fees, costs and A&R requirements for Crown Land will be determined through lease issuance and other related regulatory documentation. (ie. Amendment to the Environment Agreement and subsequent operating plans).

Number L-15

**1. TOPIC (VEC affected)**

Land - Physical Environment

**2. TOR reference (section #) .**

Section 3.5 Cumulative Impact  
Lines 554 to 555, 559 to 561

**3. Environmental Assmt. Report reference (section # - BHP's report)**

Section 3.5

**4. ISSUES (describe the concerns in brief sentence)**

What is the combined effect on the land from the proposed project, when included with other land uses.

**5. BOUNDARIES (Spatial and Temporal)**

Spatial/Temporal: "Do you agree with the spatial and temporal boundaries set by BHP are adequate? If not, what would be appropriate and why?"

Yes

**6. SUMMARY OF ISSUES (all issues related to the VEC)**

While the proposed development is an actual increase in mine area, operational activities are decreased from the 1996 permitted use (removal of Leslie from the mine plan). Production rates are stated not to increase, as a result of the proposed development. This will mean the impacts to other land uses (ie. Lupin winter road) from the proposed development will remain fairly constant to existing levels.

**7. SIGNIFICANCE DETERMINATION / CONCLUSION**

negligible

**8. RECOMMENDATIONS TO MVEIRB (Mitigation, monitoring, etc)**



Number L-16

1. **TOPIC (VEC affected)**  
Land - Physical Environment
2. **TOR reference (section #)** .  
Section 3.6 Abandonment and Restoration  
Lines 578 to 582, 585 to 586
3. **Environmental Assmt. Report reference (section # - BHP's report)**  
Section 3.6
4. **ISSUES (describe the concerns in brief sentence)**  
Verify BHP is aware of all Crown regulations with respect to final closure and abandonment and reclamation requirements and assess the final condition of the site upon the completion of this work.
5. **BOUNDARIES (Spatial and Temporal)**  
Spatial/Temporal: "Do you agree with the spatial and temporal boundaries set by BHP are adequate? If not, what would be appropriate and why?"  
Yes
6. **SUMMARY OF ISSUES (all issues related to the VEC)**  
All appropriate Crown land regulations and abandonment/restoration requirements contained in the existing authorizations for the Ekati™ mine (ie. Environmental Agreement) have been identified. A description of the area upon closure has been assessed and found adequate from a land management perspective. Current documentation for the mine operation provides for periodic reviews and updates of the A&R requirements based upon changes to the mine operation, new technology and A&R standards.
7. **SIGNIFICANCE DETERMINATION / CONCLUSION**  
minor with mitigation measures
8. **RECOMMENDATIONS TO MVEIRB (Mitigation, monitoring, etc)**  
Continuation of monitoring and reviews of Abandonment and restoration issues and requirements under the Environmental Agreement and other regulatory instruments is required.

Number L-01

1. **TOPIC (VEC affected)**  
Land - Physical Environment
2. **TOR reference (section #)** .  
Section 2.5 Existing Ekati™ Diamond Mine  
Lines 138 to 142
3. **Environmental Assmt. Report reference (section # - BHP's report)**  
Section 2.5
4. **ISSUES (describe the concerns in a brief sentence)**  
Evaluate any changes to the lease and land management structure of the existing Ekati™ development as a result of the proposed Beartooth, Pigeon and Sable project.
5. **BOUNDARIES (Spatial and Temporal)**  
Spatial/Temporal: "Do you agree with the spatial and temporal boundaries set by BHP are adequate? If not, what would be appropriate and why?"  
Yes
6. **SUMMARY OF ISSUES (all issues related to the VEC)**  
Based upon information provided by BHP in the Project Description, Environmental Assessment Report and mine plan, the development will not result in a measurable increase to current approved operations within the land leases for the Ekati™ mine. This is due largely to the tradeoff in effects from the removal of the Leslie Pipe from the mine.
7. **SIGNIFICANCE DETERMINATION / CONCLUSION**  
negligible
8. **RECOMMENDATIONS TO MVEIRB (Mitigation, monitoring, etc)**  
Maintain the ongoing monitoring and the review/updating of the operating plans as required pursuant to the Environmental Agreement.

