National Energy Board
CEAA Screening Report

Paramount Resources Ltd.

Amendment to Cameron Hills Development Plan
2620-D-4-7

and

Paramount Transmission Ltd.

Cameron Hills Transborder Pipeline
3400-P097-1

January 2002

Table of Contents

NATIONAL ENERGY BOARD/OFFICE NATIONAL DE L'ÉNERGIE

ENVIRONMENTAL SCREENING REPORT

1.0 GENERAL INFORMATION

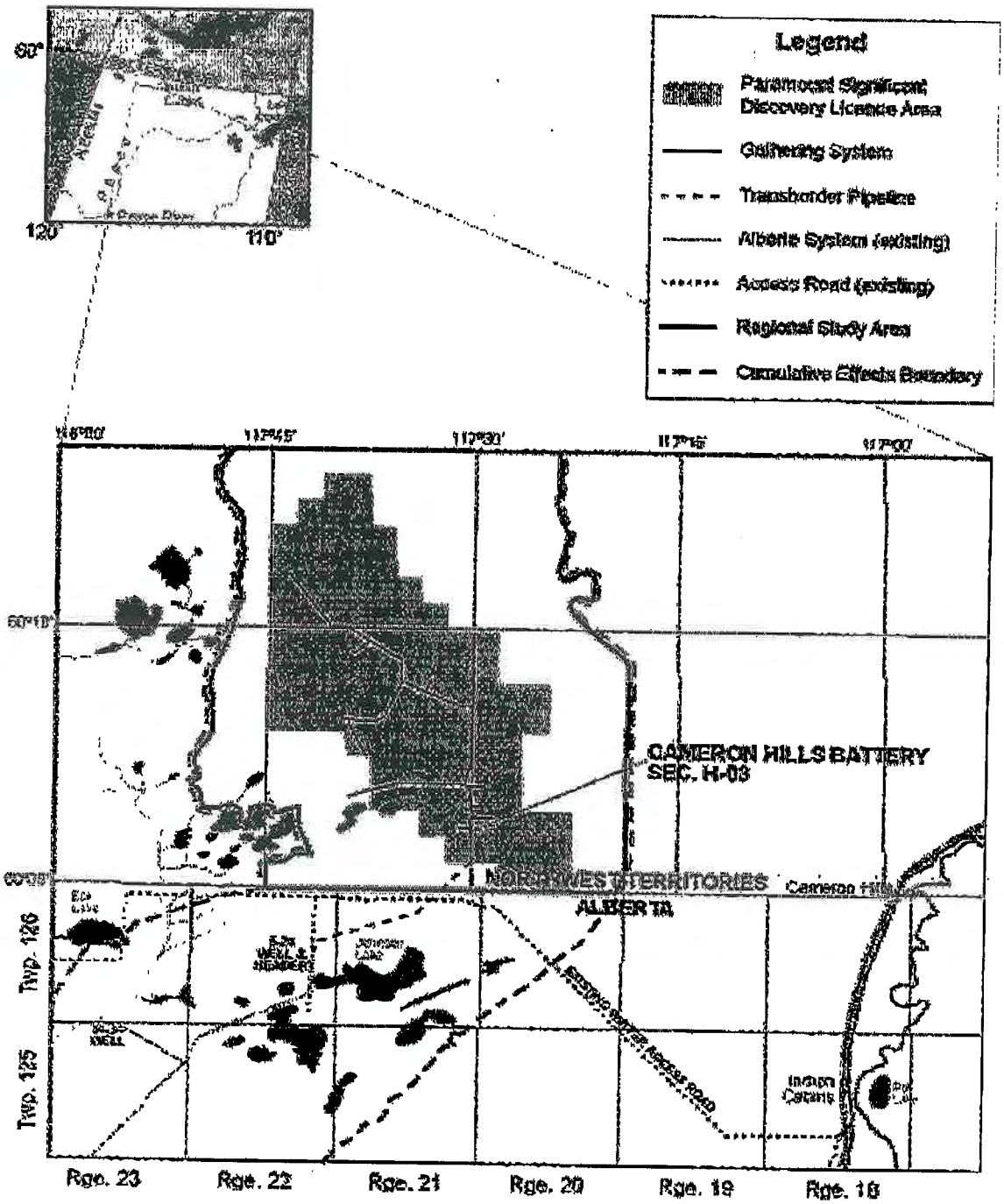
Applicant:	Paramount Resources Ltd. (Paramount)
NEB File:	2620-D-4-7
Application Date:	21 November 2000
Title:	**Amendment to Cameron Hills Development Plan**
Applicant:	Paramount Transmission Ltd. (Paramount or PTL)
NEB File:	3400-P097-1
Application Date:	29 June 2001
Title:	**Cameron Hills Transborder Pipeline**

1.1 Introduction

On 29 June 2001, Paramount Transmission Ltd. (Paramount) applied to the National Energy Board (the Board or NEB) for an Order pursuant to Part III of the *National Energy Board Act* (the NEB Act) regarding the construction and operation of an approximately 15 kilometre (km) raw sour oil and natural gas pipeline originating at a central battery located at H-03 Grid Area 60 20' N, 117 30' W in the Northwest Territories (NWT) and terminating at a pipeline header in Alberta located in LSD 5-24-126-22 W5M. Paramount also applied to construct and operate an approximately 15 km sweet fuel gas pipeline between these same points. The project is referred to as the Cameron Hills Transborder Pipeline. The Cameron Hills is a relatively remote area located immediately north of the Alberta/NWT border, about 60 km south of the community of Kakisa, NWT (Figure 1).

By separate application dated 21 November 2000, Paramount Resources Ltd. (Paramount or PTL) applied to the Board for an amendment to the existing 1992 Paramount Cameron Hills Oil Development Plan (Development Plan) pursuant to subsection 5.1(5) of the *Canada Oil and Gas Operations Act* (COGOA). As amended, the Development Plan describes the general approach to developing the oil and gas field and includes the construction and operation of 21 wells, approximately 59 km of gathering pipelines, a central battery, approximately 12 km of water disposal pipeline, 11 km of fuel gas pipeline, the raw sour oil and natural gas pipeline referred to above, temporary and permanent construction camps, borrow pits, an airstrip, use of an existing winter access road, and other activities (Figure 1).

Figure 1: Cameron Hills Project Map



The two proposed projects, the 'Cameron Hills Transborder Pipeline' and the 'Cameron Hills Gathering System', are collectively referred to as the 'Cameron Hills Gathering System and Transborder Pipeline' or 'the Cameron Hills Project' (Figure 1). The Board administers and has decision-making responsibilities with respect to both the NEB Act and the COGOA, and therefore in relation to both proposed undertakings. For the purposes of this Screening Report, Paramount Resources Ltd. and Paramount Transmission Ltd. are collectively referred to as "Paramount".

The purpose of the Cameron Hills Project is to develop a pool of oil and natural gas. Previously, Paramount had applied for regulatory approval to delineate the pool through the drilling and testing of 9 wells. Associated developments and activities included use of existing winter access, a temporary airstrip, 6 temporary construction camps and use of an existing borrow pit. This drilling program was the subject of an environmental assessment pursuant to the *Mackenzie Valley Resource Management Act* (MVRMA). The Mackenzie Valley Environmental Impact Review Board's (MVEIRB) Report on Environmental Assessment for the drilling program was released on 16 October 2001. It concluded that the drilling program would not likely cause a significant adverse impact on the environment or cause a significant public concern. Paramount intends to carry out the drilling program during the winter 2001/2002. Although the drilling program is considered to be a separate development, construction and operation of production facilities for these wells are part of the Cameron Hills Project and the consideration of potential environmental effects discussed in this environmental screening is based on the assumption that all of those wells would be placed in production.

As a Responsible Authority (RA) under the *Canadian Environmental Assessment Act* (CEAA), the Board is required to carry out an environmental screening of the Cameron Hills Transborder Pipeline. On 1 August 2001, the MVEIRB passed a motion to conduct an environmental assessment of the Cameron Hills Project pursuant to the MVRMA, consisting of the proposed facilities in both the NWT and Alberta. Recognizing their respective environmental assessment responsibilities and the benefits of avoiding duplication, the Board and the MVEIRB undertook to coordinate their respective environmental processes and developed a *Work Plan for the Environmental Assessment of the Paramount Resources Ltd. Cameron Hills Gathering System and Pipeline Development* (Work Plan), dated 5 September 2001 (Appendix 1). On 3 December 2001, the MVEIRB released its report entitled *Report of Environmental Assessment on the Paramount Resources Ltd. Cameron Hills Gathering System and Pipeline Development.* The report concluded that the project would not likely cause a significant impact on the environment or cause significant public concern subject to implementation of several recommended measures.

For the purposes of the CEAA Screening, the Board has considered the entire Cameron Hills Project, which consists of both the Cameron Hills Transborder Pipeline and the Gathering System (Section 2).

1.2 Description of the Environment

Paramount provided a description of the environment in its applications and subsequent filings. In order to provide context for this assessment, a summary is provided below. More detailed descriptions of the existing environment may be found in the Environmental Impact Assessments (EIAs) submitted as part of the applications for the Development Plan Amendment and the Transborder Pipeline.

