



**Paramount Resources Ltd.**

**Significant Discovery Licence 8, 2D Geophysical Program**

**Environmental Assessment EA0506-007**

**Addendum to Developers Assessment Report**

June 15 2006

Submitted by:

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## INTRODUCTION

Paramount Resources Ltd. (Paramount) is submitting this Addendum to Developers Assessment Report to address items raised in the Mackenzie Valley Environmental Impact Review Board (MVEIRB) letter dated May 29, 2006. Paramount submitted a Developers Assessment Report (DAR) to the MVEIRB in May 2006. By letter dated May 29, 2006 the MVEIRB informed Paramount that a number of items in the DAR did not conform, or that sufficient information was not provided to permit the MVEIRB to meaningfully consider the items requested.

### Item A

Request: *Paramount's explanation of how Traditional Knowledge was utilized in the planning of the SDL8 application requires further support. The Review Board requests that the 2001 Traditional Knowledge Study be submitted to the Review Board for its consideration.*

Response: Paramount has subsequently been informed by the MVEIRB that they do have a copy of the 2001 Traditional Knowledge Study and a further copy is not required.

### Item B 1b)

Request: *The map submitted by Paramount in the DAR is of very poor quality. Paramount is requested to resubmit a better, higher-resolution copy of the map, or if not possible, to explain why such a copy is not available.*

Response: The map has been re-scanned and is attached. A separate pdf file of the map is also being forwarded.

### Item D 5c)

Request: *Potential effects to wildlife (during all seasons) of using helicopter-based seismic was not responded to in the DAR. Paramount is requested to address this outstanding issue.*

Response: The main concern of helicopter use in the seismic operation is the introduction of unnatural sounds (noise disturbance) into the natural environment. Rotary-wing aircraft (helicopter) noise consists of a complex mixture of continuous engine (usually turbine) noise and rapidly repeating impulse noise from the rotor blades, sometimes including nonlinear noise of rotor tips traveling near Mach 1. Propagation of sound in natural environments is difficult to measure<sup>1</sup>. Some habitats enhance stimuli associated with aircraft over-flights. The sound and visual stimuli associated with aircraft have different effects in an open desert than in a forest where trees can obscure the sight and may reduce the sound of aircraft.<sup>2</sup>

Most researchers agree that noise can affect an animals physiology and behavior, and if it becomes a chronic stress, noise can be injurious to an

animal's energy budget, reproductive success and long-term survival. Determining the effect of noise disturbance on wildlife is complicated however because responses vary between species and between individuals of a single population. These variable responses are due to the characteristics of the noise and its duration, the life history characteristics of the species, habitat type, season, activity at the time of exposure, sex and age of the individual, level of previous exposure, and whether other physical stresses such as drought are occurring around the time of exposure<sup>3</sup>. Habituation may be possible for some species to after long periods of exposure to the noise.

There are many species of birds in the area. Birds may be more affected by noise during nesting periods in the spring and summer seasons. Potential effects include increased mortality of birds during migration (due to lower weight gains during staging), or population effects due to reduced reproductive success (due to egg loss, for example).<sup>2</sup> Few species of birds over-winter in the area so disturbance potential to bird species is reduced. A qualitative observation has been made that Deer and Caribou appear to react more strongly to helicopter noise than do Moose<sup>4</sup>. Woodland Caribou normally mate in early to mid October and calves are normally born by early June. Observations made on the Porcupine Herd of Alaska and northern Yukon showed that the Barren Ground Caribou were more likely to exhibit panic and strong escape responses while on calving grounds, in pre-rut conditions, and during cold weather in early winter<sup>5</sup>. Of concern in the early winter is that multiple disturbance encounters over time may cause the caribou to expend more energy during escape responses than energy gained during forage intake. This may lead to a mass loss in adult females and possibly reduced calf survival<sup>6</sup>.

1. Michelson, A. 1978. Sound reception in different environments. In Ali, M. (Ed)., *Sensory Ecology: Reviews and Perspectives.*, (pp. 345-373). New York: Plenum Press.
2. Report on Effects of Aircraft Overflights On the National Parks System. Chapter 5: Effects of Overflights on Wildlife. 5.1-5.27.
3. Busnel, R.G. and John Fletcher (eds.) 1978. *Effects of Noise on Wildlife.* New York: Academic Press.
4. Klein, D.R. 1973, The reaction of some northern mammals to aircraft disturbance. Paper presented at the XIth Conference, International Union of Game Biologists., Stockholm.
5. Calef, George et al. 1976. "The Reaction of Barren Ground Caribou to Aircraft." *Arctic.* 29(4):210-212.
6. Bradshaw, C.J.A. et al. 1998. "Energetic implications of disturbance caused by petroleum exploration to woodland caribou. *Can. J. Zool.* 76: 1319-1324.

