



September 25, 2000.

Sable - Pigeon - Beartooth Pipe Development (BHP)
Yellowknives Dene Comments on the Proposal

This paper summarizes 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 (Beartooth - Pigeon - Sable pits). The sentences highlighted in **bold** express our concerns.

A. Climate Change Effects:

1. It has been reported that global warming so far has had the greatest effect on the Northwest Territories and the prairie provinces. The Mackenzie District climatic region, which contains the BHP and DIAVIK mining areas, has experienced the greatest warming trend in all of Canada over the last 50 years (+1.1°C.). Nationally, 7 of the 10 warmest & 8 of the 10 wettest summers on record have occurred in the last 20 years. (EA -p.3-4)

Has BHP done any computer modeling to project this warming trend over the next 50 years so that potential impacts on permafrost barriers, frozen-core dams and waste rock ice caps can be evaluated?

2. Further to #1 above: what is the "substantial time lag" (EA -p.4-64) between a warming trend of the air and the warming response of the ground?

This is important to understand as it has a bearing upon the stability of frozen-core structures for their entire operating life.

3. "Some local effects [of frost heave] may occur on the surface; however, design and construction practice will ensure there is no risk to structures." (EA -p.4-65)

Could BHP elaborate on what these design/construction measures are?

B. Water Balance:

1. Sable is the only pit to be mined below the lowest depth of permafrost. This means that it is most likely to affect the groundwater under the permafrost, which could result in lowering the water level of nearby lakes. BHP believes that this won't affect water levels significantly if at all because of low permeability of the granite and long seepage pathways. (EA -p.4.46)

BHP should test these assumption with hydrogeological baseline studies and also determine which nearby lakes/ponds would likely be affected.

2. The upper reaches of a runoff stream feeding Bearclaw Lake will be knocked out by the expansion of the Panda waste rock storage dump.

How will this affect the water balance of that lake ?

C. Fish/Water Quality:

1. Pigeon waste rock "may possess some potential to generate acidic... runoff", according to the Project Description report. (P. 4-12) This is the only one of the 3 new pits that has acid-producing granite rock. But according to the EA, Pigeon waste rock is inert to acid-consuming & therefore no acid production is expected.

.Kinetic testing is still needed to determine the net acid-generating/acid-consuming potential of all waste rock piles. (EA-p.2-31) We would like to see this testing doen and the results presented to the Water Board.

2. BHP states that the potential for metal-leaching has not been addressed in their EAR, but will be in the next pit design (EA p. 2-35). BHP does not expect metal leaching problems at Pigeon due to no net acid production from the waste rock (EA - p.4-75)

But it is our contention that metal contamination at this site should still be assessed in the event, however unlikely BHP believes it to be, that acid production proves to be greater than the preliminary waste-rock testing indicates. This would be in keeping with a reliance on a conservative approach to environmental protection, based on consideration of worst-case scenarios when planning for predicted effects.

3. High aluminum levels in the Koala watershed lakes have been attributed to aluminum-silicates in the kimberlite being released into the water during exploratory drilling. (EA - p.3-44, 3-48) **Will the Two Rock Lake sedimentation & polishing ponds be effective at removing particulate kimberlite in pitwater at the Sable pit?**

4. BHP expects there to be nitrogen loading (mostly in the form of nitrates in pitwater) from Two Rock Lake into downstream water bodies. They say it won't be noticeable by the time that water gets to Exeter Lake. BHP states that there will be no biological effect from higher nitrogen levels in the Horseshoe watershed, citing as evidence Leslie Lake, below the Long Lake Containment Facility. In late summer of 1998, it had high nitrogen levels but low phosphorous (the limiting nutrient for phytoplankton growth in most Arctic lakes) and that resulted in no higher primary production than in other undisturbed lakes in the region (EA -p.4-88,93)

Nitrogen loading is also expected from the Long Lake Containment Facility into downstream water. **Phosphorous from Long Lake is currently at natural**

background levels (EA -p.4-71/72), but that could change with the introduction of pit water from the Beartooth pit into Long Lake.