Terrain and Soils

The proposed development would be located in the Cameron Hills physiographic region, a major part of the Northern Alberta Uplands within the Taiga Plains Ecozone. The Cameron Hills Uplands rise 400 to 500 metres (m) above the surrounding lowlands with steep slopes on the eastern and northern sides. Meltwater channel sands and gravels are scattered throughout the uplands and post-glacial stream and river alluvial deposits commonly form fans along the plateau margins. The upland plateau is characterized by an undulating to depressional surface, covered with organic deposits and underlain by sporadic, discontinuous permafrost. The gathering system would cross this undulating surface, with the most noticeable change in elevation occurring where the gathering lines would cross the Cameron River valley and smaller valleys associated with its tributaries. Immediately south of the proposed H-03 central battery, the proposed transborder pipeline would cross a series of undulating ridges with slopes up to ten percent, otherwise the proposed pipeline route crosses level to gently rolling terrain. Permafrost is discontinuous in the project area and expected to be confined to thick, poorly drained "organic bogs" and "speckled bog" areas.

Surface materials consist of bedrock, glacial drift, and post-glacial sediment with outcrops of shales sandstones and siltstones of the Cretaceous Fort St. John Group. Organic-rich and clay-rich lacustrine sediments characterize the extensive, often water-covered, low-lying terrain within the Cameron Hills.

Hydrology

There are 21 watercourse crossings identified for the proposed development; 17 along the gathering system and four along the transborder pipeline. The Cameron River is the largest watercourse within the project area, flowing southwest through the middle of the Cameron Hills and then turning north to flow off the hills and into Tathlina Lake. Three crossings of the Cameron River are planned for the gathering system. The transborder pipeline route would not cross the Cameron River. South of the Cameron River, the relief is minimal and numerous irregular shaped lakes are common, often shallow and typically interconnected by streams to form extensive wetlands. All other watercourse crossings would occur either on tributaries to the Cameron River or on tributaries flowing to small lakes in the area. Much of the area has poor drainage and about 50% to 70% of the region consists of wetlands.

Fisheries

Paramount indicated that the area supports primarily warm-water sport fish species with moderate to very low fishery potential. Paramount submitted that no commercial or subsistence fishing activity presently occurs in the Cameron Hills area. Habitats for spawning, rearing and

overwintering of species supporting commercial or subsistence fisheries are limited in the project area and historical information about fish in the Cameron River is lacking.

Paramount conducted fish surveys at four of the proposed water crossings: two on the Cameron River, one on a tributary to the Cameron Rivers and one on a tributary to Johnson Lake. White sucker, longnose sucker, lake chub, spoonhead sculpin, and brook stickleback were found. Walleye and northern pike are known to be present in Tathlina Lake, an outlet of the Cameron River, north of the Cameron Hills. Presence of these species has been reported in the Cameron River; however, it is unclear whether they would be found as far upstream as the crossing locations.

Vegetation Communities and Rare Plants

The Taiga Plains Ecozone represents the transitional zone between the boreal coniferous forest to the south and tundra to the north. Typical vegetation cover on the Cameron Hills consists of spruce-dominated mixed wood. Upland slopes and well-drained areas on the uplands provide better moisture conditions to support white spruce, Jack pine, black poplar and trembling aspen mixed wood cover. Paramount described three upland and three lowland vegetation communities in the area of its proposed pool development: upland mixedwood forests, upland trembling aspen, upland coniferous forest, riparian forest, black spruce bog, and graminoid and shrubby fens, and shallow open water. Six vegetation communities were described for the transborder pipeline as well: mixedwood, coniferous woodlands (burned), deciduous, wooded bog, shrubby bog, and wooded/shrubby bog. Paramount provided a list of sixteen plant species considered rare in the NWT and/or Alberta based upon published range maps, but stated that it had not observed these species in the project area during its field surveys. High potential habitats for rare plants were identified as rivers and stream banks, aquatic habitats, saline areas, bogs, seeps and rocky outcrops.

Wildlife

To identify wildlife species in the project area, Paramount conducted a literature search, contacted government agencies and, in July and September 2000, carried out field surveys. Paramount also consulted with the communities of Enterprise, Kakisa, Hay River, Hay River Reserve, Fort Providence, Dene Tha', Trout Lake and West Point and contacted users of the land such as hunters, trappers and food gatherers. Paramount also conducted aerial reconnaissance of portions of the project area with the Dene Tha' and residents of Kakisa and Hay River Reserve.

Paramount stated that the Cameron River valley is reportedly the most productive area for mammals in the Cameron Hills, with bio-diversity being low elsewhere in the study area. Several wildlife species designated by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) are known to occur in the area, including wolverine and woodland caribou. Others, such as wood bison and grizzly bear, could occur but have been observed in the project area infrequently. Paramount noted that, although it observed black bears and bear sign throughout the project area, no bear den sites were located.

Paramount stated that the preferred winter habitat of woodland caribou, listed as threatened by COSEWIC, is mature open black spruce-lichen forest, usually with numerous scattered small lakes. Paramount noted woodland caribou sign in black spruce habitat in the southern portion of

the study area and stated that Alberta Environment estimated the regional population to be 100-200 animals. Paramount also indicated that both moose and woodland caribou are hunted in the project area. Paramount stated that the project area does not provide high quality moose habitat. Further, Paramount reported that elders mentioned that, while some moose hunting may occur on the Cameron Hills plateau during the winter, moose habitat and density are significantly better below the plateau. In general, Paramount submitted that the Hay River valley, located approximately 5 km to the east of the proposed project, provides higher quality wildlife habitat for most species, and equivalent habitat for woodland caribou and snowshoe hare.

Paramount also stated that other mammals, and larger furbearers such as lynx, marten, wolf, beaver and wolverines occur in the project area.

Avifauna

During field surveys conducted in July and August 2000, Paramount recorded 69 bird species within 1 km of the proposed project. Paramount stated that, while the project area may support bald eagles and ospreys, no raptor nests were observed during its field surveys. Further, Paramount stated that the Canadian Wildlife Service (CWS) has not highlighted any site in the project area as a key migratory bird terrestrial habitat site[1].

Based on field observations of available habitat, a literature search, and agency contact to identify potential sensitive species in the regional study area, Paramount identified four sensitive bird species that could be affected by the proposed project: short-eared owl, Cape May warbler, Canada warbler and bay-breasted warbler. Paramount stated that no suitable peregrine falcon or golden eagle habitat occurs near the proposed project and that no raptor nests were noted during its field reconnaissance.

Land Use

The project is situated on federal Crown lands within the Deh Cho region of the Northwest Territories (NWT) and provincial Crown lands in Alberta. Current land use in this area is identified as primarily activities related to oil and gas development and traditional use activities of trapping and possibly berry picking. Timber cutting has occurred on the east and north slopes during winter months; however, there are currently no active permits or licences for timber harvesting in the project area. Due to the poor quality of the soils, agriculture does not occur in the project area but market gardening does occur in Hay River. No commercial or subsistence fishing occurs in the Cameron Hills area. The lack of road access limits the use of the area for recreational purposes.

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[1] Key migratory bird terrestrial habitat - a terrestrial area that supports at least 1% of the Canadian population of at least one migratory bird species. Source: Alexander, S.A., R.S. Ferguson, K.J. McCormick. 1991. 2nd Edition. Key migratory bird terrestrial habitat sites in the Northwest Territories. Occasional Paper Number 71, Canadian Wildlife Service. Environment Canada. 184 pp.

The area is remote and access is primarily via winter roads, aircraft or existing seismic lines. Existing infrastructure includes Highway #35, CNR railway lines, oil and gas facilities and remote airstrips.

Socio-economic Environment

The nearest NWT communities to the proposed development are Enterprise (population less than 100, located 80 kms from the regional study area) and Kasika (population 36, located 90 kms from the regional study area). Other area communities in the NWT include Hay River (population, 3,600), Hay River Reserve (181), West Point First Nation (80 to 100) and Fort Providence (750). Indian Cabins (population 3, located 15 kms from the regional study area) is the nearest Alberta community. Paramount states that the most significant impacts of the proposed project would likely be on these communities.

As described in the socio-economic information provided by Paramount, the communities in proximity to the project area are characteristic of NWT communities in general and are typically young, Aboriginal, underemployed and experiencing social changes. Paramount indicated that many residents are actively seeking sustainable economic diversification and have identified tourism, forestry and, to a lesser extent, agriculture, as long-term engines of growth in the region. Paramount stated that communities in the area have initiated talks to optimize the opportunity for co-ordinated economic development. Based on 1994 and 1996 studies, the labour force participation rate for the communities varied from 47% (in Kakisa) to 91% (in Enterprise). The unemployment rate varied from 10% to 31%.

Heritage Resources

Paramount requested a search of the available heritage sites database from the Prince of Wales Northern Heritage Centre (PWNHC). Archaeologists at PWNHC indicated that the lands around Cameron Hills were used by ancestors of the indigenous Slavey for some 4,000 years but did not report any known heritage resource sites for the project area. On behalf of Paramount, Golder Associates Ltd. completed a Heritage Resource Impact Assessment (HRIA) of the project area between 31 July and 17 September 2000. A report was prepared on 24 May 2001. No heritage resources were identified during the HRIA and Paramount noted that no further archaeological work is recommended for the proposed project.