Number L-02

**1. TOPIC (VEC affected)**

Land - Physical Environment

**2. TOR reference (section #) .**

Section 2.6.1 Development Sequence  
Lines 146 to 152

**3. Environmental Assmt. Report reference (section # - BHP's report)**

Section 2.6.1  
BHP IR response to exploration activities

**4. ISSUES (describe the concerns in brief sentence)**

Assess the impact of exploration activities and changes to the mine plan in relation to the new development.

**5. BOUNDARIES (Spatial and Temporal)**

Spatial/Temporal: "Do you agree with the spatial and temporal boundaries set by BHP are adequate? If not, what would be appropriate and why?"

Yes.

**6. SUMMARY OF ISSUES (all issues related to the VEC)**

An approval for the use and development of the Pigeon and Sable pipes, Sable access road, and pipeline facilities would be for the land use activities directly required for the purpose of developing, mining and the reclamation of these pipes. Construction of additional facilities or the use of this land for purposes other than the development, mining and reclamation of Sable and Pigeon pits (ie. Storage of material, fuel, equipment, accommodations, etc) would only be allowed where the Ekati™ mine does not have or cannot provide similar facilities or services. The incidental use of these two sites subject to review.

**7. SIGNIFICANCE DETERMINATION / CONCLUSION**

minor

**8. RECOMMENDATIONS TO MVEIRB (Mitigation, monitoring, etc)**

Effects and impacts from this development and possible future developments beyond the already approved Ekati™ mine operation, can be minimized by restricting land use operations to those activities directly required to conduct the land use activity, as put forward and defined in the EAR. This will facilitate the rehabilitation of the site, allowing progressive reclamation to start as soon as the land is no longer required for Sable or Pigeon mining purposes.

Number L-03

<p>1. <b>TOPIC (VEC affected)</b> Land - Physical Environment</p> <p>2. <b>TOR reference (section #) .</b> Section 2.6.2 Hazardous Materials Lines 153 to 155</p> <p>3. <b>Environmental Assmt. Report reference (section # - BHP's report)</b> Section 2.6.2</p> <p>4. <b>ISSUES (describe the concerns in brief sentence)</b> Review the location and assess any impacts of areas utilized for hazardous materials.</p> <p>5. <b>BOUNDARIES (Spatial and Temporal)</b> Spatial/Temporal: "Do you agree with the spatial and temporal boundaries set by BHP are adequate? If not, what would be appropriate and why?" Yes</p> <p>6. <b>SUMMARY OF ISSUES (all issues related to the VEC)</b> Existing facilities will be utilized for hazardous materials, with the exception of a maintenance building to be constructed at the Sable site. Hazardous material generated at this building will be removed to the Waste management building according to the Waste Management Plan. Other than the new building, which is within the proposed Sable lease boundary, no additional areas of land are required.</p> <p>7. <b>SIGNIFICANCE DETERMINATION / CONCLUSION</b> negligible</p> <p>8. <b>RECOMMENDATIONS TO MVEIRB (Mitigation, monitoring, etc)</b> The continued monitoring and updating of operating plans, including the Waste Management Plan, pursuant to the Environmental Agreement is required.</p>
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Number L-04

1. **TOPIC (VEC affected)**  
Land - Physical Environment
2. **TOR reference (section #)** .  
Section 2.6.3 Accidents and Malfunctions  
Line 166
3. **Environmental Assmt. Report reference (section # - BHP's report)**  
Section 2.6.3
4. **ISSUES (describe the concerns in brief sentence)**  
Assess implications to Crown land from failures and accidents of various components of the development.
5. **BOUNDARIES (Spatial and Temporal)**  
Spatial/Temporal: "Do you agree with the spatial and temporal boundaries set by BHP are adequate? If not, what would be appropriate and why?"  
Yes
6. **SUMMARY OF ISSUES (all issues related to the VEC)**  
Tailings containment areas, sewage facilities are all located on existing leases that have been approved and have ongoing monitoring and management plans in place.  
  