**Item F2 a-f)**

**Request:** *The Review Board does not consider the responses to these questions to be in conformity with the Terms of Reference. Paramount is requested to re-read the questions and answer them to the best of its ability. Paramount may wish to also give consideration to Information Request Responses 7 and 8 submitted by the Government of the Northwest Territories, when answering these items.*

**Response:** *Based on the example of forest re-growth in the cutlines cleared in the 1960's in the SDL8 area, please discuss the following:*

*a.) The amount of re-growth that has occurred in the SDL8 area on old cutlines, including a consideration of tree heights reached.*

The GNWT, in their response to IR0506-007-7, state that the “regeneration of the forest on those lines (i.e., cutlines in SDL8) contributes to the net area of the commercial forest, but has no appreciable volume”. This indicates that tree growth is occurring on the cutlines. Re-growth of natural, endemic vegetation appears to be occurring on all the cutlines, with non-vegetated areas typically being small wetlands or drainages. The amount of re-growth that has occurred on the old cutlines in the SDL8 area varies with the habitat types crossed, including variations related to slope, aspect, soil quality and moisture levels. All cutlines appear to support re-generated vegetation cover, ranging from moss/short shrubs in bogs, to grass/sedges/shrubs in the wet, lowland areas, to deciduous trees to several metres in height on upland areas with better drained soils. As such, where present, the height of the regenerating trees tends to be between 25% and 75% of the adjacent forest height. Many of the undisturbed trees that lie along the cutlines exhibit slightly higher tree heights than trees located away from the cutline, likely due to an opening effect (i.e., better site-specific growth conditions and less competition). On the cutlines, re-growth appears to be better on the edges, nearer to the undisturbed forest, expected to result from natural encroachment.

*b. The amount of time that it will take for vegetation in the proposed cutlines to reach a climax (mature) stage.*

A mature stand may either develop through climax, edaphic or idealized successional pathways. A mature climax stand is represented by climax tree species (e.g., spruce and fir) for the climatic region. In the SDL8 area, there may also be mature edaphic stands (i.e., stands in which soil factors control tree species composition, such as on a wet site) or mature seral stands (i.e., stands that proceed through an idealized successional pathway, such as in a mixedwood site). The amount of time required for

vegetation (i.e., trees) on the proposed cutlines to reach maturity, is expected to be approximately 60 to 140 years (Alberta Environmental Protection 1994) in this area of the NWT. As indicated by the re-growth occurring on upland areas, this process occurs more quickly on areas with better soil quality. Re-growth on proposed line A05P-Cam-01 is shown in the attached picture which was taken July 19, 2005.

***c. The composition of the plant communities that have re-grown in the area.***

Specific vegetation surveys were not completed on the individual cutlines. However, as indicated earlier, and based on other work that Paramount has conducted in the Cameron Hills region, regenerating vegetation appears to be natural endemic species, that reflect the species within the adjacent forest. Typically, cutlines that crossed upland, better drained soils showed better revegetation, with trees reaching several metres in height. Tree species composition in these upland areas varies, but appeared to be dominated by deciduous (e.g., aspen, and to a lesser extent birch), likely with some conifers (e.g., spruce) in the understory. Where cutlines crossed areas with high peat content and associated high water levels, the regenerating vegetation appears to consist of moss/grass/sedges and tall shrubs. Black spruce bogs typically exhibit the slowest revegetation patterns, affected by the poor soil quality and excess water.

***d. The habitat value of the re-grown vegetation during vegetative succession following the program, and the wildlife species that prefer it, as compared to the habitat value of climax (mature) vegetation and the wildlife species that prefer it.***

As discussed in the DAR, the lines cleared will represent only a small portion of the habitat within the general region, and wildlife do use lines for browsing and movement. Because the program is scheduled for the winter, and will be completed in a manner that minimizes disturbance to the moss or duff layer (i.e., avoidance cutting, no blading on the lines), regeneration of vegetation is expected to begin in the following growing season. The habitat type that would be expected to be present will likely be regenerating grass/sedge and shrubs, with better growth occurring along the edges of the line, adjacent to undisturbed forest. At this point, the lines would be expected to represent limited wildlife habitat, increasing yearly as natural encroachment and regeneration occurs. The regenerating habitat (composition related to the adjacent habitat) would be expected to be most used by species that use openings, edges and regenerating vegetation, such as redpolls, common nighthawk, short-eared owls, mice, voles, foxes, snowshoe hare and deer, but diversity would likely be limited. However, sensitive species such as woodland caribou also use these regenerating habitats, as caribou have been observed on

leases and cutlines in the Cameron Hills, with avoidance expected to be related more to human activity disturbance.