2.0 PROJECT DESCRIPTION AND SCOPING

The Board has an obligation, pursuant to section 15 of the CEAA, to determine the scope of the project in relation to which an environmental assessment is to be conducted. The MVEIRB, pursuant to section 117 of the MVRMA, is required to determine the scope of the development for the environmental assessment. The MVEIRB described its scope in the 5 September 2001 Work Plan (Attachment 1).

The Board determined, after notifying other federal departments pursuant to section 5 of the *Regulations Respecting the Coordination by Federal Authorities of Environmental Assessment*

Procedures and Requirements (CEAA Coordination Regulations) that it is the only RA for the proposed transborder pipeline. The Board, in accordance with section 8 of the CEAA Coordination Regulations, provided other federal authorities with an opportunity to comment on the scope of the assessment. The scope of the assessment sent for comment was the same as the scope described in the 5 September 2001 Work Plan. No changes to the scope were suggested as a result of the comment process. All parties involved in both the MVEIRB and CEAA processes received a copy of the Work Plan, which included a project description, a scope of the development and a scope of the assessment for the proposed project.

The Board has determined, pursuant to section 15 of the CEAA, the scope of the assessment to be that as outlined in the Work Plan.

3.0 CONSULTATION

Consultation with government departments, first nations and the public occurred throughout the development, planning, and assessment of the proposed project.

3.1 Public Consultation

In accordance with the Board's *Guidelines for Filing Requirements*, Paramount developed a public information program for its proposed project. The Early Public Notification (EPN) program began on 10 May 2000. This program included contacting local communities, trappers, aboriginal groups, regulatory agencies, local government representatives, federal and territorial government departments and area oil and gas industry participants. The program described the project and its potential environmental and socio-economic effects and was designed to seek public input with respect to potential environmental and socio-economic effects of the project.

Paramount consulted with the Dene Tha' and various communities including the Hay River Reserve, Hay River, Kakisa, Fort Providence, West Point, Trout Lake, Enterprise, Indian Cabins, and Assumption. Paramount conducted "Open House" meetings in Fort Providence, Yellowknife, Hay River, Hay River Reserve, Kakisa and Calgary. Paramount published a public notice in area newspapers on 22 and 23 August 2000 to advise area stakeholders about the project and to invite them to contact Paramount should they have any questions or concerns. Helicopter flights over the area have been completed with various community representatives.

Paramount invited elders and community people from Kakisa, Hay River Dene Reserve, Fort Providence, West Point and the Dene Tha' to participate in traditional knowledge studies of the development area.

Paramount provided a summary of the meetings, discussions, and communications that have taken place and stated that the majority of the responses and reactions to the proposed project were positive. Paramount submitted that attendees to the public information meetings were interested in commercial opportunities, training and employment associated with the proposed project, as well as the general effect the development might have on increased access to the area by the public. Paramount indicated that it would attempt to involve the local area foods and services providers to the greatest extent possible.

Paramount committed to the following on-going public consultation efforts:

- The local communities will be kept informed of the development progress by Paramount publishing and distributing its Project Updates;
- Applicable regulators and affected land users will be kept appraised of construction schedules with the Project Updates;
- Potentially affected trappers will be notified about two weeks in advance of construction;
- Paramount will make every reasonable effort to notify local communities about available employment opportunities;
- Paramount will make every reasonable effort to notify local communities and companies about available procurement opportunities;
- Paramount will continue to consult with the communities and discuss with them the effects of the development, and when it is demonstrated that the development has had a direct effect on the community, Paramount will work with the community in an attempt to enhance the positive effects and to mitigate the negative ones; and
- Paramount's Regulatory and Community Affairs Co-ordinator and the company's local field representative will continue to have an on-going presence in the communities.

The only party to provide any comments on public consultation was the Ka'a'Gee Tu First Nation (KTFN). The KTFN indicated that they want to ensure that consultation activities by Paramount not be considered final upon the completion of this environmental assessment. They state that there does not appear to be any commitment in place to ensure that, if Paramount proceeds with the developments and community impacts occur in the future that were not considered in this EA, Paramount will work with the KTFN to mitigate and/or compensate for these impacts. The KTFN recommend that Paramount commit to an on-going consultation process so that the KTFN can respond should unforseen impacts arise. Paramount has committed to continuing discussions with KTFN throughout the life-span of the proposed project, and to incorporate additional traditional knowledge into its operation. Consultation relevant to the CEAA is discussed in more detail in section 4.6.1 of this report.

3.2 Information Requests

The scope of the assessment has been determined to include both the Cameron Hills Transborder Pipeline and the Cameron Hills Gathering System (section 2). By letter dated 20 September 2001, Paramount stated that its responses to the Board's information requests for the Cameron Hills Transborder Pipeline also apply to the Cameron Hills Gathering System. The MVEIRB coordinated receipt and distribution of information requests from interested persons, government bodies, first nations and expert advisors (see section 3.3). To reduce duplication and effort among stakeholders, the MVEIRB also established a facilitated information request process to assist interested persons in developing and clarifying their information requests. In addition, the Board issued its own information requests.

The Board and the MVEIRB maintained a common public registry for the coordinated environmental assessment. All requests and responses were placed on the common public record and all of the information related to the Project has been provided to those persons and organizations who have expressed an interest in the Project. This information is publicly available in the respective registries.

3.3 Expert Advisors

During the Environmental Assessment process, the Board and the MVEIRB provided opportunities for various federal and territorial government agencies and departments and first nations to provide comments with respect to Paramount's Application for the Cameron Hills Project. These groups are collectively referred to as Expert Advisors. Paramount's comments in reply are also summarized in the relevant sections of this screening.

4.0 ENVIRONMENTAL ASSESSMENT

4.1 Process

In accordance with section 18 of the CEAA, the Board has conducted an environmental screening for the proposed Cameron Hills Project and prepared this Screening Report based on the relevant applications, responses to requests for additional information, undertakings made to relevant regulatory authorities and expert advisors, submissions of interested persons, specialist advice and public concerns.

The Board is an RA under the CEAA pursuant to its responsibilities under the NEB Act. The Board is not an RA under the CEAA for the purposes of its COGOA responsibilities. Notwithstanding this division of responsibilities within the National Energy Board, for the purposes of paragraph 5(1)(b) of the COGOA, the National Energy Board's Chief Conservation Officer concurs with the views of the Board expressed herein. Therefore, within its NEB Act and COGOA mandates, the National Energy Board has the authority to ensure all recommendations of this report are carried out.

4.2 Significance Criteria

As described in its applications, Paramount considered the following criteria in its determination of the significance of residual environmental effects and provided levels for each criteria (Table 1). Paramount's predictions of the significance of environmental effects were considered after the implementation of its proposed mitigation measures as described in its applications, subsequent submissions, and responses to information requests.

Table 1: Paramount assessment criteria as provided in its applications

Attribute	Classification	Effect Criteria
Geographic extent	local	confined to the area of direct disturbance by the project, e.g., right-of-way (RoW) and work space compressor station footprint.
	subregional	disturbance confined to assessment area boundaries as specified for each discipline or VEC.
	regional	extending beyond subregional but confined to the province or territory being considered.

Attribute	Classification	Effect Criteria
Duration/ frequency	immediate	on the order of days.
	short-term	on the order of months.
	medium-term	on the order of years, but less than 10 years.
	long-term	greater than 10 years.
Magnitude	low	above background conditions, but within established criteria or known scientific threshold and within the range of natural variability.
	medium	substantially above the typical background conditions and concentrations, but within established criteria or known scientific threshold and within range of natural variability.
	high	predicted to exceed established criteria and known threshold to cause adverse effects and will likely cause detectable change beyond the range of natural variability.
Reversibility	reversible in short-term	effects can be reversed in months.
	reversible in medium-term	effects can be reversed in less than 10 years.
	reversible in long-term	effects can be reversed but will take longer than 10 years.
	irreversible	effects are permanent.
Occurrence	infrequent	occurs rarely.
	likely	likely to occur.
	continuous	occurs throughout the project.

4.3 Routing

Paramount presented criteria for the siting of all facilities and routing of gathering system flowlines and the transborder pipeline. Route selection for the pipeline and flowlines was based on:

- selecting the shortest route feasible (minimize ground disturbance and construction and reclamation costs);
- utilizing existing disturbance corridors;
- selecting a route that is feasible to build;
- selecting a route that is feasible to reclaim;
- minimizing crossing or infringing on sensitive habitat for wildlife;
- minimizing crossing or infringing on sensitive habitat for vegetation;
- selecting a route that avoids side slopes and parallel ridges;

- minimizing watercourse crossings;
- selecting a route to tie-in existing wells; and
- selecting a route to tie-in future potential wells.

In response to information requests, Paramount described the relative weighting of each of these criteria and discussed how they were applied to the selection of the preferred route.

Alternative Routes

In response to information requests, Paramount provided an analysis of alternative routes selected by Paramount and some route alternatives suggested by Expert Advisors for analysis. Paramount's analysis included all of the route selection criteria identified above in conjunction with a variety of landscape indices including total area disturbed, change in linear distance, number of watercourse crossings, and likely extent of permafrost to be encountered. Paramount also related the route selection to vegetation communities and habitat suitability ratings for the same indicator species as those used in the environmental assessment for the proposed project.

