IR Number: **1.1.1**

Source: **Mackenzie Valley Environmental Impact Review Board**

To: **Paramount Resources Ltd.**

DAR Section: **Section 3.2.11, Seismic Program page 78.**

Terms of Reference Section: **Section 2 (Scope of Development).**

Preamble

Paramount notes that 4 m to 6 m wide lines will be required for the Vibroseis seismic program(s). Low-impact seismic utilizing hand cut lines can be employed for programs using explosives as an energy source, thereby reducing both the long-term development footprint and potential for indirect ecological effects.

Request

The MVEIRB asks Paramount to provide information for:

a) Was low impact seismic considered as a Project Alternative?

b) If so, what factors were explicitly considered?

c) Why was it rejected?

IR Number: **1.1.2**

Source: **Mackenzie Valley Environmental Impact Review Board**

To: **Paramount Resources Ltd.**

DAR Section: **Section 7.1.1, page 118.**

Terms of Reference Section: **Section 4.1.3 (Impact Prediction).**

Preamble

The discussion of ecological thresholds references two documents that are not included in Section 10, References.

Request

The MVEIRB asks that Paramount provide the following information:

a) Please provide references for Suter (1993) and Suter et al. (1995).

IR Number: **1.1.3**

Source: **Mackenzie Valley Environmental Impact Review Board**

To: **Paramount Resources Ltd.**

DAR Section: **Section 7.1.1, page 119:**

Terms of Reference Section: **Section 2 (Scope of Development) and Section 3 (Scope of Assessment).**

Preamble

"Although the future wellsites are located to the best of Paramount's knowledge, uncertainties with respect to drilling success may affect the final location of subsequent wellsites" DAR p119. Because a spatially-explicit modelling approach was used for the cumulative effects assessment, the assessment conclusions are sensitive to the development footprint included in the Planned Development Case and Far Future Case. The Board acknowledges Paramount's effort to provide this information, but requires better definition of the effect of likely wellsite/right-of-way location changes on assessment conclusions.

Request

The MVEIRB asks that Paramount provide a detailed description of the assumptions used to generate the Planned Development Case, including:

a) The rationale for assuming that a maximum of 48 wells will be drilled within the SDL and an estimate of best case, realistic, and worst-case well numbers.

b) The assumptions used to define the footprint (including temporary workspace) for each disturbance feature (i.e., seismic source lines; seismic receiver lines; wellsites; facility sites; access roads; pipeline rights-of-way, camps, airstrips, borrow pits, other).

c) The rationale used to locate the 48 wells within the SDL as shown on Figure 7.1-5, and the locations that would be associated with best case, realistic, and worst-case well estimates.

d) The rationale used to locate the access roads and pipeline rights-of-way shown on Figure 7.1-5 and the locations that would be associated with best case, realistic, and worst-case well estimates.

e) The rationale used to generate the conclusion that 50% of planned disturbance will be reused (page 222).

IR Number: 1.1.4

Source: Mackenzie Valley Environmental Impact Review Board

To: Paramount Resources Ltd.

DAR Section: Section 7.1.1, page 119

Terms of Reference Section: Section 2 (Scope of Development) and Section 3 (Scope of Assessment).

Preamble

Although the future wellsites are located to the best of Paramount's knowledge, uncertainties with respect to drilling success may affect the final location of subsequent wellsites. As noted in various points throughout the DAR, additional temporary work space may be required during construction.

Request

The MVEIRB asks Paramount to provide the following information:

a) Please indicate whether disturbance by temporary work space was included in the estimates for Baseline, Application, and Planned Development cases.

IR Number: **1.1.5**

Source: **Mackenzie Valley Environmental Impact Review Board**

To: **Paramount Resources Ltd.**

DAR Section: **Section 7.1.1.1.2, page 120**

Terms of Reference Section: **Section 4.1.1 (Spatial Boundaries).**

Preamble

The rationale for basing the soils, terrain, vegetation, and wildlife Cumulative Effects Study Area on an average female woodland caribou home range size is not clear. Use of an individual home range implies that the assessment is focussed on organism-level effects rather than population- or community-level effects. No discussion of the procedure used to define the boundary encompassing this pre-defined area (Figure 7.1-2) was located.

Request

The MVEIRB asks that Paramount provide the following information:

a) The rationale for the use of an average female woodland caribou home range as the terrestrial CESA.

b) Provide an explanation of the procedure used to establish the terrestrial CESA boundary, including the factors explicitly considered.

