Mackenzie Valley Environmental Impact Review Board
GAHCHO KUÉ Panel

January 18, 2012

Veronica Chisholm
Permitting Manager
De Beers Canada
Suite 300, 5102-50th Avenue
Yellowknife, NT X1A 3S8

Dear Veronica Chisholm,

RE: Gahcho Kué Project - Information Requests

Please find attached information requests on the Gahcho Kué Project submitted to De Beers Canada by the Gahcho Kué Panel.

If De Beers Canada cannot respond to a specific information request, or believes it is outside the scope of the Environmental Impact Review, it should notify the Panel within one month of receiving the attached document and provide written rationale.

The Panel looks forward to responses to these information requests.

If you have questions please call me at 766-7052 or by email at chubert@reviewboard.ca or alternatively you can contact Nicole Spencer at 766-7062, or email at nspencer@reviewboard.ca.

Sincerely,

(original signed by)
Chuck Hubert
Gahcho Kué Panel Manager

IR Number: GKP 1

Source: Gahcho Kué Panel

To: De Beers Canada

Reference: Section 7.8

Subject: No assessment for sustainability of caribou populations.

Preamble: The Developer uses the term 'persistence' throughout the Environmental Impact Statement and does not clearly relate 'sustainability' to 'persistence'. The Developer concludes that the persistence of caribou populations will not be significantly changed (Section 7.8.2) but does not define 'persistence' until late in the Caribou Key Line of Inquiry (p. 134) and then only as a probability output from the population model. The model estimates the *likelihood* of persistence [reviewer's emphasis] as the projected final abundance year 30 of the simulation and the probability that the number of caribou will be below a range of abundances at the end of the simulation (Section 7.5.4 specifies that "It is emphasized that the models are not used to predict the number of caribou in 5 years, 10 years, or 30 years from now.").

The Environmental Impact Statement also refers to persistence of populations in the context of continued opportunity for traditional and non-traditional use of caribou but the Environmental Impact Statement does not describe how population persistence as an endpoint in an assessment will be monitored and incorporated into Adaptive Management. In Section 7.5 (Effects on population), the Environmental Impact Statement refers to habitat quantity and quality, survival, and reproduction as using measurement endpoints for determining the residual effects on caribou but does not relate these to population persistence. Additionally, the DAR does not discuss the limitations of methods used to monitor caribou habitat quantity and quality, survival, and reproduction. In particular, the Developer does not discuss at what level are effects detectable: for example is a 5% change in survival rates detectable? This also raises questions about the linkage between mitigation, residual effects and persistence.

Request:

1. Please explain the relationship between persistence and sustainability.
2. Please define and explain more precisely how population persistence and continued opportunity for traditional and non-traditional uses of caribou can be measured and monitored.
3. Please provide a summary including a flowchart linking how the other measurement endpoints (such as habitat quantity and quality, survival, and reproduction) will be related to population persistence and harvest opportunities in the context of the mitigation, monitoring and adaptive management.

IR Number: GKP 2

Source: Gahcho Kué Panel

To: De Beers Canada

Reference: Sections 7 and 10

Subject: Missing ecological risk assessment for caribou exposure to contaminants.

Preamble:

Two Key Lines of Inquiry (section 7 – caribou and section 10 - long-term biophysical effects, closure, and reclamation) refer to an ecological risk assessment. Pages 7.63 and 7.141 state that an ecological risk assessment was completed (to examine the effects of caribou being exposed to chemicals from run-off and dust). However, there are no citations or details provided as to where the reviewers can find any details about the risk assessment.

Request:

Please provide the caribou ecological risk assessment.

IR Number: GKP 3

Source: Gahcho Kué Panel

To: De Beers Canada

Reference: Section 7

Subject: Incomplete assessment of the lessons learned from the other diamond mines

Preamble: Section 4.1.1. Terms of Reference specify that, "Discrepancies exist between some impact predictions in previous diamond mine assessments and the real or perceived outcomes. The EIS needs to address this by explaining how it incorporated lessons learned. To this end, the developer is required to include a summary of caribou research and caribou related monitoring activities and their results for the potentially affected herds since the first diamond mine was permitted, to the extent that relevant information is publicly available".