The Government of the Northwest Territories (GNWT) provided an assessment of the results in relation to alternative routes in the NWT. Although GNWT noted that there were some tradeoffs with respect to impacts from each route alterative, it concluded that, on balance, the proposed route was not likely to have significantly greater impacts than alternate routes.

Views of the Board

The Board is of the view that Paramount's route selection criteria are heavily weighted toward the shortest feasible route. The Board also does not consider that Paramount made full use of existing disturbance corridors. However, when balanced with consideration of the other factors used in route selection, the Board is of the view that Paramount conducted an adequate analysis of alternative routes in response to information requests. After consideration of Paramount's route selection criteria and Paramount's analysis of alternative routes, the Board is of the view that the route and site selection process was satisfactory.

4.4 Issues Identification

Paramount submitted that there were a number of environmental and directly-related socio-economic effects which could result from the construction and operation of the project. Those effects, the effects of malfunctions or accidents, cumulative effects, and the mitigative measures proposed by Paramount were presented in its Environmental Impact Assessment report (EIA), its responses to information requests, and other supplementary information filed in support of its applications.

Paramount, in its effects assessment methodology, used a number of sources to identify potential biophysical and socio-economic issues associated with construction and operation of the proposed project. These include:

- consultation with the public, first nations, and regulatory representatives in Enterprise, Kakisa, Hay River, Hay River Reserve, Fort Providence, Dene Tha', Trout Lake, West Point, Calgary, Yellowknife, and Ottawa;

- recent environmental assessments from the region[2];
- published literature on impact sources and effects;
- the environmental assessment[3] supplied with the original oil field Development Plan;
- Paramount's project team knowledge of the environment and the interaction with project components and the potential effects; and
- field investigations during the planning stage of the project.

Paramount identified the following biophysical valued ecosystem components (VECs) that may be affected by the proposed project: air quality, terrain and soil, vegetation, avifauna, wildlife, hydrology and water quality, fisheries resources and noise.

For socio-economic values, Paramount identified noise, aesthetics, cultural and heritage resources, traditional land use and socio-economics. Paramount identified issues of greatest significance to affected communities through a review of historical socio-economic trends and through its public consultation program. Key issues, both positive and negative included: sustainable economic diversification; enhancement of local capacity; environmental protection; impact on hunting and gathering areas for traditional users; and retention of traditional skills and values.

Paramount evaluated the potential effects of the project on the environment including the effects of each project phase on each VEC, cumulative effects, accidents and malfunctions and the effects of the environment on the project.

The following sections respectively, 4.5 and 4.6, summarize the main biophysical and socio-economic issues identified for the proposed Cameron Hills Project. Other issues, as identified in the scope of the environmental assessment (Section 2) were addressed by Paramount in its applications and subsequent submissions.

Paramount provided information with respect to conceptual reclamation and decommissioning plans. The Board notes that although such activities would be subject to future examination under the NEB Act and/or the COGOA, and consequently under CEAA and/or the MVRMA as appropriate, they are discussed in general terms in the Screening Report (Section 4.11).

Finally, Paramount stated that it would comply with the *Onshore Pipeline Regulations*, 1999 (OPR 99) under the NEB Act for the Cameron Hills Transborder Pipeline. The Cameron Hills Gathering System facilities would be subject to the *Canada Oil and Gas Production and Conservation Regulations* under the COGOA.

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[2]Recent environmental assessments include:

ARC Inc., 1998. Environmental Assessment Cameron Hills Wells I-74 and C-75. Prepared for Paramount Resources Ltd., Calgary, Alberta; and

Golder Associates Ltd., 1999. Preliminary Terrain Hazard Assessment, Cameron Hills Forest Management Area West of Hay River, Northwest Territories. Prepared for Forest Management Division, Resources, Wildlife and Economic Development, Government of the Northwest Territories.

[3]Hardy BBT Limited, 1991. Cameron Hills Oil Development Plan: Environmental Components. Prepared for Paramount Resources Ltd., Calgary, Alberta.

4.5 Natural and Physical Environment - Environmental Effects / Proposed Mitigation / Significance of the Effects

4.5.1 Air Quality

Paramount identified vehicles, equipment, brush burning, oil and gas facility equipment operation, flaring, and construction activity as sources of air emissions. Paramount stated that there are no residences within the project area and wildlife biodiversity is characterized as low in the area except for the Cameron River valley. The majority of the construction and facilities operation would occur on the plateau above the river valley.

Paramount undertook air emissions modeling for operation, considering various equipment emissions and flaring based on the following project components:

- 10 oil wells on the oil gathering system;
- 2 oil wells on the gas gathering system;
- 7 gas wells on the gas gathering system;
- a water disposal well;
- the test satellite; and
- the central battery facility.

Paramount submitted that, based on its modeling results, predicted ground-level one-hour, 24-hour and annual SO_2 and NO_2 emissions would be within NWT and federal air quality standards. The transborder pipeline is not expected to release air emissions.

Environment Canada and the GNWT indicated that Paramount's air quality modeling and environmental impact predictions were realistic based on the information filed. However, the GNWT was of the view that, should a higher than expected sulphur content be determined at the new wells, Paramount should be required to suspend operations and supply revised air quality modeling analyses to it and the Mackenzie Valley Land and Water Board (MVLWB). Paramount stated that it would only recalculate its air quality modeling if the H_2S volumetric flowrate for all gas wells combined exceeds 94 cubic metres per day on a continuous basis. The GNWT noted that there is a possibility that one well might have a high H_2S content while others are low, and that the area around the well with a high H_2S content could be impacted. The GNWT suggested that alternatively, if the H_2S content in the gas is found to exceed 50 moles of H_2S per kilomole of gas, then Paramount should be required to suspend operations and revise the air quality modeling. The GNWT suggested that this would be more consistent with industry best practices and the Alberta Energy Utility Board (EUB) Guide 60[4].

In response to the GNWT, Paramount submitted that it would have an objection to suspending operations if the H_2S level is above five percent. Paramount indicated that the reference the

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[4]Section 3.1.3 "Well Test Requirements" of the Alberta Energy and Utilities Board (EUB) Guide 60 states: *If a recent gas analysis (taken within a 12-month period) for the well is not available, an on-site H_2S analysis (conducted by Tutweiller or gas chromatography methods) must be conducted upon commencement of flaring. If the H_2S content in the gas is found to exceed 50 moles of H_2S per kilomole of gas, operations must be suspended and a written application to flare the gas must be submitted to the EUB.*

GNWT used from the EUB Guide 60 pertains only to well testing and not to operation of the well. Paramount stated that the EUB recognizes that H_2S does not significantly change from the initial analysis and once the well is in production, only flared volumes would be reported. Paramount submitted that emissions should be recalculated to determine if they are above the guidelines, and if they are above, then mitigation measures should be proposed to the MVLWB. The MVEIRB has recognized the concerns of regulatory agencies, and recommended that Paramount submit revised air quality modeling consistent with EUB Guide 60 to the Board and others.

Paramount is a participant in the Voluntary Registry Challenge and stated that it is committed to actions to stabilize emissions of greenhouse gases. Paramount submitted that air quality effects associated with constructing the project components would be minor, localized, temporary and insignificant. Further, air quality associated with operating the development components would meet emission standards, where required.

Views of the Board

The Board notes that construction activities would be localized and of short duration and therefore, no detectable residual effects on air quality would be expected to occur. Based on expected levels of air contaminants, the Board is satisfied with the analysis provided by Paramount with respect to potential emissions during operation.

The Board notes that the EUB requirement per Guide 60 to conduct an on-site H_2S analysis and suspend operations in Alberta's jurisdiction [until a flaring permit is obtained] relates to flaring during well testing rather than to production operations. Production operations rather than well testing is considered in this environmental assessment of Paramount's NWT operations. Further, the Board notes that the production operations and testing of wells would be subject to approval under the COGOA and that fluid sampling and gas analyses are typically undertaken during drillstem and extended flow testing operations. Therefore, if Paramount's upstream operations were to be approved under the COGOA, the Board would condition Paramount to sample and analyze the gas during drillstem and extended flow testing, and should the composition exceed 50 moles of H_2S per kilomole of gas, submit revised air modeling analysis consistent with the provisions of the EUB Guide 60 to the Board, GNWT, and the MVLWB. The submission would also be required to include measures to mitigate potential adverse environmental effects. The Board notes that this proposed condition would also be consistent with the measure recommended by MVEIRB.

The Board is of the view that, with the implementation of Paramount's proposed mitigative measures and the proposed condition, significant adverse environmental effects on air quality are unlikely to occur.

4.5.2 Soils

Paramount indicated that project activities may affect the productivity of soils through compaction, rutting, changes in drainage, mixing of soil layers, and soil loss through erosion.

Paramount submitted that winter construction is the primary mitigating factor that would limit adverse effects to soil. Soil stripping and storage for later replacement would occur along the

pipeline trench and at long-term facilities sites such as well sites, the central battery, camp, airstrip, workshop/residence, and the road to the airstrip. Paramount noted that, during winter frozen soil conditions, some admixing of subsoil and topsoil would occur despite careful soil handling. However, Paramount considered the effects of admixing to be insignificant given the nature of the soil types in the project area.