The development of the Pigeon and Sable pipes will be constructed, such that shut-downs of any length will not generate safety or environmental concerns from a land management perspective. For example, waste rock and overburden storage areas will be constructed to maintain long term stability.
7. **SIGNIFICANCE DETERMINATION / CONCLUSION**  
negligible
8. **RECOMMENDATIONS TO MVEIRB (Mitigation, monitoring, etc)**  
All aspects and phases of the development undertaken, should minimize maintenance and future work required to ensure the integrity and safety of the development.

Number L-05

**1. TOPIC (VEC affected)**

Land - Physical Environment

**2. TOR reference (section #) .**

Section 2.6.4 closure and Reclamation  
Lines 178, 179, 181, 184 to 188

**3. Environmental Assmt. Report reference (section # - BHP's report)**

Section 2.6.4  
IR response from BHP on A&R costs

**4. ISSUES (describe the concerns in brief sentence)**

Assess the proposed reclamation activities in relation to Crown Land Management principles and policies.

**5. BOUNDARIES (Spatial and Temporal)**

Spatial/Temporal: "Do you agree with the spatial and temporal boundaries set by BHP are adequate? If not, what would be appropriate and why?"

Yes.

**6. SUMMARY OF ISSUES (all issues related to the VEC)**

The A&R activities include the construction of water pipelines and associated infrastructure to aid in the infilling of the mined out open pits. The duration and proposed construction of these facilities will necessitate application for the appropriate land tenure instruments by BHP.

Upon completion of the active mining (extraction of kimberlite ore) of the Pigeon and Sable kimberlite pipes, to facilitate progressive and successful A&R work, use of the area would be limited to activities directly related to the ongoing and ultimate rehabilitation of the area.

An IR was made and a response was received from BHP for further information on A&R costs, including the factoring of salvageable material and equipment and the use of waste rock piles and open pits for the disposal of equipment and material no longer required. In its response, BHP describes the processes currently in place for the review of A&R costs vis a vis security deposits and regulatory instruments.

They have also stated "...BHP recognizes that this information is required for the regulatory phase of permitting the development, and is committed to furnishing further information, if required and when appropriate, upon completion of the environmental assessment phase."

They go on to state "... Based on the Water Licence and the Environmental Agreement, the cost of reclamation is updated on a regular basis thereby addressing the concerns expressed above. The Environmental Agreement provides the framework for considering a review of the security deposit. The review will consider the current scope of development and the progress that has been made with regard to ongoing reclamation. Based on the bi-annual review, the Environmental Agreement security deposit may be adjusted. We fully anticipate including the cost of reclamation of Sable, Pigeon and Beartooth calculations once they are being mined.

Before land tenure documents can be issued for the Pigeon and Sable Pipe development, an assessment of A&R activities and costs (preferably engineered approved) is required. In preparing the assessment, the disposal of materials and/or equipment or other misc. items utilized in the mining of the proposed development in waste rock piles or open pits options shall not be considered.

**7. SIGNIFICANCE DETERMINATION / CONCLUSION**

negligible

**8. RECOMMENDATIONS TO MVEIRB (Mitigation, monitoring, etc)**

As a result of this development and changes to the mine plan (expansion of 3 pipes and the removal of the Leslie Pipe), the existing operating plans (Abandonment and restoration plans, ongoing restoration) should be reviewed for changes prior to the issuance of land documentation, to ensure the impact of the noted changes and development are properly reflected in the regulatory instruments prior to project commencement.

These changes to the mine plan as a result of new developments should be assessed at the time of their review and approval and not left to the next scheduled review (ie. bi-annual review)

Number L-06

**1. TOPIC (VEC affected)**

Land - Physical Environment

**2. TOR reference (section #) .**

Section 3.1.1 Alternatives  
Lines 219 to 225

**3. Environmental Assmt. Report reference (section # - BHP's report)**

Sections 2.3.1. to 2.3.4  
BHP IR response to Ursula quarry  
BHP IR response to Winter road Alternatives

**4. ISSUES (describe the concerns in brief sentence)**

Assess the use of alternatives for carrying out the proposed development in relation to land management principles and policies.