Information on lessons learned from other diamond mines with respect to caribou appears to be scattered in the submitted Environmental Impact Statement materials. The developer refers to four sections within the Caribou Key Line of Inquiry as a response to lessons learned (Sections 7.3.3.2, 7.6, 7.8.2, 7.9). However, while those sections emphasize the Zone of Influence and that few caribou have been accidently killed at the three diamond mines, those sections do not provide a consistent or clear account of all the predicted impacts for caribou relative to the observed impacts. There is a reliance on categorical statements rather than concise assessment of the evidence and analyses using tables and diagrams. Only for Diavik mine, does the DAR specifically mentioned that the ZOI exceeded the original (1998) prediction.

Thus the review would benefit from a consolidation of information to understand the predicted impacts at the other diamond mines and the effectiveness of their mitigation and monitoring. This includes any impacts that were either not predicted or were under or over-estimated and how monitoring was used to describe the residual impacts relative to the predicted endpoints. It should also include an appraisal of any shortcomings in mitigation and monitoring.

Request: Using tables and a flowchart format:

For each of the four diamond mines (Ekati, Diavik, Snap Lake and Jericho) list the predictions for impacts on caribou at the time of the environmental assessments and summarize the linkage between the effects mitigation, monitoring and subsequent level of impact relative to the initial prediction.

IR Number: GKP 4

Source: Gahcho Kué Panel

To: DeBeers.

Reference: Section 7

Subject: Inadequate use of baseline data: caribou distribution relative to the winter access road and the Tibbett-Contwoyto Lake winter road

Preamble:

The Environmental Impact Statement does not analyze the annual probability of caribou encountering the winter roads although this was done for the mine site (Figure 7.5.8). The maps showing caribou distribution are only for 2004 and 2005 and suggest a relatively high likelihood of caribou encountering the winter access road and the Tibbett-Contwoyto Lake winter road but the baseline information based on aerial surveys from 1999-2005 is not analysed or mapped. The tables summarizing the surveys are not used to contribute to assessing the likelihood of caribou encountering the winter roads.

The annual variability in winter distribution is high added to which as abundance changes, so does distribution especially on the winter range. The analyses would assist the Developer in examining the effect of the road on access for hunting. Although the Developer suggests that the decreases in hunting traffic may be due to high volumes of mine-related vehicles on the road, it could also be a change in caribou winter distribution.

Although analyses are needed to assess the likelihood of caribou encountering the road, the methodology used elsewhere in the report for the mine site and for cumulative effects depends on the satellite collared caribou. The Environmental Impact Statement does not describe the limitations or their consequences (only cows are collared) nor does the document discuss the representation of the collared caribou of the herd's distribution from the collared cows. The Environmental Impact Statement does not include even a summary of all the information available on winter and pre-calving migration available since the 1980s.

Request:

1. Provide a description and analysis of annual changes in the winter and pre-calving migration relative to the winter access road and the Tibbett-Contwoyto Lake winter road using all available information.

2. Develop encounter rates based on the satellite collared cows for the winter access road and the Tibbett-Contwoyto Lake winter road.

3. Assess the extent to which the collared cows represent the distribution of the entire herd including bulls.

IR Number: GKP 5

Source: Gahcho Kué Panel

To: De Beers Canada

Reference: Section 11.8

Subject: Uncertainty in the assessment for the duration of the winter road season and frequency of traffic.

Preamble: The Environmental Impact Statement does not analyze any trends in the duration of winter road season and the frequency of traffic. Table 11.8.7 gives the dates of the beginning and end of the season but does not include the number of days for the trucking season or the daily frequency of traffic or their trends. The table does not include the earlier years of the winter road which would be useful to determine the trend in the duration of the winter road. Although the Environmental Impact Statement does not give the length of the winter road season it can be calculated from the dates of opening and closing. From 2000 to 2011, the road was open an average of 62 (range between 48 and 80 days); the linear trend toward a shorter duration is insignificant ($p=0.061$).

The Environmental Impact Statement does not include reference to a study by EBA Engineering Consultants Ltd. (2008) which examined the risks that climate warming for reducing the length of the winter road season. The analysis correlated the length of operating season and the cumulative air freezing index for the season. The freezing index correlates with the historic road operating season (1994-2006, 65 days) which could decline to an average of 54 days by 2020.