To minimize erosion potential at facility sites, Paramount proposed to grade the sites to ensure controlled drainage. Along pipeline routes, ditch plugs, diversion berms, check dams, slash rollback, and seeding would be used to mitigate erosion and promote site stabilization. Paramount stated that potential for erosion at wet areas, slopes, or banks would be avoided or mitigated by a number of means, such as laying down of corduroy roads where all-terrain vehicles (ATVs) would need to cross bogs, seeding in erosion prone areas, periodic inspections of the pipeline and prompt restoration.

Paramount stated that, in the event of warm weather and soft ground conditions, construction would be suspended if rutting occurs to a depth of 30 cm. The GNWT expressed concern regarding Paramount's reference to a rutting depth of 30 cm and submitted that, although some rutting is unavoidable, Paramount should commit to undertaking mitigative action if rutting of any depth occurs during construction. In response, Paramount submitted that it would be impractical to have "no rutting" since heavy construction equipment would cause a depression even on frozen ground. In its EA Report, MVEIRB recommended that this issue be addressed in the Environmental Protection Plan (EPP) after consultation with GNWT.

Paramount indicated that, during the operational phase, on-going assessment and conscientious repair practices and appropriate restoration would be undertaken to mitigate potential effects to soil. Paramount further submitted that potential effects to soil would be expected to be low in magnitude, confined to specific sites, short-term in duration, and reversible.

Views of the Board

The Board supports GNWT's recommendation that Paramount undertake mitigative measures prior to rutting at depths of 30 cm. However, the Board recognizes that several factors may influence the selection of appropriate mitigation for rutting and that both the GNWT and Paramount recognize that some rutting is inevitable. The Board notes that, as discussed in section 4.10, Paramount's mitigative measures for use during construction would be consolidated in its EPP and submitted to the Board for approval. The Board expects that any criteria for implementation of mitigation for rutting would be clearly outlined in the EPP and that these criteria be developed in consultation with GNWT. The Board notes that this would be consistent with the recommended measure of the MVEIRB.

The Board notes that, potential adverse environmental effects on soils are likely to be localized, short-term and reversible either during the operation of the project or upon reclamation.

The Board is of the view that, with the implementation of Paramount's proposed mitigative measures, including those to be included in its EPP, significant adverse environmental effects on soils are unlikely to occur.

4.5.3 Vegetation

Potential direct adverse effects on native vegetation include loss of community type within the local area, loss of a rare species, and loss of merchantable timber and future timber resources. Indirect adverse effects include the introduction of weedy or otherwise invasive species, reduction in soil productivity (section 4.5.2), and erosion and sedimentation. Paramount's proposed development would require a total of approximately 133.5 hectares (ha) of new clearing.

Some of the factors considered for siting of the flowlines and transborder pipelines included use of existing linear disturbances and avoidance of sensitive habitats, in particular, riparian areas associated with the Cameron River, larger tributaries, and wetlands where possible. Paramount submitted that it sited its proposed central battery, satellite, camps, and airstrip in part to avoid drainages and water courses and to use existing areas of disturbance.

Paramount identified other mitigation measures that it would implement to minimize adverse effects on vegetation. Paramount proposed to keep the right-of-way (RoW) width and facility leases to the minimum dimensions needed to safely construct and operate the pipelines and facilities. Natural re-vegetation would be promoted and, where erosion potential is a concern, the site would be re-seeded. To promote natural re-vegetation, Paramount submitted that, with proper soil salvaging and replacement, the seeds and propagules present in the seed bank would be the basis for returning disturbed areas to as close to pre-disturbance conditions as possible. Paramount also indicated that it would assess vegetation cover during the growing seasons following construction.

The introduction of invasive or weedy species could change species composition of the vegetation communities on and adjacent to the RoW and surface leases. Such species could invade the recently disturbed RoW soils naturally or be introduced through seed mixtures used in reclamation or for erosion and sediment control purposes. Paramount proposed to use mechanical weed control at the battery and camp sites. As well, Paramount would require that all contractors ensure that construction equipment arrive on site free of mud and weed seeds.

Paramount indicated that, due to limited availability of seed that is both indigenous to the regional study area and suitable for re-vegetation programs, it would seed only those areas that are susceptible to erosion. The GNWT recommended that indigenous species be used for re-vegetation and that the introduction of exotic grass species should be avoided if possible. The GNWT expressed concern that the seed mix proposed by Paramount for use in erosion prone areas would have the potential to inhibit the establishment of native species. The GNWT recommended that the South Slave regional office of the GNWT be contacted for advice on appropriate re-vegetation plans if erosion prone areas are identified that require immediate remedial action prior to the re-establishment of natural vegetation. In its EA Report MVEIRB recommended that re-vegetation plans be developed in consultation with the GNWT, along with a follow-up program to assess the vegetation recovery in both seeded and non-seeded areas. MVEIRB also recommended that Paramount periodically report on the presence and relative abundance of indigenous and non-indigenous species in the seeded areas versus the unseeded areas.

Paramount submitted that winter construction, i.e., during frozen ground conditions and dormancy for most plants, would reduce potential impacts to underlying plants. Field surveys found no rare plants in the area of the central battery, satellite, camp, airstrip or borrow pit sites. Habitat types that have potential to support rare plants would be avoided during construction.

The loss of vegetative cover would continue at facility sites for the duration of the project. Paramount submitted that effects would be expected to be subregional in extent and medium in magnitude. Potential weed invasion would be low in magnitude, confined to specific sites, and reversible in the short-term.

To reduce the loss of timber resources, Paramount proposed to survey and clearly mark the boundaries of the RoWs. No trees would be felled off the RoWs. Any merchantable timber remaining after corduroy needs are met would be stacked and decked for recovery by a timber operator. Paramount submitted that loss of timber resources would be expected to be local in extent, low in magnitude, and reversible in the long-term. The GNWT indicated that the project area generally has a low potential for commercial timber and poor access from the NWT makes costs for recovery in the NWT prohibitive. As such, the GNWT does not consider the timber within the NWT to be merchantable. The GNWT also noted that Paramount would have to stack and deck any timber of merchantable size on cleared pushouts along the RoW. Given the above, the GNWT recommended that Paramount windrow the trees that are not required for corduroy. In response, Paramount indicated that if timber is stacked on the RoW, there will be less space for construction and more RoW would be required. MVEIRB recommended in its EA Report that acceptable windrow break frequency and width be determined with consultation among the parties concerned.

Views of the Board

The Board notes that the relative area of disturbance that would occur as a result of the Cameron Hills Project within the regional study area is low and that, during reclamation, native vegetation species and communities would be encouraged to re-establish. In addition, representation of all identified vegetation communities and rare species of plants would be maintained within both the local and regional study areas. The Board notes GNWT's concerns regarding the use of non-native grass species for erosion prone areas. Therefore, should Paramount's application be approved, the Board would impose a condition requiring Paramount to review and revise its seed mixtures in consultation with GNWT and other government agencies and local communities, as appropriate, and file this information with the Board. Paramount would also be required to develop and implement a follow-up monitoring program to assess the success of natural species re-establishment in both seeded and unseeded areas. The Board notes that MVEIRB has also recommended that these measures be undertaken.

The Board notes GNWT's recommendations regarding merchantable size timber in the NWT. The Board also understands Paramount's concerns regarding windrowing of merchantable size timber on the RoW. The Board is of the view that the use of pushouts for stacking and decking of merchantable size timber would be acceptable, but that the company would be required to use natural clearings where possible to minimize the need for new clearing. The Board recognizes the differing views of Paramount and the GNWT regarding spacing of breaks in the windrows. It is unclear whether elimination of the requirement to windrow merchantable size timber would have a bearing on the differing recommendations regarding spacing of gaps. As discussed above,

mitigative measures for use during construction would be consolidated in the EPP. The Board expects that gap spacing in windrows and handling and use of merchantable size timber would be clearly outlined in the EPP. Further, the Board expects Paramount to undertake discussions with the GNWT to clarify specific requirements before the EPP is filed. The Board notes that this is consistent with the recommendations of the MVEIRB.

The Board is of the view that, with the implementation of Paramount's proposed mitigative measures, significant adverse environmental effects on vegetation are unlikely to occur.

4.5.4 Water Quality and Quantity

Quality

Paramount indicated that potential issues with respect to hydrology and water quality include disruption to natural drainage patterns, increased sediment to low-lying areas by all terrain vehicles (ATVs) traveling across corduroy road segments, and contamination due to spills. Spills are discussed in section 4.8 Accidents and Malfunctions. Exposure of the pipeline due to flood scour is discussed in section 4.7 Effects of the Environment on the Project while potential effects on fish and fish habitat are discussed in section 4.5.5.

Paramount proposed to build the pipeline, gathering system and associated facilities during the winter when frozen ground conditions occur. Paramount identified several additional standard mitigative measures to control erosion and sedimentation that it would implement during construction. The well sites, central battery, satellite, airstrip and workshop/residence would be built away from water bodies and low lying areas. Specifically, Paramount stated that the central battery would be located away from watercourses and be located on flat and stable terrain. Temporary camps would be a minimum of 100 m from any watercourses on slopes of less than three percent grade. Water quality would be protected by ensuring that no chemicals, fluids or portable toilets would be stored within 100 m of a drainage, by ensuring appropriate containment, e.g., berms and dykes, and by regular tank/berm integrity monitoring and inspection.