IR Number: **1.1.6**

Source: **Mackenzie Valley Environmental Impact Review Board**

To: **Paramount Resources Ltd.**

DAR Section: **Section 7.1.1.1.2, page 120**

Terms of Reference Section: **Section 4.1.1 (Spatial Boundaries).**

Preamble

The terrestrial Cumulative Effects Study Area is based on the home range of one female woodland caribou (70,000 ha), however, the area used in the calculations is actually the total Terrestrial Study Area shown as 96,231 ha (Table 7.8-1 Native Vegetation Communities). These areas appear to be contradictory.

Request

The MVEIRB asks that Paramount provide the following information:

a) Why is the CESA being expanded to the vegetation boundaries when the original intent was to use the range of a single female woodland caribou?

IR Number: 1.1.7

Source: Mackenzie Valley Environmental Impact Review Board

To: Paramount Resources Ltd.

DAR Section: Section 7.1.1.5.1, Duration impact description criteria page 127

Terms of Reference Section: Section 4.1.2 (Temporal Boundaries).

Preamble

"Medium-term is 1-20 years (proposed life of the project), and long-term is >20 years (e.g., persists beyond the life of the project)" p127. The Terms of Reference note that the assessment should be based on existing and potential future impacts rather than the duration of the development.

Request

The MVEIRB asks that Paramount provide the following information:

a) Rationale for basing duration criteria on project rather than ecological or social considerations.

IR Number: **1.1.8**

Source: **Mackenzie Valley Environmental Impact Review Board**

To: **Paramount Resources Ltd.**

DAR Section: **Section 7.1.1.5.3 Environmental Consequence, page 128**

Terms of Reference Section: **Section 4.1.3 (Impact Prediction).**

Preamble

"This quantitative assessment system is intended to be used as a guide to facilitate the final assessment step; it is not intended to provide a definitive value" p128. The Terms of Reference note that the developer should present its views on the significance of each impact, but the Paramount Cameron Hills DAR only presents numerical and descriptive values for Environmental Consequence.

Request

The MVEIRB asks that Paramount provide the following information:

a) Are the terms Environmental Significance and Environmental Consequence being used interchangeably by the developer?

b) If not, please provide a rating scheme to relate Environmental Significance to Environmental Consequence.

IR Number: **1.1.9**

Source: **Mackenzie Valley Environmental Impact Review Board**

To: **Paramount Resources Ltd.**

DAR Section: **Section 7.1.1.5.3, Environmental Consequence, Reversibility ratings, page 128.**

Terms of Reference Section: **Section 4.1.3 (Impact Prediction)**

Preamble

The numerical screening system used in the Paramount Cameron Hills DAR applies a negative factor to reversible impacts. This weighting effectively negates one or more values assigned to the Duration, Frequency, or Geographic Extent criteria (e.g., the Duration of an impact is irrelevant to Environmental Consequence, as long as it is reversible) and effectively emphasizes the Magnitude criteria. As noted in the CEAA Reference Guide appended to the MVEIRB cumulative effects guidance document (MVEIRB 2000), "In practice, it can be difficult to know whether the adverse effects of a project will be irreversible or not." This should be especially relevant to impacts that are long-term or continuous, those where mitigation/revegetation/reclamation methods are unproven, or those outside the proponent's direct control (e.g., public use of rights-of-way).

Request

The MVEIRB asks that Paramount provide the following information:

a) Rationale for applying a negative weighting factor to reversible impacts.

IR Number: **1.1.10**

Source: **Mackenzie Valley Environmental Impact Review Board**

To: **Paramount Resources Ltd.**

DAR Section: **Section 7.2.5.2.3 Other Air Quality Parameters (pps 158,165-166)**

Terms of Reference Section: **Section 4 (Developer's Assessment Report).**

Preamble

"It is also reasonable to assume that the areas with elevated PAI levels (i.e., above 0.17 keq/ha/yr) at Cameron Hills would be smaller than at Snap Lake and that they would be restricted to an area that would lie fully within the Cameron Hills SDL"(p158).
The discussion of potential acid deposition effects is based on comparison with another EIA, rather than a quantitative evaluation of potential effects in the Paramount CESA. While it may be true that the area with elevated PAI levels is smaller than at Snap Lake, what matters is the potential effects of this deposition on sensitive receptors (i.e., soils and waterbodies) in the Paramount CESA. The basis for the impact description criteria provided in Tables 7.2-19 and 7.2-25 is not clear. There is no evidence shown that supports a direct comparison between Cameron Hills and Snap Lake.

Request

The MVEIRB asks that Paramount please provide the following information:

a) Justification for the comparison of Cameron Hills and Snap Lake PAI.

b) Spatially-explicit modelling predictions of cumulative Potential Acid Input levels resulting from Application Case and Planned Development Case emissions at Cameron Hills.

IR Number: 1.1.11

Source: Mackenzie Valley Environmental Impact Review Board

To: Paramount Resources Ltd.