**5. BOUNDARIES (Spatial and Temporal)**

Spatial/Temporal: "Do you agree with the spatial and temporal boundaries set by BHP are adequate? If not, what would be appropriate and why?"

Yes.

**6. SUMMARY OF ISSUES (all issues related to the VEC)**

Several alternatives are presented for various facets of the proposed development:

- use of open pits for disposal of waste rock and processed kimberlite
- all season road versus winter road for Sable Pipe development;

Technical analysis sheet L-011 provides information on alternatives for disposal of processed kimberlite and waste rock.

BHP's IR response, while providing information on a "winter ice road", does not offer a comparison to a "winter land road" option.

However, any increase in the Sable land use area must be factored against the impact of a winter access road, as seasonal operation would likely result in an increase to the overall size of the Sable 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 impact 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 impact would appear to be minimized with an all season road.



**7. SIGNIFICANCE DETERMINATION / CONCLUSION**

negligible

**8. RECOMMENDATIONS TO MVEIRB (Mitigation, monitoring, etc)**

All traffic use of the Sable access road from the Pigeon Lease area, north to the Sable site should be monitored to ensure it meets the projected traffic uses and volumes as stated in the EAR. Traffic uses should be limited to that as described in the EAR.

**interoffice**  
**MEMORANDUM**

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**DATE:** August 29<sup>th</sup>, 2000

**TO:** Elaine McIvor  
Environmental Scientist  
Environment and Conversation

**FROM:** Annette McRobert  
Manager,  
Land Administration, Operations

**SUBJECT:** BHP's Beartooth, Pigeon and Sable Project Technical Review

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I am pleased to attach the final version of Land Administrations technical analysis for inclusion into the Departmental response to the Mackenzie Valley Environmental Impact Review Board's Environmental Assessment of the BHP's proposed expansion.

We have noted BHP's withdrawal of its intention to quarry the Ursula Esker, and have subsequently amended our technical review to no longer provide an assessment of its use. Should the Board determine otherwise, we would request the opportunity to change our tech. analysis package according.

In summation, the impact of the proposed development is felt to be generally negligible from a Land Management perspective. Where land management issues or requirements may exist, we will request they be resolved through the regulatory phase of this project review, prior to the issuance of land documentation.

Please contact, Buddy Williams, Land Specialist should you have any questions or comments on our package.



Annette McRobert

Manager,  
Land Administration

williams/bw

Number L-17

1. **TOPIC (VEC affected)**  
Land - Physical Environment
2. **TOR reference (section #)** .  
Section 4.3 Tenure  
Lines 645 to 646
3. **Environmental Assmt. Report reference (section # - BHP's report)**  
Section 2.1.1.3  
IR response by BHP on reclamation  
BHP IR August response
4. **ISSUES (describe the concerns in brief sentence)**  
Assess the proposed development in relationship to actual Crown land and tenure requirements.
5. **BOUNDARIES (Spatial and Temporal)**  
Spatial/Temporal: "Do you agree with the spatial and temporal boundaries set by BHP are adequate? If not, what would be appropriate and why?"  
Yes.
6. **SUMMARY OF ISSUES (all issues related to the VEC)**  

The mining of Beartooth pipe is authorized under the Koala Area Mining lease, number 76 D/10-2-2. The development of both the Pigeon pipe and Sable pipe would be under individual surface leases. The road from the Koala area Mining Lease would be under its own land tenure instrument.

The proposed development for the Pigeon Pipe will include a portion of the Tailings Disposal Facility Lease No. 76 D/10-3-2 for the waste rock storage area. Lease number 76 D/10-3-2 will be amended to exclude that area now required for the mining of Pigeon.

Abandonment and reclamation activities will include the need for land to locate a pipeline and access road for the purposes of infilling the mined out Pigeon and Sable pits. The duration and type of proposed development would necessitate the issuance of land tenure specifically for this use.

