



BHP Diamonds Inc.

14 September 2000

Gordon Lennie
Chairman
Mackenzie Valley Environmental Impact Review Board
Box 938
Yellowknife, NT X1A 2N7

Re: Review Board Information Requests of September 1, 2000-09-15

Dear Mr. Lennie:

Please find attached BHP's response to your information request regarding graphically displaying cumulative effects, monitoring, and mitigation measures. Additionally, BHP is also submitting, under separate confidential cover, one sealed envelope which contains BHP's employees's as of December 31, 1999.

Please do not hesitate to contact me if there is additional information required by the Review Board for their assessment.

Regards,
BHP Diamonds Inc.

Tina Markovic
Senior Resource Planning Coordinator

Cc: Chris Hanks, Senior Environmental Specialist

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Mackenzie Valley Environmental Impact Review Board Information Request on Cumulative Effects Assessment

Review Board's Specific Request

"Explain graphically the linkages between the source of development generated cumulative effects, the mitigation used to attenuate the development specific effects and on-going monitoring to assess cumulative effects."

Background

The following sections are short summaries of the analysis found in the EAR in Section 4.9. This information is reproduced here to provide context of the attached Figure.

Selection of VECs

In the cumulative effects assessment for the Sable Pigeon and Beartooth proposed development, the VECs initially included in the scoping evaluation were:

- Air Quality;
- Permafrost;
- Surface Water Quality and Quantity;
- Fish/Aquatic Habitat;
- Physical/Terrestrial Environment;
- Caribou/Habitats;
- Carnivores/Habitats;
- Breeding Birds/Habitats;
- Groundwater;
- Heritage Sites; and
- Socio-economic elements.

As the cumulative effects assessment is a focused evaluation, the VECs considered are those for which the proposed Sable, Pigeon and Beartooth development have identified a residual effect that is categorized as *minor or greater*. Additionally, only those effects that have changed from the 1995 EIS and the Diavik Diamonds Project EA are addressed.

Following the initial scoping for the cumulative effects assessment, as presented in the EAR, three VECs were selected for inclusion in the current cumulative effects assessment:

- Air Quality;
- Carnivores/Habitat; and
- Caribou/Habitat.

Selection of Activities/Projects

For the effects assessment, some of the activities were those requested in the Terms of Reference by the MVEIRB:

- BHP EKATI™ Diamond Mine;
- Diavik Diamonds Project;
- Echo Bay Mines Ltd. - Winter Road; and
- Echo Bay Mines Ltd. - Lupin Mine.

These were complimented by several other local and/or smaller projects/activities including:

- Local outfitters;
- Aboriginal land use; and
- Mining and exploration operations.

In general, the local outfitters and potential mines are point sources of potential effects and the larger mines are the only sources that are classed as more than a point source for the assessment.

Air Quality

The evaluation of the potential for cumulative effects on air quality was based on the recognized national and global interest in and importance of this VEC. The NWT Diamonds Project and Diavik Diamonds Project environmental assessments projected that there would be no measurable cumulative effects on regional air quality. The EKATI™ mine field monitoring results have confined the limited effects on air quality mine operation. The distance from other properties and the small size of the sources precludes any measurable cumulative effects resulting from other activities in the area.

Caribou/Habitat

Habitat Loss

Caribou will be excluded from about 497 ha of former habitat usurped by the footprint of proposed and existing developments. Avoidance of disturbance and other habitat alterations may extend the area of habitat disruption for caribou, and intensive industrial activity could disrupt migration patterns.

Calving and winter range are not affected by existing or proposed development within the CEA Study Area. Diavik predicted that their proposed development, in conjunction with existing and permitted land uses within their Regional Study Area, would cause a net reduction of about 0.17 % of caribou summer habitat availability (Axys and Penner and Associates, 1998). Development of the proposed Sable, Pigeon, and Beartooth pipes would add minimally to this total habitat reduction.