5. Since understanding the food selection of fish in Sable Lake has a bearing on how it will be reclaimed after being mined out (i.e. the relative proportion of deep-water versus shallow-water feeding habitat), **we would recommend that stomach analysis on a significant sample of the harvested fish during fish-out be done.** The baseline study only sampled 2 fish in concluding what the feeding habitat of lake trout is in this lake.(EA -p.3-66)

6. Only one young lake trout & one young grayling were found in the stream between Beartooth and Bearclaw lakes, in late June 1997, both within 30 m of Beartooth Lake. (EA - p.3-96) **Could this indicate that this half of Reach 1 [total 80 m length] of the stream is good rearing habit for these 2 species? If so, this would be lost to the habitat accounting under DFO's No-Net-Loss Plan since BHP considers the entire stream poor fish habitat**

7. The Panda Waste Rock Storage Pile will increase in size to accept Beartooth rock. **If "waste rock placement and associated mitigation measures" (EA -p.4-122) turn out to be not as effective at preventing runoff that flows off the pile from entering Bearclaw Lake, does BHP have any idea of the effectiveness of the tundra at filtering the suspended solids, heavy metals and nitrogen from runoff water before it reaches the lake?**

For the Sable Waste Rock Storage Pile, berms will be constructed at points where drainage is expected to emerge. **However, if runoff drainage occurs at unexpected locations, the only thing protecting Ulu & Horseshoe Lakes is distance (100 m). This may not be enough to keep contaminated water from reaching the lakes, given the steeper downward slopes at certain points (the map shows that one point at the southeast side of Horseshoe has 2 contour intervals [5 m each] within the buffer zone; the south side of Ulu has 4 contour intervals within the buffer). Also, while there are 100 m buffer zones between the waste rock dump and the lakes, there is not the same distance separating the Ulu-Horseshoe stream from the rock dump. Although grayling probably don't use the downstream reaches of this stream, any contaminated water that reaches it will feed into Horseshoe Lake, potentially creating problems there.**

8. As is the case with DIAVIK, we would expect BHP to conduct geomorphologic tests of the ground at proposed dam and rock pile sites to ensure these won't be built over ice wedges or rock fractures, 2 places of potential contaminated water leaks.

9. Water that naturally flows from Bearclaw Lake into Beartooth Lake will be diverted around Beartooth Lake into Beartooth Stream, to eventually enter North Panda Lake. This diversion will last for 10 years.

What are the probabilities of ice jams occurring on the Pigeon and the Beartooth water diversions as has happened before in the Panda Diversion Channel? What would be the likely impacts associated with ice jams?

10. Fish populations in the 5 impacted lakes are isolated from other lakes in the watershed. For example, Big Reynolds Pond, which has a small, isolated population of grayling in it, will be lost (for the Pigeon Waste Rock Pile) and not reclaimed. According to BHP, these lakes, being isolated from the rest of the water shed, contribute nothing to the genetic stock of the fish populations of the watershed. (EA -p.4-92)

However, if these lakes are genetically isolated, then this means that eliminating entire lake populations will reduce the region's genetic diversity of fish, which may not be ecologically healthy. In times of environmental disasters or major environmental stress, (potential impacts from future decades of global warming come to mind), when populations of animals may perish, it is the genetically isolated subpopulations of the impacted species that may be the key to species or population survival if their genetic characteristics make them more resistant to the environmental stresses that cause others of their species to die.

11. The all-weather road will cross 7 streams (EA - p.4-79), of which as many as 3 contain fish. **BHP states that they will monitor the water quality of these streams during construction, but it is not clear how long the streams will be monitored after road construction is completed. Also, will those streams be monitored after any accidental spill of materials from the road? Baseline studies as well as construction phase and post-construction monitoring should be done to verify assumptions of no fish use in some of the streams and determine the level of habitat use in the streams that contain fish.**

D. Pit Reclamation:

1. SABLE:

Natural flooding of the pit (50 million m³) will take 200-300 yrs.

Flooding w/water from Ursula Lake will take only 15 - 25 yrs.

During the last stages of flooding, the pit lake will be monitored to determine a need for putting in nutrients for fish stocking. If BHP is prohibited or is incapable of moving water from Ursula or other water bodies (the 15-20 year scenario), do we expect that they will be monitoring the pit lake 150-200 years from now?

2. BEARTOOTH:

BHP predicts flooding the pit will take 15-22 years, but only 2 years if kimberlite is dumped in. If the latter option is used then the total time anticipated from initial lake de-watering before mining starts until fish-stocking in the reclaimed lake is 10-12 years (EA -p.4-123).

This is the first pit of all the BHP mine pits to be reclaimed, so this one will be the test case for all the pit reclamation to follow.