Development of the Pigeon and Sable Pipe, Sable road, Pipeline will require a land use permit under the Mackenzie Valley Land And Water Regulations.
7. **SIGNIFICANCE DETERMINATION / CONCLUSION**  
negligible
8. **RECOMMENDATIONS TO MVEIRB (Mitigation, monitoring, etc)**

Number L-18

1. **TOPIC (VEC affected)**  
Land - Physical Environment
2. **TOR reference (section #) .**  
Section 4.4 Developer's Policies  
Line 653
3. **Environmental Assmt. Report reference (section # - BHP's report)**  
Section 4.4
4. **ISSUES (describe the concerns in brief sentence)**  
Assess the Developer's policies with Crown Land management principles and policies.
5. **BOUNDARIES (Spatial and Temporal)**  
Spatial/Temporal: "Do you agree with the spatial and temporal boundaries set by BHP are adequate? If not, what would be appropriate and why?"  
Yes
6. **SUMMARY OF ISSUES (all issues related to the VEC)**  
The policies and guiding principles of the developer are consistent with accepted Crown land management practices.
7. **SIGNIFICANCE DETERMINATION / CONCLUSION**  
  
Negligible
8. **RECOMMENDATIONS TO MVEIRB (Mitigation, monitoring, etc)**

Number L-19

<p>1. <b>TOPIC (VEC affected)</b> Land - Physical Environment</p> <p>2. <b>TOR reference (section #)</b> . Section 4.5 Regulatory Regime Line 662 to 666</p> <p>3. <b>Environmental Assmt. Report reference (section # - BHP's report)</b> Section 2.1.1.2., 2.1.1.3.</p> <p>4. <b>ISSUES (describe the concerns in brief sentence)</b> Review existing and proposed authorizations in relation to actual Crown land requirements for the project</p> <p>5. <b>BOUNDARIES (Spatial and Temporal)</b> Spatial/Temporal: "Do you agree with the spatial and temporal boundaries set by BHP are adequate? If not, what would be appropriate and why?" Yes.</p> <p>6. <b>SUMMARY OF ISSUES (all issues related to the VEC)</b> also see L-017 technical analysis sheet  Development of the Pigeon pipe will encroach within NWT Lease No. 76 D/10-3-2 which is for Tailings Disposal and associated facilities only. An amendment to NWT Lease No. 76 D/10-3-2 to exclude that portion of the leased land is required before the mining of Pigeon pipe can occur.</p> <p>7. <b>SIGNIFICANCE DETERMINATION / CONCLUSION</b> negligible</p> <p>8. <b>RECOMMENDATIONS TO MVEIRB (Mitigation, monitoring, etc)</b></p>
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Number L-20

**1. TOPIC (VEC affected)**

Land - Physical Environment

**2. TOR reference (section #) .**

Section 2.2 IV and 2.4 II

**3. Environmental Assmt. Report reference (section # - BHP's report)**

IR response by BHP to Conformity Issue by the MVEIRB

IR dated July 24/00 by Buddy Williams

IR response dated August, 2000 from BHP

**4. ISSUES (describe the concerns in brief sentence)**

Assess the use of the Ursula esker for quarrying purposes

**5. BOUNDARIES (Spatial and Temporal)**

Spatial/Temporal: "Do you agree with the spatial and temporal boundaries set by BHP are adequate? If not, what would be appropriate and why?"

Yes

**6. SUMMARY OF ISSUES (all issues related to the VEC)**

By way of BHP's latest IR response, they have withdrawn their intention to use the Ursula Quarry location. Future use of this esker or any new eskers that would be developed, must undergo a preliminary screening.

**7. SIGNIFICANCE DETERMINATION / CONCLUSION**

negligible

**8. RECOMMENDATIONS TO MVEIRB (Mitigation, monitoring, etc)**

Should development of any new quarry(ies) in eskers be planned, they must be thoroughly thought out and planned to maximize the resource potential (long and short term) while minimizing impacts. This process should not be done in isolation of other activities of the mine, but should factor in the overall mine operation for the present and the future. Yes, the future is largely unknown, however, the development and disturbance of a quarry in an esker should be lessened to the greatest extent possible.