As the terrestrial vegetation progresses through successional stages, the habitat characteristics change, as does the wildlife assemblage that uses that habitat. Older forest habitat would be expected to provide habitat for a wider range of wildlife species, due to higher vegetation diversity and cover composition. Species that would typically be associated with mature or older forest, again depending on the plant species assemblage and the cover type, would include warbler species, caribou, marten, least flycatcher, and Lincoln's sparrow.

***e. The quality of the future re-grown vegetation as it pertains to economic use.***

Sustainable forestry operations depend on the regeneration of tree species on areas that have been harvested. It is expected that, given time, the re-grown vegetation on the cutlines (acquired in 1967, therefore 39 years of regeneration) would provide merchantable timber. The GNWT, in their response to IR0506-007-7, indicate that the "regeneration of the forest on those lines (i.e., cutlines in SDL8) contributes to the net area of the commercial forest, but has no appreciable volume". It is expected that given time to mature, the timber on the lines would have an economic value, which would be expected to be limited, due to the low volumes affected by the seismic 2D program and the transportation costs.

***f. The potential impacts to the forest health that re-clearing of the re-grown seismic lines may have, and the potential for this to lead to degradation of the area.***

Boreal forests have evolved, based on chronic disturbances such as forest fires and diseases. Because the program is scheduled for the winter, and will be completed in a manner that minimizes disturbance to the moss or duff layer (i.e., avoidance cutting, no blading on the lines), regeneration of vegetation is expected to begin in the following growing season. This process is expected to be enhanced by the propagules and seeds left in the duff layer, which is expected to remain undisturbed due to snow cover and minimal disturbance clearing on the lines. As such, the pattern of regeneration currently occurring on the cutlines, is expected to be repeated, within a comparable timeline.

**Item G**  
Request:

*The Review Board does not consider the responses to these questions to be in conformity with the Terms of Reference. Paramount is requested to re-read the questions and answer them to the best of its ability. In its consideration of Valued Components (VC) of the environment, Paramount*

*should ensure that boreal caribou are included as such a VC. Paramount may wish to also give consideration to Information Request Response 8, submitted by the Government of the Northwest Territories, to assist in answering these items.*

Response: ***1. Please identify which Valued Components of the environment may, in the opinion of Paramount, be affected by multiple human activities or developments.***

Paramount is not aware of any other human activities or developments approved to occur within the general area, other than this seismic program. In Paramount's opinion, any or all of the following valued components considered in previous Cameron Hills environmental assessments could be affected by multiple human activities or development, depending on the activities. However, as the importance of any effects must be considered in the correct context and within a reasonable temporal and spatial context. Because there are no multiple human activities or developments occurring the potential for this type of effects is expected to be minimal.

Valued Components qualitatively considered, include air quality, terrain, soils, wildlife, vegetation, surface water, groundwater, fish, cultural and heritage resources, traditional harvesting, and health, social and economic factors.

***2. Please identify past, present and reasonably foreseeable human activities (including but not limited to the activities of Paramount) that may affect the Valued Components identified above.***

The past, present and reasonably foreseeable human activities within the area that may affect the Valued Components identified above, would depend on the spatial boundaries of such an assessment, but could include Highway 35 (construction, maintenance and vehicle traffic), railway line (construction, maintenance and rail traffic), timber harvesting, hunting, trapping, and oil and gas exploration.

**In addition to describing these activities, include the following:**

**a) A discussion of human activities considered, but not included and the rationale for that decision; and,**

Paramount considered all human activities that we could think of that could result in a direct or indirect effect on any of the Valued Components listed, that could overlap spatially and temporally with the A05P-CAM-2D seismic program.