The Environmental Impact Statement does not describe caribou behaviour relative to snow and ice roads such as the information from the snow track surveys for Ekati's Misery road or other mines such as the Alaskan Red Dog mine. The cited references are mostly older reviews of wildlife in general relative to roads. EBA Engineering Consultants Ltd (2008) report that one option to offset a shorter winter road season (or increased frequency of traffic) is to twin sections of roads crossing ice-covered lakes. This could influence the likelihood of caribou either paralleling or crossing the roads.

Request:

It is not clear if the EBA Report identified above was included with respect to climate warming and the winter road season analysis. Please describe how incorporation of the EBA Report would change the assessment of caribou behaviour relative to snow and ice conditions and describe mitigation for a reduced winter road season and implications for caribou.

EBA Engineering Consultants Ltd McGregor, R. V., H. M. Hassan, D. Hayley. 2008. Climate change impacts and adaptation: Case studies of roads in northern Canada. "Climate Change and the Design and Management of Sustainable Transportation" Session, 2008 Annual Conference of the Transportation Association of Canada, Toronto, Ontario

IR Number: GKP 6

Source: Gahcho Kué Panel

To: De Beers Canada

Reference: Reclamation (Section 3.12.1)

Subject: Reclamation, vegetation and habitat

Preamble

One of the long-term objectives is to "*return the site to a state that is <u>similar</u> to other habitats in the same region*" (p.3-99)[emphasis added]. In the Assessment approach of Section 6, the EIS states that "*Reversibility does not imply returning to environmental conditions prior to development of the Project*." (p 6-11).

It is unclear what "similar" means and how reversibility is determined. It is important to provide clarity on the objective to return the site to similar habitats because some deviations of plant composition may result in deviations of ecosystem function, particularly related to their value as wildlife habitat. For example, a reclaimed heath tundra habitat that is "similar" to the original habitat in all vegetation species but lacking lichen would not be useful for caribou. Alternatively, a higher abundance and depth of plant litter and grasses would favour a higher abundance of small mammals than the original habitat (effects on both lichen and vegetation litter have been found in the Diavik Diamond mine monitoring programs). If some key forage or cover resource species will not be re-established after reclamation, then the impact could be considered irreversible. This may have implications for much of the wildlife impact assessment.

Request

Please define the term "similar habitat", describe how similarity will be measured or evaluated before and after disturbance and explain whether the definition of similarity is also used to define reversibility in the effects assessment.

IR Number: GKP 7

Source: Gahcho Ku Panel

To: De Beers Canada

Reference: Section6.7.4

Subject: Determination of Significance

Preamble

De Beers provided a definition of significance for the impacts to wildlife leaning on the viability of populations. From an ecological point of view it may be reasonable to assume that an impact is significant when any given wildlife species ceases to be viable in the landscape. However, significance also can reflect social or cultural value; that is, a reduction of wildlife resources or the local extirpation of a species may be deemed significant by some people, even if the regional population viability is not at stake. The Terms of Reference clearly link the determination of significance to the values of communities: "*Communities have expressed that their primary concerns often are broad and holistic, dealing with interconnecting systems of the land and the people who depend on it, instead of the more narrow subjects often studied by conventional scientific specialists*."(p.3) and *"Generally an impact on a highly valued component may trigger significance at relatively low magnitude, duration, and likelihood."(*p. 16).

Community members stated at the analysis sessions in early December, 2011, that impacts may be deemed significant by the community even if the ecologists concluded that, for ecological reasons, any given impact is not significant.

Request

Did the developer include the importance of community information and traditional knowledge in its determination of the significance of impacts to wildlife? If yes, please describe methodology.

IR Number: GKP 8

Source: Gahcho Kué Panel

To: De Beers Canada

Reference: Section 6.5

Subject: Moose and musk ox, pathway analysis

Preamble

The EIS states that *"no linkage – pathway is removed by environmental design features and mitigation so that the Project results in no detectable environmental change and, therefore, no residual effects to a VC relative to baseline or guideline values;"* (p.6-13).