DIAMIK provided for long-term isolation of PK (processed kimberlite) from the environment behind engineered structures. BHP proposes the option of filling the bottom of the pit with fine PK from the plant in order to cut down the flooding time required.

How will the presence of fine PK in the bottom sediments or resuspended in the water column affect the pit's suitability for fish habitat creation? Will the PK change the pH of the water in the filled pit to alkaline conditions? 2 of 5 lakes on the BHP property have PK with pH of >9 [Fox & Misery] (p. 5.7 of NWT Diamonds Project EIA) The developed lakes have pH of 6.1-6.7 (EA - p. 3-47). If the PK increases the pH, this would probably increase the toxicity of ammonia (would be present as residues from blasting) in the water, or at least the benthic sediments. A benthic invertebrate community, needed by some fish species for food, could not become established under such conditions.

3. Buried material: Materials that cannot be removed from the site will be buried in the pits or the waste rock piles (EA -p.5-32).

What are these materials and how will their presence affect water quality in the reclaimed pit lakes if buried in pits?

4. Introduced species: BHP is considering the Inuit suggestion of using estuary plant species to reclaim the PK, which is salty. (EA - p.5-17)

Even if this proves effective, do we want to introduce non-indigenous species into the area? There are well-documented problems that this strategy sometimes creates for native plant species when introduced species from other regions competes for limited resources and can eventually displace them.

E. Air Quality:

1. "Past experience at EKATI and other northern mining operations in the region, namely DIAMIK, has shown that the air quality effects from the activities have been negligible." (EA - p. 4-27)

How can BHP state that they have any empirical (fact-based) evidence from the DIAMIK mine when it hasn't been built yet? All of the DIAMIK "experience" at the time that this was written was based purely on statistical modeling!

In 1999, greenhouse gas emissions (CO²) from EKATI represented 4% (108,000 tonnes) of total from all sources in the Canadian North (Yukon, NWT). Annual emissions from the 3 pits are expected to be about 1/2 of that. (EA-Table 4.3-4). **Cumulatively, the present EKATI and proposed Sable-Pigeon-Beartooth (S-P-B) account for a combined 6.1% of total Yukon-NWT CO² emissions.**

2. Air quality in pits: Currently, the deepest pit at ETAKI is 95 m deep. No air quality deterioration (caused by thermal inversions in pit) has occurred; but there have been visibility problems in summer caused by dust. (EA - p. 4-31)

Might we expect the air in the pits to deteriorate as the pits get deeper, much as has occurred at the Udachnaya diamond pipe in Siberia? There, carbon monoxide and nitrogen oxide built up in the pit air when temperature inversion layer was created over the pit. (P. Whiteway in Canadian Mining Journal Feb. 1993)

3. Levels of the following pollutants are higher in snow within the Koala watershed than in snow at control sites north, southwest and east of the Ekati development area:

- ammonia
- altimony (questionable due to sample contamination)
- manganese
- uranium (questionable due to sample contamination)
- vanadium

Since these results leave in question the levels of altimony and uranium in the air around the mine, Yellowknives Dene would expect BHP to do follow up studies on these 2 pollutants, and continue to monitor all of the above pollutants.

F. Eskers:

The Ursula esker a few km west of Ursula Lake will be used to extract 200,000 m³ gravel for road, berm and pad construction. Also the road will pass within 500 m of a wolf den at the west end of Falcon Lake.

What wildlife are using that esker and at what times of the year? Dean Cluff, the NWT wolf biologist, says that there is wolf denning & "significant wolf activity" on that esker. There are also wolves near Sable Lake. Given that BHP acknowledges that "wolves play an important role in local and regional economies" through aboriginal hunting and trapping (EA - p.3-140), its breeding grounds (denning areas on eskers) should be safeguarded.

G. Archaeology:

No ground surveys have been done on the route for the road. BHP says the probability of finding archaeological resources is low to moderate, and that they can mitigate the disturbance/destruction of any that are encountered prior to construction. It

is not clear how this mitigation will be accomplished without a complete ground survey. (EA - p. 4-56)

There are "numerous sites on the Ursula West and Exeter eskers between the Pigeon & Sable pits". These have the potential to be disturbed by employees of the mine if allowed access (either work-related or recreational) to these eskers. Access to these sites by mine personnel or truckers servicing the mine should be restricted.