**b) The rationale for activities you have included.**

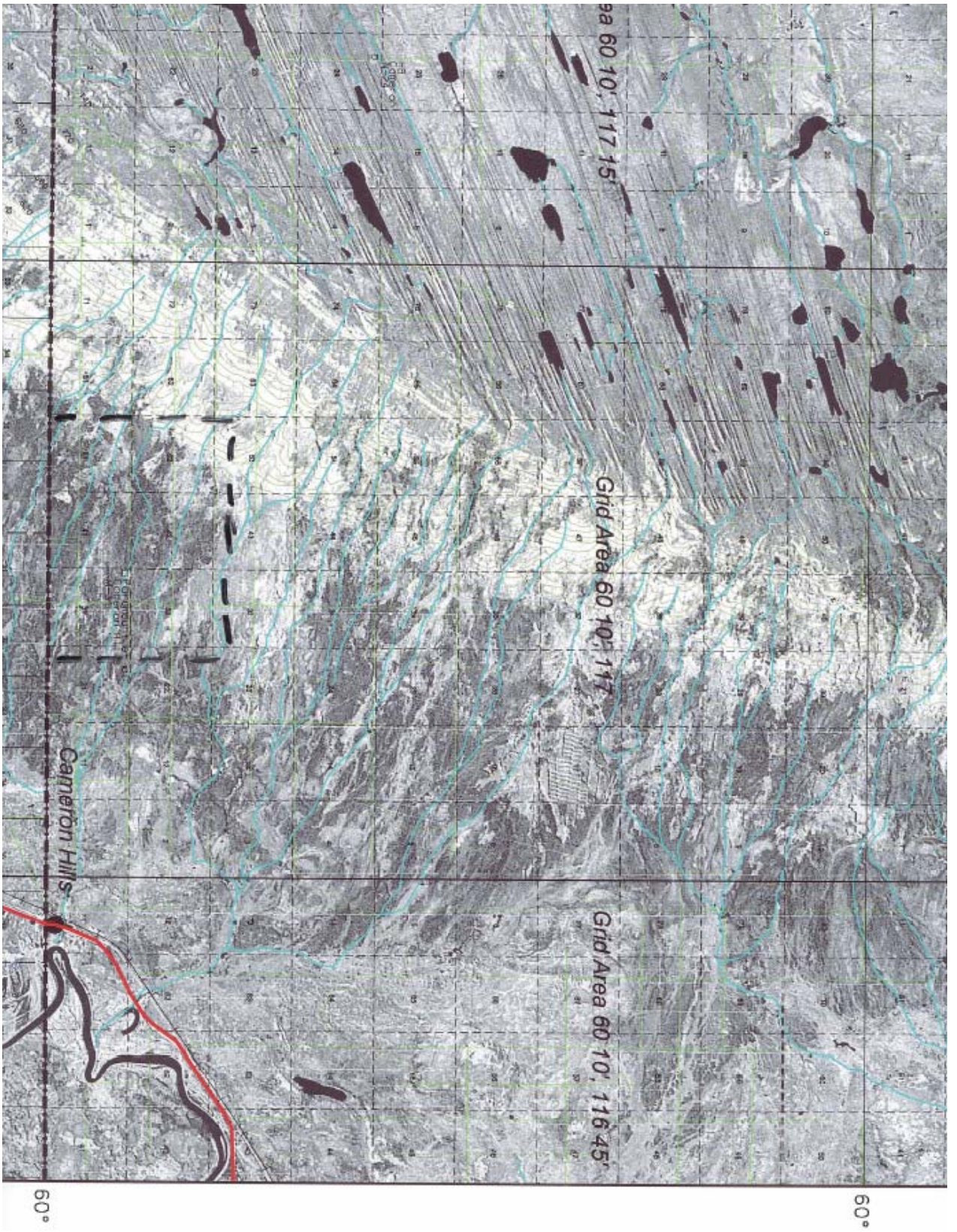
The rationale for the activities that Paramount has included is that any human activities that overlap spatially or temporally could result in some effect to at least one of the Valued Components listed above. Considering the remote location of the program, the winter schedule, re-use of existing lines to the extent practical, and vehicle access in the winter only it is predicted to result in limited residual impacts, and cumulative effects that are not significant .

Literature Cited

Alberta Environmental Protection. 1994. Ecological Land Survey Site Description Manual. Finance, Land Information and Program Support Services. Edmonton, Alb



**Map Depicting Surficial Geology of the SDL 8 Area**





**Proposed Line A05P-Cam-01 showing re-growth, looking west (taken July 19, 2005)**