The Department of Fisheries and Oceans (DFO) expressed concern regarding the use of a gravel extraction site along the Cameron River. In response, Paramount provided site-specific details and outlined some of the mitigative measures that it would implement to minimize effects on water quality. DFO submitted that the selection of the gravel site would meet its approval on the condition that Paramount follows appropriate mitigation measures including those outlined in Paramount's response. DFO identified several key measures, including that a vegetated buffer zone of 25 m from the top of the river bank be maintained and that no excavation occur below the water table or the present water level of the Cameron River. MVEIRB also included these measures in the recommendations of its EA Report.

Twenty-one watercourses would be crossed, most of which are small drainages that would be expected to have no water or be frozen to bottom at the time of construction. Paramount stated that these would be crossed using open cut techniques (see also section 4.5.5 Fish and Fish Habitat). Two crossings of the Cameron River and two tributaries would be spanned by bridges, while a third crossing of the Cameron River will be constructed using a horizontal direction drill method (HDD). Paramount stated that, should flowing water be encountered at other crossings,

it would use an isolated flow crossing techniques rather than open cut. Paramount also stated that it would construct its temporary vehicle crossings with clean ice and snow, and v-notch or remove them at the end of construction.

In its response to concerns raised with respect to ATV use of corduroy, Paramount indicated that corduroy would be installed so as to allow water to flow between, under and over the logs and therefore they would not significantly impede water movement. Paramount submitted that, due to the floatation from the balloon tires and their tread configuration, ATVs typically pick up very little dirt or mud. Paramount indicated that vehicles would be cleaned if a large amount of soil build up were found on them. Paramount would also instruct operators to minimize their speeds to limit the potential for bouncing and shaking off dirt or mud when crossing the corduroy.

Paramount submitted that potential effects to drainage patterns would be expected to be local to sub-regional in extent, low to medium magnitude, and short-term.

Quantity

Paramount submitted that water needed for construction of the gathering system flowlines and the transborder pipeline would be obtained from water wells. Paramount submitted that it would require approximately 12,000 cubic meters of water from a shallow, unnamed lake located approximately 1,600 m west of the proposed M-73(02) well pad. Based on lake volume calculations, Paramount estimated that the total water withdrawal would result in a lowering of the lake level by 2 cm. Paramount submitted that potential impacts to the lake could be expected to be mitigated by recharge from groundwater and an adjacent bog. Lake and water usage would be subject to a land-use permit and water licence applications to the MVLWB. During construction of watercourse crossings, maintenance of downstream flows would be required. This is discussed in section 4.5.5 below.

Since Paramount proposed to use pneumatic testing procedures, no water would be required for pressure testing of the pipeline. However, if hydrostatic testing were to be required, Paramount submitted that it would bring the water to and from the area using tanker trucks, thus, there would be no potential effects on water quantity.

Views of the Board

The Board is satisfied that the design and siting of the proposed facilities reduce interactions with surface water. The Board notes that there is an existing regulatory framework for the taking and disposal of surface water which would apply to the operation of the construction camps and the central battery and is satisfied that specific environmental concerns would be addressed through this process. The Board also notes that, pursuant to section 24 of OPR 99, Paramount must obtain any permits required in respect of the use and disposal of water for test purposes.

The Board notes MVEIRB and DFO's recommendations with respect to the gravel site along the Cameron River. As discussed in section 4.10, all of Paramount's proposed mitigative measures would be consolidated into its environmental protection plan (EPP). Further, should the proposed project be approved, the Board would propose a condition that Paramount submit its EPP to the Board for approval, prior to construction.

The Board is of the view that, with the implementation of Paramount's proposed mitigative measures, including those in Paramount's EPP, significant adverse environmental effects on water quality and quantity are unlikely to occur.

4.5.5 Fisheries Resources

Paramount stated that no commercial or subsistence fishing activity presently occurs in the Cameron Hills area. The Cameron River and a tributary support fish, while fisheries resources are limited elsewhere (see section 1.2). In its environmental assessment, Paramount identified the following potential issues: alteration to fish habitat from increased sediment loading; alteration to bank vegetation and top of banks; alteration to water quality; entrainment of fish during water intake; and chronic disturbance to the banks and bed from fording by ATVs.

At four crossings, the pipeline would be suspended from bridges and one crossing of the Cameron River would be directionally drilled. At other watercourses, Paramount proposes to construct the crossings using an open cut method. Most watercourses are expected to be frozen to the bottom or be at low or negligible flows. Paramount stated that, should open water be encountered, the crossing would be constructed using an isolated flow technique. Paramount committed to limit bed disturbance to trench width, replace the original bed material, and implement erosion control measures (ditch plugs, diversion berms, and check dams). DFO stated that downstream water flow must be maintained at pre-instream work levels and all instream work must be completed in a maximum of three days to prevent significant disruption to fish movements. Consistent with DFO, MVEIRB recommended in its EA Report that downstream flows be maintained and crossings be completed expeditiously. Additional proposed measures to mitigate stream sedimentation include not placing bridge piles in active channels, using only material clean of fines and other contaminants below the high water mark, constructing ice/snow bridges with clean snow and ice only, and "v-notching" or removing the ice/snow bridges prior to the spring thaw.

Alteration to vegetation and top of bank would be mitigated by minimizing access width at stream crossings, re-vegetating exposed soil, re-contouring graded banks and stabilizing them with rock rip rap.

With respect to water withdrawals required for drilling wells, Paramount identified an unnamed lake 1600 m west of pad M-73(02) as a water source (also see section 4.5.4). Paramount observed bullrush, water lily, and eel grass during a survey of the lake but due to its shallow depth of 1.0 m, submitted that the lake was not considered capable of supporting a self-sustaining fish community. Regardless, water intake fish screens, as provided with a 5 millimetre mesh, would be used to ensure that fish, if present, would not be entrained during water intake. Further, Paramount indicated that, if disturbance to banks and bed at ATV fords is noted, it may lay down a small log bridge or gravel to create a stable ford.

Paramount submitted that potential for alteration to fish habitat from increased sediment loading would be expected to be subregional in extent (downstream effects), low to medium magnitude, and reversible in the short- to medium-term. Potential for alteration to bank vegetation and the top of banks would be expected to be confined to specific sites, be low magnitude, and be reversible (stabilized) in the medium-term.

Views of the Board

The Board recognizes that in those watercourses for which fisheries resources were identified, the use of HDD crossing technique and span bridge construction should effectively avoid interaction with fish and fish habitat, and that fisheries resources are limited elsewhere. The Board is of the view that construction of crossings during frozen conditions or the use of isolated flow crossing techniques would limit the geographic extent and therefore magnitude of adverse effects. The Board notes MVEIRB and DFO's recommendations with respect to maintenance of flow and duration of instream work. The Board also notes Paramount's commitment to restore watercourses to pre-construction profiles or otherwise stable conditions and to use clean backfill material. Further, the Board expects that Paramount's mitigative measures for construction would be consolidated into its EPP and submitted to the Board for approval prior to construction (see section 4.10).

The Board is of the view that, with the implementation of Paramount's proposed mitigative measures, including those in its EPP, significant adverse environmental effects on fish and fish habitat are unlikely to occur.

4.5.6 Avifauna

Paramount indicated that potential effects on avifauna include loss or alteration to habitat, change in bird community composition, increase in depredation of nests, and visual and noise disturbance from project construction and operational activities.

Paramount discussed scientific research on the effects of pipelines on northern boreal forest bird populations. Effects included differences in bird community composition in forests adjacent to pipeline RoWs, increases in nest depredation adjacent to wide RoWs as compared to narrow RoWs, and behavioural reluctance to cross wide RoWs compared to narrow RoWs. Paramount stated that the research concluded that new pipeline construction should focus on reducing RoW width wherever possible and consider leaving forest corridors across them to facilitate wildlife movement.

Paramount submitted that its mitigation measures would minimize adverse effects on avifauna through the maximum use of existing disturbance corridors and winter construction that would avoid sensitive breeding periods. Further, Paramount stated that nest trees located during construction (i.e. cavity trees) would not be cut down, if possible. Paramount submitted that disturbed habitat would regenerate throughout the natural encroachment over the project life span, with the exception of the well sites, the central battery and access roads and airstrip which would be reclaimed during decommissioning.

Further, Paramount submitted that there is typically a low density of breeding birds in the project area and that local loss of tree cover on the RoWs would be mitigated by the presence of adjacent available nesting and foraging habitat. Further, the vegetation communities that would be expected to support the highest densities of breeding birds would be mature mixedwoods and dense old growth coniferous stands. These are located in the Cameron River valley and large tributaries which are crossed by RoWs only a few times and perpendicularly. Paramount also submitted that edge conditions created by the presence of the RoWs, access and airstrip could provide habitat for certain species which are habitat generalists.

Paramount also submitted that, although there might be localized seasonal potential for birds to strike power lines, the lines would not be within high use bird migratory areas and the lines would be located along planned or existing RoWs.

By letter dated 26 October 2001, Environment Canada provided a technical review of Paramount's EIA Report and subsequent submissions with respect to migratory birds. Environment Canada noted that fragmentation would be minimized and that winter construction would avoid nesting and rearing periods. Environment Canada also expressed concern with respect to the need for monitoring (see section 4.10). Environment Canada indicated that it was of the opinion that, with the implementation of Paramount's proposed mitigative measures, project impacts on the natural environment would be minimal.