DAR Section: Section 7.8.3.1.5, Residual Impact Classification (Table 7.8-6, page 271)

Terms of Reference Section: Section 4.1.3 (Impact Prediction).

Preamble

The duration of direct vegetation loss/alteration is concluded to be of medium-term (i.e,. 1-20 years) and low frequency (i.,e., one time) in the DAR. Vegetation loss/alteration occurs until vegetation is restored to pre-disturbance conditions, which may be >80 years for mature forest and these effects occur continuously. Thus, impacts of direct habitat loss/alteration are likely to be long-term in duration (i.e., >20 years) and High frequency (i.e., continuous).

Request

The MVEIRB asks that Paramount please provide the following information:

a) Additional information relevant to the study area to support the conclusion that impacts from vegetation loss/alteration are medium-term and one-time.

IR Number: **1.1.12**

Source: **Mackenzie Valley Environmental Impact Review Board**

To: **Paramount Resources Ltd.**

DAR Section: **Section 7.3.2.3 Potential Impacts to Soil and Terrain page 172**

Terms of Reference Section: **Section 4.1.3 (Impact Prediction).**

Preamble

"Topography, site elevation, and drainage patterns can be altered at the local scale (e.g., within a lease). Implementing progressive reclamation is expected to yield short- to moderate-term disturbances to terrain"p 172. Effects on drainage patterns are generally considered to extend beyond the lease or right-of-way area (i.e., a Regional effect according to the geographic extent criteria provided in Section 7.1.1.5.1). Effects on soil and terrain will extend beyond the proposed 20 year production period (i.e., a Long-term effect according to the geographic extent criteria provided in Section 7.1.1.5.1). Therefore, there is a contradiction as to whether the effects are short/moderate term versus long term.

Request

The MVEIRB asks that Paramount please provide the following information:

a) Rationale as to whether the effects on soil and terrain are short/moderate term or long term in nature.

IR Number: **1.1.13**

Source: **Mackenzie Valley Environmental Impact Review Board**

To: **Paramount Resources Ltd.**

DAR Section: **Section 7.3.3.1.2 Soils and Terrain Residual Impact Classification, p 178-179**

Terms of Reference Section: **Section 4.1.3 (Impact Prediction).**

Preamble

"All impacts are predicted to be negligible for soil and terrain…" p178. However, the impact summary included in Table 7.3-6 notes that environmental consequence is *negligible to low*, as opposed to *low*.

Request

The MVEIRB asks that Paramount please provide the following information:

a) Confirm that impacts on soils and terrain are rated as *negligible to low*.

IR Number: **1.1.14**

Source: **Mackenzie Valley Environmental Impact Review Board**

To: **Paramount Resources Ltd.**

DAR Section: **Section 1.1.16 and 1.1.1.17**
Terrain and Soil Non-Technical Summary, p 8

Terms of Reference Section: **Section 4.1.3 (Impact Prediction).**

Preamble

"Project development will not alter the terrain in the long-term…" p8. However, the Soil and Terrain Residual Impact summary included in Table 7.3-6 notes that effects on soil and terrain will be long-term.

Request

The MVEIRB asks that Paramount please provide the following information:

a) Clarify and confirm that impacts on soils and terrain will be long-term.

IR Number: **1.1.15**

Source: **Mackenzie Valley Environmental Impact Review Board**

To: **Paramount Resources Ltd.**

DAR Section: **Section 7.4.4.1.5 Surface Water Assessment Approach, page 191**

Terms of Reference Section: **Section 4.1.1 (Spatial Boundaries)**

Preamble

The aquatics cumulative effects study area (CESA) was established to reflect the maximum extent of potentially affected watersheds that originate within the Cameron Hills SDL (Section 7.1.1.1.1, page 120). Quantitative analyses of disturbed area and crossings are provided for the Cameron River watershed (1,387 km^2) and combined aquatics CESA (1,987 km^2). Use of too large a study area diminishes effects; for example, the aquatic disturbed area calculations included in Table 7.4-8 (page 201) are less than half the values reported for soils and terrain units in Tables 7.3-3 and 7.3-4 (page 177), and impact magnitude was typically rated to be negligible (i.e., no measurable effect). Cumulative effects on hydrology and sediment yield are most frequently evaluated in subwatersheds smaller than 500 km^2 (e.g., Bosch and Hewlett 1982; BCF 1999), particularly where disturbance is concentrated in one part of a drainage.

Request

The MVEIRB asks that Paramount please provide the following information:

a) A quantitative analysis of existing and future disturbed areas for the Cameron River subwatershed, where most Paramount activities are concentrated, as opposed to the entire watershed.