Environmental design features and mitigation are incorporated into the Project in order to either "*remove*" or "*mitigate*" any identified linkage pathway. This step in the analysis of potential effects of the Project on moose and muskoxen does not eliminate the need to collect sufficient data to permit testing of the effectiveness of mitigation measures. An identified pathway cannot be deemed to have "*no linkage*" simply because untested mitigation has been put in place. Follow-up monitoring programs must determine that mitigation is indeed effective and that no residual effects are present. The prediction that there will be no detectable (measurable) environmental change and residual effects must be tested.

Request

Please describe how mitigation measures or environmental design features for pathways identified as "*no linkage*" or "*secondary*" and removed from the effects analysis will be confirmed as effective. Please explain how a "*qualitative evaluation*" of residual effects will be sufficient to ensure that the Project has had no impact on the pathway in question.

IR Number: GKP 9

Source: Gahcho Kué Panel

To: De Beers Canada

Reference: Section 11.7

Subject: Uncertainty in baseline data on dust and lichens

Preamble: The EIS addresses indirect effects of dust on wildlife and describes one primary and two secondary effects pathways. This means that assessing the effect of mitigation through monitoring is important and the power of monitoring to detect changes depends on the baseline information. However, there are uncertainties in the baseline data which will induce uncertainty in the assessment of effects and design of monitoring programs.

Section 11.7.2.3.5 describes baseline metal concentrations measured for plant tissue collected from six sites at Kennady Lake (Annex E; Figure E4.8.1), including one site on processed kimberlite. The table lists five species of lichens each with small sample sizes and the average values of metals were highly variable. The Developer does not state why and if the averages included the samples from the processed kimberlite. The baseline data were collected in 2005 and 2007 which is after the other diamond mines had reported on the extent of changes in lichen chemical composition. This raises the question of why so few lichens samples were analyzed and why the sites were restricted to the immediate vicinity of Kennedy Lake. The small sample sizes make it difficult to discriminate between biological (process) and statistical variation in the baseline data. The restricted baseline sampling limits interpretation of future monitoring. The results were not compared with baseline and post-development levels of metals in lichens from the other diamond mines.

Request: Please provide further details on the baseline levels of metals in lichens and describe implications for sampling design to monitor the effectiveness of mitigation.

IR Number: GKP 10

Source: Gahcho Kué Panel

To: De Beers Canada

Reference: Section 11.7.6

Subject: Residual effects on vegetation

Preamble

Residual effects are repeatedly compared to a range of baseline conditions and to natural variation, stating that the effects will be "*within the range of baseline conditions*"(p.11.7-76), or that "*the magnitude of these effects is predicted to approach the limits of natural variation or baseline values.* "(p.11.7-77). It is unclear what the range of baseline conditions or the natural variation might be. If the information on either range or variation does not exist, then the effects evaluation and significance determination may not be meaningful.

Request

Please explain how a range of conditions or how the natural variation might be used as yardsticks to evaluate significance, because it is not apparent that either a range of conditions or the natural variation has been measured. Please explain if an alternative effects evaluation would be more meaningful, such as a clear and simple percentage or amount of change (such information exists in some results tables).

IR Number: GKP 11

Source: Gahcho Kué Panel

To: De Beers Canada

Reference: Section 11.8

Subject: Impacts from traffic on road

Preamble

The EIS provides useful information on impacts of the roads from past records. Information relates mostly to mortalities and spills. However, information on the effects on wildlife behavior, namely movement across the roads or avoidance of roads in the region, is qualitative and appears to be based solely on professional opinion. The EIS assures that "best practices" (e.g. p.11.8-65 or p.118-67) will mitigate impacts to wildlife. However, community members during the Analysis Sessions in early December, 2011, have testified that harvest occurs along the winter access roads. Therefore, it appears that the impacts of increased access during winter have not been assessed adequately.

The EIS assumes that "*changes to the behaviour of caribou from activity along winter roads is predicted to be within 5 km of a road.*"(p11.8-70).

Requests

Is there any statistical evidence that may exist in support of the claim that "*the magnitude of incremental impacts from sensory disturbance from combined indirect effects, including vehicles on the Winter Access Road is predicted to be negligible to low.*"(p.11.8-70)? Please elaborate on the rationale that a 10 km wide corridor of potentially several hundred kilometres in length (depending on the road segments included in the assessment) results in a negligible impact.