H. Caribou:

"The relative importance of different ecosystem types to migrating caribou is unknown, ***so it is not possible to assess the value of the lost habitat.*** However, 88% of disturbed habitat is ..heath tundra., the most common habitat type in the local study area." (EA -p.4-134)

1. The EAR discussion of mine/road effects on caribou does not make enough comparisons between age and sex classes in assessing behavioural responses to various disturbances. It would have been more useful and effective to relate observations to different age/sex classes, as it is acknowledged that females with calves are likely to show more intense reactions to roads and disturbances than other groups of caribou. This was done in assessing spatial distribution of caribou from mining activity, and percent time feeding at mine versus control sites for "nursery" and "non-nursery" groups. But it would have been useful to have these sex/age class comparisons expanded to include behavioural responses to various stress-inducing activities.

2. BHP chooses to report on the daily percentage of the Bathurst herd that entered within close proximity to the mine (EA -p.4-139) , but does not report the total percentage for the entire migration period. This gives a misleading indication of the potential impact on the caribou. In 1999, 5.9% of the herd went through this area at one time or another during migration $[(20,700/350,000) \times 100]$ which is a more useful statistic than reporting a maximum daily percentage of 1.9%.

3. It would be beneficial to know why the mean daily caribou numbers that passed within 14 km of the EKATI mine on southward migration in 1997 decreased by 93 - 99% in the next 2 summer migrations ((EA, Table 4.6-4) from RESCAN 1999). Was it:

- (a) increased disturbance (eg. greater noise, more truck traffic) in 1998 & 1999, or
- (b) something that attracted them in 1997, or
- (c) because of a general decrease in abundance of the entire Bathurst herd, or
- (d) within the range of natural variability (in other words, a natural occurrence)?

4. BHP uses the DIAVIK environmental assessment in asserting that cumulative impacts would increase caribou energetic costs by 0.2 - 2.0%, which would not measurably affect the numbers, fitness, or reproductive success of the Bathurst Caribou.

However, the Sable pit was not included in this accounting and so the predicted energetic costs will likely be somewhat higher than reported.

I. Grizzly Bears:

1. An 800 m zone of impact on bears is expected around the roads; 1 km around the pits. The 1-km zone increases to 10 km during blasting; that is the distance that blasting noise carries. (EA - p.4-147)

In assessing the habitat degradation for bears due to the S-P-B development ("habitat effectiveness" EA Table 4.6-5), the "Zone of Influence" around the pits (32 to 1085 ha) should be increased 10-fold as a worst-case to incorporate blasting noise. (We would consider stress-inducing/sleep-disturbing noise to be one factor degrading a habitat). This would then increase the % of home range impacted by S-P-B development from 1.8% to 8.6% (Females) and from 0.6% to 2.7% (Males).

[an extra 14,570 ha + original 3265 ha estimate = 17,835.

(17,835 x 100)/207,400 ha = 8.6; 17,835 x 100/668,500 ha = 2.7]

2. Given that "grizzly bears are known to be sensitive to disturbance, and displacement from habitat adjacent to roads has been widely reported", **can we expect the grizzly den at the north end of Ulu L to be abandoned as it is in close proximity to the north waste rock dump ?**

3. **Roads & Grizzlies: Research is needed on the response of grizzlies to roads on open tundra (they avoid them in forest areas).** According to the EAR, bears may become habituated to road traffic if traffic frequency is fairly constant and there is no negative consequences associated with it such as shooting or direct harassment from vehicles or humans on foot. This has the potential of leading to greater frequency of bear deaths/injuries from collisions with vehicles.

4a. **Dust & Grizzlies:** Berries are a big part of diet in mid- to late-summer and fall (EA - p.3-135). If dust from roads and pits destroys large amounts of berries such as lingonberries & blueberries, will bears be more likely to :

- (a) move out of the area [resulting in possibility for territorial conflicts], or
- (b) switch to hunting ground squirrels in the affected areas?

Research may be needed on this topic.

4b. If dust creates early snow-melt , this may lead to colonization of these areas by small mammals. **This increased prey concentration could attract bears to these**

areas. This could lead to a potential increase in man-bear conflicts or vehicle collisions.