IR Number: **1.1.16**

Source: **Mackenzie Valley Environmental Impact Review Board**

To: **Paramount Resources Ltd.**

DAR Section: **Section 7.1.1.5.1 Magnitude impact description criteria, page 127**

Terms of Reference Section: **Section 4.1.3 (Impact Prediction).**

Preamble

"The categorization of the impact magnitude (i.e., high, moderate, low, or negligible) is based on a set of criteria, ecological concepts, and professional judgement pertinent to each of the discipline areas analyzed." Geographic extent description criteria page 127: It is recognized that a method of defining impacts … in terms of a percentage … must be tempered with an overall qualitative approach that considers the impacts of disturbance …" p127. The same impact magnitude criteria appear to have been used for each discipline area and effect pathway in the cumulative effects assessment, although the discussion included in Section 7.1.1.5.1 implies that other factors were considered.

Request

The MVEIRB asks that Paramount please provide the following information:

a) Identify the other factors that were considered when assigning magnitude ratings for potential effects on hydrology and sediment yield.

IR Number: 1.1.17

Source: Mackenzie Valley Environmental Impact Review Board

To: Paramount Resources Ltd.

DAR Section: Section 7.5.7.1.1, page 209
Section 7.5.8, Classification of Cumulative Impacts on Groundwater, page 211.

Terms of Reference Section: Section 4.1.2 (Temporal Boundaries).

Preamble

In Table 7.5-1, the effect of pits and sumps is concluded to be short-term in duration (i.e., <1 year), whereas the text included in Section 7.5.7.1.1 refers to long-term impacts.

Request

The MVEIRB asks that Paramount please provide the following information:

a) Does Paramount intend to contain drilling fluids in remote sumps? (Section 3.2.5)

b) Are potential impacts from these pits long-term in duration?

IR Number: **1.1.18**

Source: **Mackenzie Valley Environmental Impact Review Board**

To: **Paramount Resources Ltd.**

DAR Section: **Section 7.6.1.1, page 213**

Terms of Reference Section: **Section 4.2 (DAR Specific Items)**

Preamble

"During the winter caribou utilize uplands, bogs and south-facing slopes …these findings are similar to those found in northeastern Alberta" DAR p213.
"As a result, upland areas considered suitable habitat for ungulates such as moose are not considered suitable habitat for woodland caribou…."Appendix V, Wildlife HSI Model Descriptions, page V-2.
These statements appear to be contradictory.

Request

The MVEIRB asks that Paramount please provide the following information:

a) Are uplands, bogs and south-facing slopes suitable habitat for woodland caribou?

b) Resolve inconsistencies in above statements presented in DAR.

IR Number: **1.1.19**

Source: **Mackenzie Valley Environmental Impact Review Board**

To: **Paramount Resources Ltd.**

DAR Section: **Section 7.6.1.3, page 217**

Terms of Reference Section: **Section 4.2 (DAR Specific Items).**

Preamble

"Overall, the Cameron Hills is considered to be of poor habitat quality for fur-bearers and in particular marten, due to a lack of forested vegetation with a high structural complexity" p217. This conclusion regarding marten habitat quality is inconsistent with the habitat suitability map included as Figure 7.6-3 which shows large areas of medium and high quality marten habitat.

Request

The MVEIRB asks that Paramount please provide the following information:

a) Resolve inconsistencies in above statements presented in DAR

IR Number: **1.1.20**

Source: **Mackenzie Valley Environmental Impact Review Board**

To: **Paramount Resources Ltd.**

DAR Section: **Section 7.6.3.2, page 222**

Terms of Reference Section: **Section 4.2 (DAR Specific Items).**

Preamble

"Approximately 50% of new disturbances will be reused for other components of the project" p222. Information on disturbance features for the Existing, Project Application, and Planned Development cases is presented in several locations in the DAR.

Request

The MVEIRB asks that Paramount please provide the following information:

a) A tabular summary of disturbance by land use feature (i.e., seismic lines, roads, pipelines, wells, facilities, camps, etc.) in the aquatic and terrestrial CESAs for the Existing developments

b) A tabular summary of disturbance by land use feature (i.e., seismic lines, roads, pipelines, wells, facilities, camps, etc.) in the aquatic and terrestrial CESAs for the Project Application developments

c) A tabular summary of disturbance by land use feature (i.e., seismic lines, roads, pipelines, wells, facilities, camps, etc.) in the aquatic and terrestrial CESAs for the Planned developments