Views of the Board

The Board notes that, due to the proposed winter construction schedule and limited project footprint, the principal disturbances to avifauna would likely be associated with noise and visual disturbances related to the operation of the central battery, well sites, and access. Noise effects are further discussed in section 4.5.8. The Board also recognizes that visual disturbances would be localized and steady in nature. The Board further notes the high mobility of birds and is satisfied that the disturbance of the project is relatively small relative to the available habitat in the regional study area.

The Board is of the view that, with the implementation of Paramount's proposed mitigative measures, significant adverse environmental effects on avifauna are unlikely to occur.

4.5.7 Wildlife

Paramount identified several potential project-related effects on wildlife, including loss, fragmentation or alteration of habitat; destruction of nesting and denning sites; increase of wolf predation along the RoW; creation of a long line-of-sight; visual barriers to species that prefer cover; displacement of wildlife due to construction activity and operational inspections; wildlife harassment and habitation; increased vehicle-wildlife collisions; physical barriers to movement and increased access by humans to remote areas. Paramount described its proposed mitigative measures in its applications and subsequent submissions. Certain, specific measures are discussed below.

Paramount provided a list of vegetation communities within the project area and a habitat suitability rating for caribou, moose, fisher, and snowshoe hare. Further, it estimated the linear distance of habitat with high, moderate and low suitability ratings that would be traversed by the proposed project. Paramount stated that the transborder pipeline would traverse no high quality woodland caribou habitat, 2.26 km of moderate quality habitat and 0.42 km of low quality habitat.

Paramount stated that it minimized RoW width where feasible and that natural revegetation would promote the propagation of native browse species. Further, Paramount submitted that, through the use of winter construction, disturbance to ground vegetation that provide food

resources for woodland caribou would be minimized. Paramount also submitted that it avoided important moose habitat, such as wetland and riparian habitat, where feasible and that moose, during the winter, would move towards the Hay River valley to the east of the project area.

In its technical review comments, the GNWT noted Paramount's approach to identify wildlife species that could be affected by its proposed project (section 1.2) and was of the opinion that presence/absence must be determined through ground surveys. The GNWT therefore recommended that Paramount consult with hunters and trappers who are knowledgeable about the project area as part of their on-going traditional knowledge study. Further, the GNWT recommended that, should harvesters identify areas of particular importance for wildlife, Paramount should commit to developing and implementing appropriate mitigation to avoid impacts to those areas. MVEIRB recommended that a wildlife monitoring program be designed in consultation with Environment Canada and the GNWT. The monitoring report would periodically summarize data, identify potential impacts, and suggest mitigative measures if determined necessary.

Fragmentation and Barriers to Movement

Paramount indicated that, during construction, slash piles, trenching and snow embankments may act as barriers to wildlife movements. Paramount identified sensitive locations for avoidance during a pre-project survey and stated that the RoW would avoid parallelling potential animal movement corridors.

Paramount discussed recent research[5] with respect to disturbance (Dyer 1999). Paramount indicated that, while fragmentation can be permanent for roads, it is considered temporary for pipelines and was of the opinion that pipeline RoWs would not be a barrier to caribou movement. Paramount submitted that its primary mitigation for fragmentation was to minimize RoW width, use existing disturbances to the extent possible and natural regeneration. Paramount submitted that edge effects could be expected to diminish over time as natural regeneration occurs. Paramount cited research that noted caribou use of new vegetation on pipeline RoWs as spring and summer forage[6]. Paramount noted that moose were observed on old seismic lines in the project area and submitted that they would not be hesitant to cross access corridors.

To mitigate increased wolf access and predation, Paramount stated that it would rollback slash and encourage re-vegetation. Paramount was of the opinion that project-related changes to wolf movement patterns (i.e. use of the RoW) would only occur during the early winter, before deep, soft snow conditions occur. Paramount submitted that revegetation, maintenance of riparian vegetation, natural topography and bends and corners along the RoW would provide visual obscurity to minimize lines-of-sight.

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5 Dyer, S.J. 1999. Movement and Distribution of woodland caribou (*Rangifer tarandus caribou*) in response to industrial development in northeastern Alberta. M. Sc. Thesis, University of Alberta, Edmonton.

6 Cronin, M.A., W.B. Ballard, J. Truett and R. Pollard. 1994. Mitigation of the Effects of Oil Field Development and Transportation Corridors on Caribou. Final Report to the Alaska Steering Committee. Prepared by LGL Alaska Research Associates, Anchorage, Alaska. 120 pp.

The GNWT indicated that it was of the opinion that habitat fragmentation and alteration would likely persist over the long-term (>10 years) due to the slow growth of vegetation in the north. The GNWT submitted that species favouring early successional habitats would thrive in new disturbance areas while species favouring mature or old growth habitat types could be adversely affected. The GNWT submitted that, based on the findings of recent scientific research[7], woodland caribou could be expected to reduce their use of the well, central battery and pipeline areas over the long-term.

As discussed in section 4.5.3, Paramount stated that, during construction, it would maintain 10 m breaks in windrows every 500 m, following similar guidelines for breaks in welded pipe as outlined in the Boreal Caribou Committee, Strategic Plan and Industrial Guidelines for Boreal Caribou Ranges in Northern Alberta. The GNWT stated that it has a guideline for windrow breaks and recommended its use for the proposed project. The GNWT's guideline indicates that windrows should be every 60 m and be 10 m in width, which would maximize opportunities for wildlife to both cross the RoW and to escape from the RoW should they encounter humans or vehicles. The GNWT also submitted that frequent breaks in windrows interrupt the fuel supply available to forest fires. MVEIRB recommended in its EA Report that acceptable windrow break frequency and width be determined with consultation among the parties concerned.

Noise/Disturbance

Paramount stated that activity and noise associated with the construction and operation could result in wildlife, including caribou, moose and furbearers, avoiding the project area. The GNWT stated that it was of the opinion that project-related disturbances would result in some localized displacement of some wildlife species. Paramount noted that, for many species, disturbance of wildlife during breeding, birthing or rearing periods would be avoided with winter construction.

Paramount submitted that when exposed to predictable, frequent, non-threatening events, wildlife is able to habituate. Paramount submitted that wildlife would become habituated to project activities and associated noise and light, particularly since activity would be restricted to the facility sites and access and because wildlife would not be chased. Paramount further submitted that noise produced by construction equipment is not expected to create loud bursts such as those made by seismic operations and that, during operation, noise would be associated with the operation of the well sites, central battery facilities and the test satellite (see section 4.5.8) and infrequent use of access routes (road, ATV, air). Paramount submitted that it observed woodland caribou and their sign in the vicinity of existing well sites and winter road corridors in the project area and further noted their low numbers (100-200) in the region. The GNWT suggested that the large area to the west of the Cameron Hills may be able to absorb woodland caribou displaced by the proposed project but noted the lack of existing research to indicate if this would occur.

During operation, Paramount stated that it would conduct line inspections by helicopter and that land-based disturbances would be limited to access routes at the battery. Well inspections would

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[7] Dyer, S.J., J.P. O'Neill, S.M. Wasel and S. Boutin. 2001. Avoidance of industrial development by woodland caribou. J. Wild. Management 65(3):531-542.

be accessed by ATV or snowmobile. Paramount submitted that disturbance, including use of the airstrip, would be very localized and for brief periods of time on an occasional basis.

Paramount stated that, if a valid noise concern was raised by its personnel, trappers or other users of the land, it would take action to meet the EUB noise guideline of 40 decibels at a distance of 1.5 km. (see section 4.5.8 Noise).

Project-related Mortality

During construction, Paramount would ensure that measures would be implemented to minimize or avoid wildlife harassment and habituation, including instructing personnel to maintain a clean work area (free of debris and refuse) and not allowing firearms or dogs on the project site. Further, to reduce the risk of vehicle-wildlife collisions, drivers would be instructed to be alert for wildlife and to obey set speed limits.

Increased Access

Increased access could lead to increased levels of disturbance and hunting and trapping pressures. Paramount reported that existing access into the Cameron Hills plateau is poor and that there would be no change in access to the area as a result of the proposed project. Paramount submitted that ground access to the project area would only be available during the winter via an existing winter road, and that no all-weather access is proposed. No access would be provided via the transborder pipeline.

Summary

Paramount submitted that most of the potential environmental effects to wildlife would be expected to be local to subregional in extent, low to medium in magnitude, and reversible in the short- to medium-term. Effects resulting from clearing the RoWs, such as habitat fragmentation, increased wolf predation, creation of long lines-of-sight and visual barriers to crossing, as well as the presence of artificial structures (i.e. bridges at watercourses), would likely not be completely reversible until the long-term, i.e., after decommissioning and natural re-vegetation has occurred.

Paramount submitted that the potential residual effects of the project on wildlife would be medium- to long-term in duration, local in extent, low in magnitude, and reversible in the short- to medium-term. Paramount further submitted that the loss and alteration of habitat resulting from the proposed project would not be sufficient to trigger a decline in regional wildlife populations or biodiversity. The GNWT stated that it was of the opinion that the proposed project is not of sufficient scale to cause a decline in regional wildlife populations or biodiversity on a regional scale.