IR Number: GKP 12

Source: Gahcho Kué Panel

To: De Beers Canada

Reference: 11.11-12

Subject: Other ungulates, musk oxen

Preamble

"*Surveys for muskoxen populations were completed by government biologists in 1989, 1991, and 1998, and included the eastern and northeastern edge of the RSA (Wildlife Management Area U/MX/02 and Wildlife Management Area U/MX/01). Because the Project lies within the transition zone between the tundra and the treeline, moose, which are characteristic of boreal habitat types, may also occur within the RSA. Incidental observations of muskoxen and moose were documented within the RSA, from 1995 to 2005, during surveys for caribou and other wildlife species. The objective was to estimate the annual and seasonal occurrence, abundance, and distribution of muskoxen and moose in the RSA. Esker surveys completed in 2007 also were used to document the presence of muskoxen sign on all eskers within 35 km of the Project.*" (p 11.11-12)

It is not clear if "*baseline*" data will be representative of current conditions for wildlife in the area given that survey information for muskoxen spanned a timeframe of 16 years (1989-2005). Muskoxen population surveys dating back to 1989 (with the most recent being 1998) are more than 10 years out of date and do not cover the entire RSA, if they are even in the RSA.

Furthermore, only incidental observations of muskoxen and moose were documented in the RSA from 1995 to 2005. It appears no moose-specific surveys were completed and muskoxen specific surveys only covered a portion of the RSA over 10 years ago.

Request

1. If muskoxen datasets are combined, rationale should be provided. How will the data be analyzed given the time lag between surveys?
2. Please justify how incidental observations are sufficient to "*estimate the annual and seasonal occurrence, abundance, and distribution of muskoxen and moose in the RSA*".

IR Number: GKP 13

Source: Gahcho Kué Panel

To: De Beers Canada

Reference: Section 11.11.9, Section 11.11.10

Subject: Uncertainty, impact predictions and monitoring

Preamble

The EIS states that "*a Wildlife Effects Monitoring Program (WEMP) will be implemented to test impact predictions and further reduce any uncertainty related to each prediction*." (Section11.11.10).

The uncertainty analysis discusses various sources of uncertainty and how they were addressed in the EIS, but it does not explicitly identify parameters that would require particular attention in the follow-up programs. There does not appear to be a section in the Environmental Impact Statement on how impact predictions will be verified.

Request

Please explain how impact predictions will be verified, beyond the development of a WEMP (as this is already a requirement and expectation for the Project). Please describe what alternative measures will be used if proposed mitigation is not effective. Please identify specific parameters that would require attention in follow-up programs, or explain why there are none.

IR Number: GKP 14

Source: Gahcho Kué Panel

To: De Beers

Reference: Appendix 3.II

Subject: Fish and Fish Habitat

Preamble: It seems that, after the project is completed and Kennady Lake is refilled, the lake will have three submerged pits - Tuzo to 300 metres below the surface, Hearne to 200 metres and 5034, which is to be backfilled to 200 metres below the surface. The conceptual compensation plan acknowledges the existence of those pits, but there appears to be comparatively little information about how they will fundamentally change the properties of the lake's bathymetry. Beyond comments that the overall impacts on the fish community of the lake will be temporary (not entirely accepted by Fisheries and Oceans Canada) and will be compensated, the nature of the post-project lake as fish habitat may remain problematic. Kennady Lake may, after the project, appear from the surface to be a normal lake, but that will not be the case. The EIS should be more explicit about the eventual configuration of Kennady Lake. DBC should further substantiate the assertions in the EIS that the lake will essentially return to normal and may for a period even experience higher fish production.

Request: Please describe in more detail the eventual configuration of Kennady Lake and further substantiate the assertions that the lake will essentially return to normal and may for a period even experience higher fish production.

IR Number: GKP 15

Source: Gahcho Kué Panel

To: De Beers Canada Inc.

Reference: 7.4.1, 13.3.2

Subject: Cumulative Effects to Valued Components of the Terrestrial Environment

Preamble:

EIS Section 13 - Cumulative Effects does not provide sufficient detail to evaluate the potential significance of each Key Line of Inquiry (KLOI) and Subject of Note (SON) because the assessment pathways that were considered are not clear.