Habitat effects will be limited to the local study area and will therefore not influence calving or winter range. Relative to the large size of the Bathurst herd's migration corridor and summer range, habitat disruption arising from the proposed development acting cumulatively with the existing EKATI™ development, Diavik, Lupin, and the winter road, is predicted to result in only very localized changes in habitat use with no measurable effect on broad seasonal distribution.

Caribou abundance may be influenced by indirect effects such as increased energetic costs associated with disturbance from human activities. Diavik predicted low to moderate (0.2-2%) increases in energetic costs within their Regional Study Area during spring and fall migration, in a development scenario exclusive of the proposed new development at EKATI™ (Axys and Penner and Associates, 1998). Specific to northern migration, predicted energetic increases were less than 1%. The proposed development of Sable, Pigeon and Beartooth can be expected to contribute small increased energetic costs to migrating caribou. However, the cumulative increases in energetic costs resulting from EKATI™, the full development scenario of Diavik, the winter road, the Lupin mine, and the proposed development, are not expected to measurably affect the abundance of the Bathurst herd.

Mortality

Potential direct mortality sources arising from the EKATI™ mine and the proposed development are related to possible collisions with vehicles. Effective environmental management and mitigation has resulted in no mortalities to date at EKATI™. Known mine-related mortality of caribou at Lupin has averaged less than one incident per five years (Hohnstein, 1996). Diavik predicted low direct mortalities resulting from their development considered cumulatively with EKATI™, the winter road, and hunting mortalities within their Regional Study Area (Axys and Penner and Associates, 1998). Including the proposed

development at EKATI™, combined mortalities from all these sources within the CEA Study Area are predicted to remain very low and of no measurable significance.

Carnivores/Habitat

Distribution

Diavik predicted that their full-development scenario would result in moderate reductions (3%) in grizzly bear habitat availability at their regional study area level (Diavik Diamonds Project EIA, 1998b). They also predicted that multiple, incremental changes in habitat availability were unlikely to occur in a concentrated space, so the overall distribution of the bear population at the greater-than-regional scale would not likely be measurably affected.

Models of habitat loss and reduction for this cumulative effects assessment indicate minor reductions in availability of preferred habitat within the area of the Landsat image. Cumulatively, developments within the CEA Study Area are unlikely to affect the distribution of bears.

Abundance

Diavik (1998b) predicted that cumulative effects in their Regional Study Area, including the existing EKATI™ development (excluding the proposed development of the Sable, Pigeon, and Beartooth pits), could increase human-caused mortality rates from 0.5 bears (1.6% of the estimated minimum population of 30 bears in the RSA) per year to as many as 0.98 bears (3.3% of the estimated minimum population in their RSA) per year. The development of the Sable, Pigeon, and Beartooth pipes is predicted to contribute a slight increase to this mortality rate.

The estimated sustainable mortality rate for grizzly bears in the Slave Geological Province is 3% (R. Case, D. Cluff, RWED, pers. comm.). Therefore, if the predicted mortality rates are realized, the grizzly bear population in Diavik's RSA could be reduced. However, if the initial grizzly bear population is higher than the estimated minimum (55 bears rather than 30 in the RSA, and 750 bears rather than 407 in the SGP; Axys and Penner and Associates, 1998b; D. Cluff, RWED, pers. comm.), then the projected mortality rate would be within sustainable levels (*i.e.*, 1.8% of the population).

The grizzly bear harvest quota for the North Slave Region, which encompasses the regional study area, is zero (D. Cluff, RWED, pers. comm.). Therefore, subsistence and sport harvest is not directly relevant to the regional study area. However, grizzly bears are harvested in Nunavut in the vicinity of Kugluktuk, Bathurst Inlet, and Umingmaktok, and these bears are part of the same greater-than-regional population.

Loss of habitat and reductions in habitat effectiveness can affect population carrying capacity and, therefore, potentially the populations size. However, the cumulative loss of habitat and reductions in habitat effectiveness within zones of influence around disturbance sources are predicted to have a negligible effect on bear population abundance.