IR Number: **1.1.21**

Source: **Mackenzie Valley Environmental Impact Review Board**

To: **Paramount Resources Ltd.**

DAR Section: **Section 7.6.3.4.3, page 228-229**

Terms of Reference Section: **Section 4.2 (DAR Specific Items).**

Preamble

Pages 228-229 of the DAR suggest that the sensory disturbance assessment is "conservative" or "ultra-conservative", because Section 7.6.3.2.4, page 225: "... displacement is reduced following wildlife habituation to the disturbance; page 7.6.3.4.3, page 228: "It is anticipated that most animals will learn to tolerate noise as long as the disturbance is predictable in both time and space." Table 7.6-16: the frequency of sensory disturbance is concluded to be of Short-term duration (i.e., <1 year), and Low frequency (i.e., once).As noted later in Section 7.6.3.4.3. of the DAR, actual response to disturbance "is expected to vary, depending on the individual and species". Although habituation to consistent, stationary noise sources (e.g., compressors) is likely to occur, thereby reducing (but not necessarily eliminating) the zone of influence, habituation to production-related ATV and vehicle traffic outside protected areas such as National Parks cannot be considered likely. Wildlife monitoring conducted by Paramount has documented reduced wildlife use adjacent to pipeline rights-of-way (Section 9.3). Thus, impacts associated with sensory disturbance are likely to be long-term in duration (i.e., >20 years), and high frequency (i.e., continuous during the project).

Request

The MVEIRB asks that Paramount please provide the following information:

a) When referring to the term impact in this case, do you mean stimulus (ie. actual noise)?

b) Are impacts associated with sensory disturbance short-term?

c) Are impacts associated with sensory disturbance one-time?

IR Number: 1.1.22

Source: Mackenzie Valley Environmental Impact Review Board

To: Paramount Resources Ltd.

DAR Section: Section 7.6.4, Wildlife Assessment Results

Terms of Reference Section: Section 4.2 (DAR Specific Items), page 13

Preamble

Page 13 of the Terms of Reference requests Paramount to "... address changes in effective or critical habitat for boreal woodland caribou." The wildlife impact assessment focuses on generic 'habitat units' (HU) that provide a single measure of habitat availability and suitability. One of the disadvantages of this approach is that comparative changes in low and high quality units cannot be compared. This can result in a situation where disturbance of a small area of high suitability (critical) habitat can be discounted by large areas of low suitability habitat. As noted in DAR page 233, "... disturbance is relatively localized in the central and southern areas of the SDL..." and Figure 7.6-1 suggests that this area may contain higher suitability habitat than other parts of the SDL.

Request

The MVEIRB asks that Paramount please provide the following information:

a) Supplement each HU estimate included in Section 7.6.4 with numerical estimates of HUs classified as High and Moderate Suitability.

IR Number: **1.1.23**

Source: **Mackenzie Valley Environmental Impact Review Board**

To: **Paramount Resources Ltd.**

DAR Section: **Section 7.1.1.5.1, Magnitude impact description criteria, page 127**

Terms of Reference Section: **Section 4.1.3 (Impact Prediction).**

Preamble

"The categorization of the impact magnitude (i.e., high, moderate, low, or negligible) is based on a set of criteria, ecological concepts, and professional judgement pertinent to each of the discipline areas analyzed"p127. Geographic extent description criteria page 127: It is recognized that a method of defining impacts … in terms of a percentage … must be tempered with an overall qualitative approach that considers the impacts of disturbance on overall viability and diversity…" Table 7.6-16, page 238.
The same impact magnitude criteria appear to have been used for each wildlife species and effect pathway in the cumulative effects assessment, although the discussion included in Section 7.1.1.5.1 implies that other factors were considered.

Request

The MVEIRB asks that Paramount please provide the following information:

a) Identify the other factors that were considered for woodland caribou

b) Identify the other factors that were considered for marten

c) Identify the other factors that were considered for forest songbirds.

IR Number: **1.1.24**

Source: **Mackenzie Valley Environmental Impact Review Board**

To: **Paramount Resources Ltd.**

DAR Section: **Section 7.6.4.4.3 Residual Impact Classification (Table 7.6-16, page 238)**

Terms of Reference Section: **Section 4.1.3 (Impact Prediction).**

Preamble

The duration of direct habitat loss is concluded to be of medium-term (i.e,. 1-20 years) and low frequency (i.,e., one time) in the DAR. Habitat loss/alteration occurs until vegetation is restored to pre-disturbance conditions, which may be >80 years for mature forest and these effects occur continuously. Thus, impacts of direct habitat loss/alteration are likely to be long-term in duration (i.e., >20 years) and High frequency (i.e., continuous).

Request

The MVEIRB asks that Paramount please provide the following information:

a) Additional information relevant to the study area to support the conclusion that impacts from habitat loss are medium-term and one-time.