For example, the caribou assessment provided in Section 13.5.1 notes that five primary pathways were considered, but only references two of these (direct habitat loss and fragmentation and indirect changes to habitat quality) were evaluated. It is not clear whether, or how, other pathways such as road and subsistence harvest mortality, and effects of cumulative contaminant ingestion from multiple mines sites were evaluated. Impacts and linkages for non-primary pathways are also unclear in the carnivore assessment, 13.5.2, other ungulates assessment, 13.5.3 and species at risk, 13.5.4.

During the EIS Analysis Session, De Beers (Day 1 Transcript beginning at page 162) noted that the EIS considered primary, secondary, and no linkage pathways and that although secondary linkage pathways may not have been explicitly discussed, they were considered in the cumulative effects assessment. However, EIS Section 7.4.1 (page 7-50) states that "Pathways with no linkage to caribou populations or that are considered minor are not analyzed further ....". Similarly, EIS Section 13.3.2 (page 13-9) suggests that the evaluation of significance considered only primary pathways.

Request:

Please provide linkage diagrams [also referred to as impact hypothesis diagram] that shows all primary, secondary, and no linkage pathways that were considered in the EIS to reach the conclusions presented in Sections 13.5.1, 13.5.2, 13.5.3, 13.5.4. Ensure that if possible, the linkage diagrams show how interactions between pathways were considered (i.e., potential for additive, multiplicative, and synergistic effects), how effects on different seasonal ranges were integrated, and how results from this integrated scientific evaluation contributed to the evaluation of effects on sustainable use by people. Also provide a reference to where each pathway is described and assessed in the EIS.

IR Number: GKP 16

Source: Gahcho Kué Panel

To: De Beers Canada Inc.

Reference: 13.7, 13.3

Subject: Cumulative Socio-Economic Effects

Preamble:

Section 13 of the Environmental - Cumulative Effects does not always provide sufficient detail to evaluate project significance of each Key Line of Inquiry (KLOI) and Subject of Note (SON).

The Assessment of Cumulative Effects to the Social Environment provided in Section 13.7.3 concludes that "... it is likely that the cumulative positive and negative effects of social disparity will continue, although the effect will likely be low and not significant" but provides limited support for this conclusion. The Language assessment provided in Section 13.7.4.1 and the Cultural Landscape assessment provided in Section 13.7.4.2 does not provide assessment conclusions.

Request:

Please provide a linkage diagram [also referred to as impact hypothesis diagram] that shows all primary, secondary, and no linkage pathways that were considered in the EIS to reach the conclusions presented in Section 13.7.4.1 and 13.7.4.2. Ensure that the linkage diagram shows how interactions between pathways were considered. Please indicate how the proposed project, in combination with other existing and reasonably foreseeable projects, will affect the cultural landscape using the impact criteria provided in Section 13.3.1 (i.e., direction, magnitude, geographical extent, duration, reversibility, frequency, likelihood).

Please provide a conclusion of the overall significance of the Project in combination with other existing and reasonably foreseeable projects on the assessment endpoint for the socio-economic environment.

IR Number: GKP 17

Source: Gahcho Kué Panel

To: De Beers Canada

Reference: 7-91

Subject: Cumulative Terrestrial Effects

Preamble:

The De Beers EIS and presentations at the EIS Analysis Session cite several papers to support their conclusion that projected direct and indirect habitat loss is low relative to science-based 'critical thresholds'. For example, on page 7-91, the EIS states that cumulative direct disturbance to each seasonal range of the Bathurst herd is predicted to be less than or equal to 1.7%, and notes that "... this change is well below the 40% threshold value identified for habitat loss associated with declines in bird and mammal species... ". This conclusion may be misleading because the 40% value actually refers to the range at which numerical population effects increase more than expected, not the point at which numerical population effects begin to be observed. It is also inconsistent with Canadian analyses which have demonstrated that caribou are highly sensitive to comparatively low levels of direct habitat loss and alteration.

Request:

1. Provide a summary of research and studies that relate total direct and indirect disturbance (anthropogenic and natural) to barren-ground caribou population performance and likelihood of persistence.

2. Describe the potential effects of cumulative habitat loss relative to natural influences at different points in the natural caribou population cycle (i.e., population low, population high, increasing population, declining population).