Diavik (1998b) predicted that cumulative grizzly bear mortality associated with human activity within the Slave Geological Province would increase from 14.3 per year to 14.8 per year, and would be moderate (Diavik evaluation scale) in magnitude. Development of the Sable, Pigeon, and Beartooth pipes can be expected to slightly increase the possibility of mortality. Given the mortality risk associated with developments and activities within the CEA Study Area, cumulative effects on grizzly bear abundance are predicted to be potentially moderate at the local and regional scales, and minor to moderate at the greater-than-regional scale. However, interpretation of the significance of effects on the grizzly bear population is confounded by uncertainty as to population size, predicted mortality patterns, and effectiveness of efforts to mitigate mortality.

Wolves and Wolverines

Cumulative habitat effects on wolves and wolverines were estimated based on the habitat model developed for grizzly bears. Minor habitat loss and disruption are predicted to occur as a result of cumulative developments and activities within the CEA Study Area. Relative habitat quality for these species is unknown, but is likely closely tied to the presence of caribou and, therefore, cannot easily be mapped. Wolves have an affinity for esker complexes for denning. There are minor quantities of eskers within the disturbance ZOI.

Wolves and wolverines are harvested within the regional and greater-than-regional study areas, and potentially within the local study area. Caribou hunters harvest a small number of each species. Occasionally, hunters access the regional study area by the Echo Bay winter road, where they may harvest wolves or wolverines. However, overall harvest and other human-caused mortality of these species is low and cumulative influences of activities and developments are likely to have no more than a minor effect on their populations.

Conclusions

The cumulative effects associated with the proposed development are not expected to change are quality in the region. Potential residual effects are limited to a negligible effect on caribou, a moderate effect grizzly bears and a minor effect on wolves and wolverines.

Therefore, this information request addresses the linkage and control of potential effects associated with caribou and grizzly bears. The grizzly bears are seen as a "worst-case" for the wolf and wolverine populations in the regional area. Therefore, they will not be addressed individually.

Project Design

The design model for the EKATI™ proposed development means that the environmental controls are included in the design phase. The proposed development pits are fixed due to their physical nature. However, the options for the management of associated potential environmental effects are identified early during the design of the project and incorporated. For example, the Sable Road is routed to avoid habitat that is important for grizzly bears and the potential effects of waste rock storage areas are minimized by carefully siting them away from sensitive areas.

Regionally, all modern mining projects incorporate the same "design for prevention" - as is the design of the proposed development. Therefore, the cumulative effects assessment deals with the residual effects. That is, those effects present following the application of management, design strategies, and mitigation measures to minimize the effect of the projects. The only other large regional projects that will jointly affect the caribou and grizzly bears are the existing EKATI™ mine and the Diavik Mine.

Both these projects are relatively recent (Diavik is under construction) and are closely regulated. Therefore, modern design practices have been applied to all phases of the operation and the permits address all the concerns of regulators and stakeholders.

Identification of Linkages

The identified potential interactions of the proposed development with the other existing and proposed projects in the area are limited to the *large mammals* (grizzly bears, wolves, caribou and wolverines) using the area. The effects can be summarized into 3 direct categories:

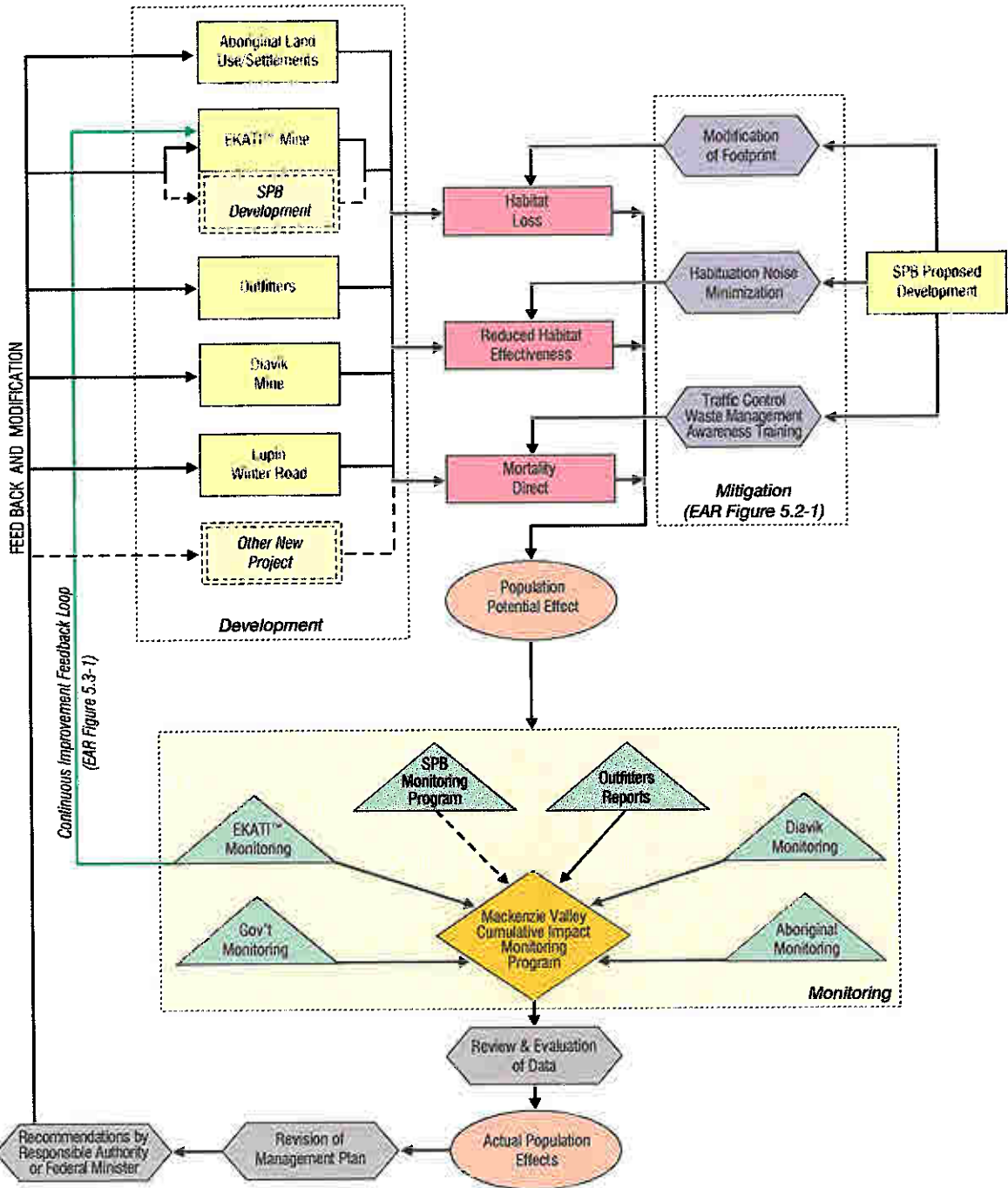
- Direct habitat loss due to construction;
- Loss of habitat effectiveness due to disturbance; and
- Direct mortality.

The activities can further be defined to the potential effects associated with the construction, operation and closure/post-closure phases of the developments under evaluation. However, the majority of the effects on wildlife are associated with the construction and operation of the projects as the closure and post closure reduces the disturbance and focuses on the rehabilitation of the affected areas to viable wildlife habitat without the disturbance factor.

The information used in determining the cumulative effects includes the available information on other regional projects. This information assumes that all the mitigation strategies (design and management) are applied and that the project residual effects are those addressed in the assessment and the effects reported to the agencies. In the design of the proposed development, the potential effects that

may act cumulatively are minimized with the management and mitigation strategies for the mine.

Figure 1 (attached) for the cumulative effects assessment indicates the mitigation strategies that are available for reducing the effects of the Sable Pigeon and Beartooth Proposed Development. Moreover, the regional cumulative effects results of the proposed development and other land-users are co-ordinated centrally and the level of acceptable effect is defined considering the other land use requirements for the region. This produces a feedback loop to the existing and potential land users to ensure that an acceptable level of effect is maintained.



Development, Mitigation and Monitoring for Cumulative Effects at the Sable, Pigeon and Beartooth Proposed Development

FIGURE 1