IR Number: **1.1.25**

Source: **Mackenzie Valley Environmental Impact Review Board**

To: **Paramount Resources Ltd.**

DAR Section: **Section 7.6.4.4.3 Residual Impact Classification (Table 7.6-16, page 238)**

Terms of Reference Section: **Section 4.2 (DAR Specific Items)**

Preamble

Page 11 of the Terms of Reference asks Paramount to "... examine ecosystem components and analyze how they will be impacted by all development components combined in space and over time, rather than presenting individual components and their impacts." Residual effects are provided for each VEC and effect pathway, but potential combined effects from multiple pathways are not considered.

Request

The MVEIRB asks that Paramount please provide the following information:

a) Total impacts of past, present, and reasonably foreseeable activities and developments on Woodland Caribou

b) Total impacts of past, present, and reasonably foreseeable activities and developments on Moose

c) Total impacts of past, present, and reasonably foreseeable activities and developments on Marten

d) Total impacts of past, present, and reasonably foreseeable activities and developments on Forest Songbirds

IR Number: **1.1.26**

Source: **Mackenzie Valley Environmental Impact Review Board**

To: **Paramount Resources Ltd.**

DAR Section: **Section 7.8.3.4 Far Future Vegetation Scenario pp 276-277**

Terms of Reference Section: **Section 4.1.2 (Temporal Boundaries).**

Preamble

Forest fires are one of the primary sources of natural disturbance in the boreal forest. Because they affect both habitat availability and suitability over the long-term, assumptions used in scenario modelling affect both modelling conclusions and confidence.

Request

The MVEIRB asks that Paramount please provide the following information:

a) Provide the assumptions used to generate the Far Future Case burned area estimate of 395 ha, including the pre-disturbance vegetation communities considered to have been burned.

b) Provide information relevant to the study area to support the assumption that historical fire frequencies will continue over the next 70 years, given the dominance of mid to mature seral stage vegetation communities.

IR Number: **1.1.27**

Source: **Mackenzie Valley Environmental Impact Review Board**

To: **Paramount Resources Limited**

DAR Section: **Cameron Hills Extension Development Description, Water Use**

Terms of Reference Section: **C. Development Description, C-5.Water Use**

Preamble

The DAR illustrates proposed water consumption (Table 3.5-1) for access construction, which accounts for nearly one hundred percent of consumption, over the next ten years. However, the calculations used to predict water consumption are based on years where water consumption has been average. Furthermore, the annual water yields, or water available for consumption, from the proposed source lakes (Table 7.4-5) is based on mean hydrological conditions. Water consumption predictions based solely on mean values do not leave room for contingency planning, where outside of average hydrologic patterns may be encountered.

Request

The MVEIRB asks Paramount to please provide information for:

a) Proposed water consumption (Table 3.5-1), factoring in a twenty percent (20%) increase in water use

b) How would available source water be altered in 10 year dry and 100 year dry conditions, with a compounding factor of increased water consumption, as calculated above?

c) Plan to monitor changes in water levels and associated impacts

d) Strategy to mitigate changes in water levels and associated impacts, in the event detected (adaptive management).

IR Number: **1.1.28**

Source: **Mackenzie Valley Environmental Impact Review Board**

To: **INAC, South Mackenzie District**
DFO
Environment Canada
GNWT-RWED

DAR Section: **Developer Information, Paramount Resources Limited**
Environmental Performance Record

Terms of Reference Section: **B. Developer Information,**
B-4. Performance Record

Preamble

The DAR lists prior commitments made on behalf of Paramount Resources Ltd. to the MVLWB with respect to the operations at Cameron Hills (Table 2.4-2). This Table also describes the current status of the commitments made by Paramount Resources Ltd., according to the developer, during the previous Environmental Assessment. Past performance, with respect to recommendations made throughout the Environmental Assessment process, may be indicative of willingness to comply with future recommendations.

Request

The MVEIRB asks INAC (South Mackenzie District), DFO, Environment Canada and GNWT-RWED to please provide the following information, according to your area of expertise:

a) In your professional opinion, have all commitments made by the developer been adhered to, as indicated in the summary (Table 2.4-2)?

b) If not, please indicate which commitments raise your concern and why?

IR Number: 1.1.29

Source: Mackenzie Valley Environmental Impact Review Board

To: Paramount Resources Limited

DAR Section: 3. Cameron Hills Extensions Development Description, 3.2 Construction Methods

Terms of Reference Section: C. Development Description, C-2. Construction Methods

Preamble

The DAR proposes, as a mitigative measure, a minimum of 4 centimeters of snow cover to protect surface vegetation in low lying areas from winter access road construction. However, the Department of Transportation Handbook (GNWT 1993) clearly indicates that a minimum of 10 centimeters of snow cover is the acceptable standard. The DAR also proposes, as a mitigative measure, to keep the bottom edge of the blade elevated no less than 4 centimeters above the surface to avoid disturbance of vegetation while windrowing timber and slash. Again, the Department of Transportation Handbook (GNWT 1993) suggests the acceptable standard is at least a 1 meter blade height while clearing, and at minimum a 15 centimeter blade height from the surface while windrowing.