J. Waterbirds:

1. **Loons:** The presence or absence of nesting territories from year to year is used by BHP to monitor the long-term impacts of their mine on the lakes (since loons are fish-eaters and are sensitive to human activity). However their 1994-99 field data is not comparable between years due to differences in methodology, different lakes surveyed and the fact that loon surveys were not done in 1996 & 1997 (EA -p.3-154) Yet BHP does make these comparisons in reporting the misleading result that the percentage of control lakes (greater than 10 km from mining activity) containing loon breeding territories was similar in 3 of 4 years and similar in all years for experimental (within the core mining area) lakes. Their conclusion that “..the mine, and its associated activities, does not appear to be affecting the number of loons, nor the number of loon territories.” (EA -p.3-156) is therefore suspect. Due to non-standardized methodologies between study years, future comparisons of pre-development to development years will probably not be able to utilize the entire 1994-99 data base.

2. **Dust & Waterfowl:** If dust deposition creates early open-water habitat for shorebirds & waterfowl, will these early open-water patches concentrate birds into high impact zones (eg. along roads; at the PKC ponds) ?

Green-up of vegetation can be 10-14 days earlier than normal in these areas, according to BHP (EA - p.4-133). Waterfowl & passerine nesting can begin earlier [White-front geese arrive as early as May 7], attracting raptors to these areas.

K. Raptors (Hawks, Falcons, Owls):

The EA (p. 3-153) states that short-eared owl nests have been found in the BHP claim block. But their locations are not stated or shown as was done for the falcon nests.

We would like to see where these nests are in relation to mining activity.

L. Road:

1. BHP believes that because the road will be built of coarse material, the lack of fine-grained material will minimize dust creation. (EA -p.4-50)

Perhaps in the initial stages of road use. However, did they take into account how the heavy trucks constantly moving on the road (up to 99 loads per day) will likely pulverize the coarse gravel into finer particles which will eventually be released as dust ?

2. Dust deposition: For about 10 yrs (in the case of Sable pit) dust from the pits will be deposited on lakes within a 3-km radius. Dust from the road will be deposited onto

adjacent water bodies, creating some degree of sedimentation (i.e. higher TSS) in the water. Aluminum, manganese, nickel, iron & vanadium also have been found at elevated levels in dust-affected lakes. Nitrogen concentrations doubled over natural background levels in Grizzly Lake. (EA -p.4-90)

Will dust effects on nearby lakes be monitored? What will BHP do if dust significantly spoils the water quality in nearby lakes?

3. BHP says that there will be no negative impacts on vegetation because rain will wash dust off (EA p. 4-33). However, **if there is a drought condition during berry season, one would expect there to be an impact on this bear food for that year.**

4. Controlling ATV access: Will ATVs (4-wheelers) and snowmobiles be barred from the road? **We must eliminate the temptation of many people traveling off the road in every direction over ecologically-sensitive tundra.**

5. The control of truck speeds is one mitigation measure BHP will use to minimize dust dispersal.

How will this be monitored to ensure truckers are obeying speed limits to minimize dust deposition and prevent accidents?

6. Hunting on the winter road: statistics are not kept on the number and characteristics of wildlife killed along the road by hunters or vehicle collisions (EA -Appdx F-5).

It would be a good idea to begin collecting these statistics for the purposes of finding out residual impacts of mining roads on the local wildlife due to both
(a) increasing hunting from the road and
(b) greater and easier off-road access by hunters to a previously more inaccessible area.

This concludes our submission to the Mackenzie Valley Environmental Impact Review Board. Thank you for your consideration of the matters that we have raised.

Sincerely, CHAIR & Co-CHAIRS.

Rachel Crapeau, Alfred Baillargeon, Lawrence Goulet

and The Yellowknives Dene First Nation
Land & Environment Committee.

ADDITIONAL COMMENTS:

SECTION M:

- 1.) This new development will not change IBA provisions. It will only lengthen the time of benefits and job opportunities. No new jobs or increased business opportunities for aboriginal people will be created. (EA – p. 2-14). Mining the 3 new pipes will lengthen the entire EKATI mine life by only 3 years (EA – p. 2 – 45).
- 2.) According to BHP, there are no areas of significant traditional use by any of the aboriginal groups (EA – p. 4-60) within the EKATI mine expansion area.
- 3.) There are no significant statistics that show the level of hiring or advancement, as a result of the EKATI mine.
 - 3a.) Secondly, we've received no information demonstrating any new job opportunities for Yellowknives Dene since the mine opened.
 - 3b.) Thirdly, our information shows that Aboriginal employees have been passed over for promotion in favour of non Aboriginal employees.
 - 3c.) Lastly, BHP has not done enough studying nor have they consulted enough to the satisfaction of the Aboriginal groups to determine if the expansion area covers areas of traditional use.