Request

The MVEIRB asks Paramount to please provide the following information:

a) Rationale for not proposing to follow minimum10 centimeter snow cover standard during construction of winter access roads in low lying areas.

b) Rationale for not proposing to follow minimum 15 centimeter blade height standard when windrowing timber and slash from satellite and well sites.

c) Why is the use of mushroom shoes not included as a mitigation measure?

IR Number: **1.1.30**

Source: **Mackenzie Valley Environmental Impact Review Board**

To: **Paramount Resources Limited**

DAR Section: **7. Effects on the Environment, 7.11 Socio-Economics**

Terms of Reference Section: **G. Effects on the Environment, G-10 Economic Factors**

Preamble

The DAR utilizes the terms 'northerner' and 'northern business' in its descriptions of potential benefits, employment, procurement and economic benefits to the Northwest Territories. However, it is unclear what is exactly understood by these terms.

Request

The MVEIRB asks Paramount to please provide the following information:

a) Who does the term 'northerner', used in the DAR's description of Socio-Economics, exactly include?

b) What constitutes a 'northern business'?

IR Number: 1.1.31

Source: Mackenzie Valley Environmental Impact Review Board

To: Paramount Resources Limited

DAR Section: 7. Effects on the Environment, 7.6 Wildlife
Section 7.6.4.2.3, Barriers to Movement and Increased Access

Terms of Reference Section: G. Effects on the Environment,
G-5. Fish and Wildlife

Preamble

Section 7.6.4.2.2 of the DAR examines habitat loss and alteration due to disturbance associated with development. The linear disturbance density calculated for the Paramount Cameron Hills SDL is 3.0 km per km^2. One of the disadvantages to relying on a single mean value is that relevant spatially-explicit components cannot be evaluated. As noted in DAR page 233, "disturbance is relatively localized in the central and southern areas of the SDL..." and Figure 7.6-1 suggests that this area may contain higher suitability habitat than other parts of the SDL.

Furthermore, habitat loss due to disturbance can be more accurately measured by not only the total linear disturbance, but by looking at the zone of influence of such disturbances. In the case of Cameron Hills, Woodland Caribou can be used as the indicator species. The literature suggests that any area within 250m of a linear disturbance will be avoided by caribou and up to 1000m from wellsites will also be avoided (2003: Government of Alberta: Status of Alberta Wildlife). Other recent work of the Alberta Boreal Caribou Committee (2003) also suggests that linear corridors and forest age are the best predictors of woodland caribou population effects.

Request

The MVEIRB asks Paramount to please provide the following information:

a) Document the method used to calculate linear disturbance density

b) A spatial analysis of the Cameron Hills SDL, employing a 250 meter buffer on either side of any linear disturbance (cutlines, ROWs, pipelines, roads) and a 1000 meter buffer around wellsites. This information should be presented in the form of a paper map, at a scale of 1:50 000.

c) Evaluate the suitability of the Alberta Boreal Caribou Committee formula in the Cameron Hills area.

IR Number: 1.1.32

Source: Mackenzie Valley Environmental Impact Review Board

To: Paramount Resources Limited

DAR Section: 7. Effects on the Environment, 7.6. Wildlife

Terms of Reference Section: G. Effects on the Environment, G-5. Fish and Wildlife

Preamble

As discussed in the DAR, the cumulative amount of linear disturbance under the Planned Development Case is 2,887 km. Linear disturbance includes access roads, pipeline corridors, cutlines etc. A major concern is the increased accessibility of the Cameron Hills to nearby communities and the public at large. Increased traffic to the area results in undue pressures on wildlife populations. As a mitigative measure, Paramount proposes to install a gate along the main winter access road which will be either staffed or locked, with the understanding that no one is to pass unless it is work related.

Request

The MVEIRB asks Paramount to please provide the following information:

a) What is the schedule for the personnel at the gate?

b) Alternatively, when will the gate be locked?

c) When work crews are not on site, is it unrestricted access?

d) Is there any signage indicating controlled access?

e) Are there any repercussions for people found accessing Cameron Hills SDL?

f) What measures do you propose in the event that pressures are being felt from unrestricted access?

IR Number: **1.1.33**

Source: **Mackenzie Valley Environmental Impact Review Board**

To: **Paramount Resources Ltd.**

DAR Section: **7.4 Surface Water**

Terms of Reference Section: **G-4 Water**

Preamble

The estimated flow volume of the Cameron River is based on the assumption that the ratio between the flow volumes of the Cameron River and the Steen River is exactly the same as the ratio between the area of the watershed of both rivers. Despite the considerable uncertainty with this estimate the DAR does not include any kind of contingency. Moreover, the calculation of the water flow reduction for the Cameron River uses the average flow of the Steen River (5.4m3/2) rather than the estimated volume for the Cameron River (3.0m3/s).

The DAR concludes that the flow reduction of the Cameron River will be negligible but does not address the flow reduction of the creek that connects lake 1 with the Cameron River.

Request

The MVEIRB asks Paramount to please provide the following updated impact predictions taking into account:

a) a 20% reduction of the estimated flow volume of the Cameron River to account for possible errors in estimating the flow volume;

b) flow volumes not only in an average year and average water consumption, but under 10 and 100 year dry conditions at 20% increased water consumption; and

c) impacts on the creek and small lake connecting the water source to Cameron River.

IR Number: **1.1.34**

Source: **Mackenzie Valley Environmental Impact Review Board**

To: **Paramount Resources Ltd.**

DAR Section: **7.3 Soil and Terrrain**

Terms of Reference Section: **G-3 Soil**

Preamble

Soil erosion is generally governed by:

- amount, duration and intensity of precipitation
- soil erodibility,
- slope length and gradient,
- vegetation cover, and
- mechanical erosion control measures.

Of these the DAR addresses vegetation cover and to some extent soil erodibility. Slope is mentioned as a factor but not included in the determination of erosion potential. The DAR equates the potential for soil erosion with the disturbed area of certain soil and terrain units and concludes that the potential is low because less than 1% of the total study area constitutes disturbed areas on susceptible units. The DAR does not address the potential for erosion on steep slopes, which can introduce considerable amounts of sediment into a water body, despite affecting a very small area compared to the entire study area.

The DAR derives soil units by converting Landsat TM satellite images and equating vegetation classes with soil units. It does not explain how soil units were derived from Landsat images, e.g. which soil unit is associated with which vegetation class. The DAR further does not discuss the level of accuracy and the spatial resolution of the Landsat derived soil map.

The DAR states that organic soils have negligible erosion potential.

The DAR states that there is no erosion potential on seismic lines because seismic activity is limited to winter (7.3.2.3.1) The DAR, however, also states that pipeline construction adjacent to seismic lines can result in erosion problems (7.3.2.3).

The DAR states that "with complete restoration of all disturbed lands following final reclamation, there will be no net loss in soil and terrain units. The DAR also states that black spruce bogs will likely revert to black spruce uplands because of disturbance to the peat layer.

Request

The MVEIRB asks Paramount to please provide the following information:

a) Describe if and how slope gradient and length were used to derive the potential for erosion.

b) If these factors were not used, explain if and how Paramount intends to predict potential erosion of individual slopes prior to any future RoW development.

c) Describe the approach to derive soil units from Landsat images, including:
   a. spatial resolution,
   b. confidence level (how derived),
   c. classification procedure, and
   d. basis for equating specific soil units with vegetation classes.

d) Explain why organic soils have negligible erosion potential. While a high organic content decreases the erodibility of any soil, factors such as slope may still play a role.

e) Please clarify if there is any potential for erosion associated with seismic lines, e.g. where seismic lines cross a pipeline RoW. Justify you conclusions.

f) Explain what the term "complete restoration" entails. To what standard will the used land be restored. Particularly, to what standard can soil units be restored where cut and fill is needed on a pipeline RoW or on a lease. If complete restoration of disturbed areas is not possible, revise the impact summary in table 7.3-6 accordingly.

1. . REFERENCES

Alberta Boreal Caribou Committee. 2003. Boreal Caribou Committee Quicknote: Developing a Habitat Planning Target for Range Planning.

BCF (British Columbia Ministry of Forests). 1999. Coastal Watershed Assessment Procedure Guidebook (CWAP), Interior Watershed Assessment Procedure Guidebook (IWAP) Second Edition, April 1999. Available online at: http://www.for.gov.bc.ca/tasb/legsregs/fpc/fpcguide/wap/WAPGdbk-Web.pdf

Bosch, J.M. and J.D. Hewlett. 1982. A review of catchment experiments to determine the effect of vegetation changes on water yield and evapotranspiration. Journal of Hydrology. 55:3-23.

MVEIRB (Mackenzie Valley Environmental Impact Review Board). 2000. Addressing cumulative effects in environmental assessments under the *Mackenzie Valley Resource Management Act* (Interim Guide, September 2000).

MVEIRB (Mackenzie Valley Environmental Impact Review Board). 2003. Terms of Reference and Work Plan for the Environmental Assessment of the Paramount Cameron Hills Extension, Issued August 8, 2003.