Views of the Board

The Board recognizes that the primary adverse project-related effect on wildlife would be associated with noise from facilities, human activity and access activity. The Board notes the relatively short construction period, the relatively low activity levels anticipated during operation and the lack of new project-related access routes. The Board recognizes that Paramount would

encourage natural vegetation to re-establish on the pipeline RoW and that, in forested areas, wildlife habitat would be effectively changed to an open shrub-immature treed habitat.

The Board recognizes the differing views of Paramount and the GNWT regarding spacing of breaks in the windrows. As mentioned in section 4.5.3, it is unclear whether elimination of the requirement to windrow merchantable size timber would have a bearing on the differing recommendations regarding spacing of gaps. Mitigative measures for use during construction would be consolidated in the EPP. The Board expects that gap spacing in windrows and handling and use of merchantable size timber would be clearly outlined in the EPP. Further, the Board expects that discussions with the GNWT will be undertaken to clarify specific requirements before the EPP is filed. The Board notes that this is consistent with the recommendations of MVEIRB.

The Board is satisfied that, based on the predicted area of disturbance associated with the proposed project and the relatively large amount of available habitat in the project area, adverse effects associated with loss of habitat or reduced habitat quality would be minimal.

With respect to effects from operational noise, the Board notes the GNWT suggestion that the large area to the west of the Cameron Hills may be able to absorb woodland caribou displaced by the proposed project but note the lack of existing research to indicate if this would occur. As discussed below in section 4.5.8, the Board is of the view that the effects of the predicted operational noise are not likely to cause significant adverse environmental effects, however, monitoring must be undertaken to verify noise level predictions.

The Board notes the GNWT's recommendation that Paramount speaks with hunters and trappers regarding wildlife use. The Board notes Paramount's ongoing consultations and that any changes to mitigation resulting from these discussions would be included in Paramount's EPP which would be filed with the Board for approval, prior to construction (section 4.10). The Board also notes MVEIRB's recommendation with respect to establishment of a wildlife monitoring program. In order to accommodate MVEIRB's recommended measure, should Paramount's applications be approved, the Board would condition the company to submit it proposed wildlife monitoring program to the Board for approval. The Board would expect that Paramount design the program in consultation with Environment Canada and the GNWT.

The Board is of the view that, with the implementation of Paramount's proposed mitigative measures and with an effective wildlife monitoring program, significant adverse environmental effects on wildlife are unlikely to occur.

4.5.8 Noise

With respect to noise generated by construction activities, Paramount indicated that equipment would be fitted with appropriate mufflers. Paramount submitted that noise effects associated with construction would be minor, localized, temporary and insignificant.

For operations, Paramount submitted noise predictions in respect of:

- thirteen oil wells;
- seven gas wells;

- one water disposal well;
- one test satellite at H-04; and
- a gathering system header and central battery at H-03.

Noise calculations for all sites were based on specific equipment and activities anticipated at the sites, and scaled from similar facilities. All noise level estimates were given at a 15 m distance. Paramount submitted that noise evaluations would typically be concerned with impacts to an adjacent property or residence. Paramount stated that in the case of remote locations such evaluations are of little merit but noted the EUB's night-time noise guideline of 40 dBA at a distance of 1.5 km . Given the absence of local limits, Paramount stated that it had "made use of these numbers" in its evaluation of the project. In responses to information requests from the Board, Paramount indicated that it would take action to meet the 40 dBA limit upon receiving any reasonable complaints. In its EA Report, MVEIRB recommended that baseline and operational noise surveys be completed and filed with the Board, among others.

Views of the Board

The Board is of the view that construction related noise effects would be minor, localized, and temporary. With respect to operations, the Board notes that the project area supports a low density of wildlife (see section 4.5.7) and, currently, there is a low level of human use of the immediate areas of the proposed well and central battery sites.

However, the Board notes that several facilities have more than one piece of equipment that would emit noise and that Paramount's analysis does not appear to consider combined noise levels at any given location. The Board recognizes that the EUB guideline is designed around a "complaints" basis. Given the lack of data, and remote location where it is unlikely people would be present to complain, the Board is of the view that Paramount should undertake a field noise assessment survey. Therefore, if the project were approved, the NEB's Chief Conservation Officer would impose a condition requiring Paramount to file a baseline noise survey to establish ambient noise levels, and conduct noise surveys shortly after the commencement of operations. Subsequent environmental noise assessment surveys would also be required in the event of changes to operations or increases in throughput levels from those measured shortly after commencement of operations. The Board notes that this is consistent with MVEIRB's recommendations.

The Board is of the view that, with the implementation of Paramount's proposed mitigative measures and the proposed condition, significant adverse environmental effects resulting from project-related noise are unlikely to occur.

4.6 Socio-economic Environment

4.6.1 Current Use of Land and Resources for Traditional Purposes

Under section 16.1 of the NEB Act, Paramount filed confidentially with the Board on 4 December 2001 copies of Traditional Knowledge (TK) studies for the following communities: Deh Gah Got'ie First Nation and Fort Providence Metis Nation; Dene Tha' First Nation; Ka'a'gee Tu First Nation; K'atlodeeche First Nation; and West Point First Nation. These studies represented TK collected by Paramount over the previous 15 months.

To collect the information for the TK studies, Paramount met with each of the above mentioned communities. These meetings were typically small, at times, one-on-one, and generally included elders, trappers, other community members and translaters. Generally, the Chief was in attendance for at least one of the meetings in their community. Paramount stated that the purpose of the meetings was for the communities to share their TK about the Cameron Hills area. Paramount also used these meeting to talk about the proposed project. At these meetings a large scale map of the entire Cameron Hills - Tathlina Lake - Great Slave Lake region was used where participants outlined and discussed the significant areas and information for inclusion into the TK study. Paramount prepared a report which summarized the information presented. This study was provided to the communities for review and comment.

From the information collected, Paramount concluded that traditional land use activities of hunting, fishing and berry picking are generally concentrated near water bodies (lakes, streams and rivers) throughout the Cameron Hills - Tathlina Lake - Great Slave Lake region; however, in the vicinity of the project, traditional use activity is limited to winter trapping. Paramount also concluded that berry picking is not likely to occur in the project area due to the difficulty of accessing the area in non-frozen conditions and the availability of berries closer to the communities.

To limit the potential effects on trapping and berry picking, Paramount has committed to the following mitigation activities:

- the RoW width has been minimized and limited to existing linear disturbances to the extent possible;
- the encroachment of natural vegetation will be encouraged on RoWs;
- the project will be completed during frozen ground conditions;
- the numbers of crossings of the Cameron River has been reduced;
- wildlife disturbance will be limited by maintaining all construction and operations activities to the approved RoWs and work areas;
- 10m openings every 500m and at active game trails in the slash and snow windrows;
- hunting and pets will not be allowed on the project site;
- garbage will be collected and disposed of in the appropriate manner; and
- Paramount's Caribou Protection Plan will be followed for portions of the pipeline in Alberta.

Paramount has also committed to the following measures to address concerns related to watersheds:

- drainages to be crossed will be assess for fisheries habitat and the appropriate crossing technique selected;
- on the Cameron River and its tributaries, the flowlines will either be attached to bridges or will be directionally drilled;
- the banks at drainage crossings will be stabilized and seeded as appropriate;
- Paramount's Emergency Response Plan and Spill Contingency Plan will address spills or accidents at watercourses;
- at bridge crossings a double pipe system will be used to contain potential leaks; and
- no refuelling will take place within 100m of a waterbody or drainage.

Paramount has stated they will continue to communicate with potentially impacted lands users of the Cameron Hills region throughout the life of the project and if any additional TK information becomes available pertaining to Paramounts' project area, Paramount will incorporate the information into the ongoing project operation and future potential development.

Views of the Board

The Board notes Paramount's commitment to continue to communicate with potentially impacted lands users of the Cameron Hills region throughout the life of the project and to incorporate additional TK information into the ongoing project operation and future potential development. The Board also expects that Paramount would document its ongoing communication with First Nations, particularly with respect to the traditional knowledge studies and any associated mitigation. Paramount would be required to ensure the implementation of any and all commitments made by the company in the Board's regulatory process. Further, the Board notes that it has, for projects under its jurisdiction, several formal and informal mechanisms and processes to ensure that commitments are fulfilled and appropriate measures to protect the environment are undertaken throughout the life-span of the project. These include inspection of facilities and activities, ensuring compliance with commitments, conditions of approval and the *Onshore Pipeline Regulations*, 1999, regulatory audits, letters, direction and adjudication of complaints.

The Board is of the view that since the wildlife will not be significantly effected by this project as discussed in section 4.5.7 Wildlife and with the implementation of the mitigation measures and ongoing communications noted above, the proposed project is unlikely to cause significant adverse environmental effects to the use of land and resources for traditional purposed by aboriginal people.

4.6.2 Heritage Resources

No heritage resources were identified during the Heritage Resources Impact Assessment (HRIA) and Paramount noted that no further archaeological work is recommended for the proposed project.

Paramount stated that should unexpected heritage resources be encountered during construction, all work in the immediate area of the discovery would cease until an archaeologist is able to examine the find and develop an appropriate site management plan.

In their technical review comments dated 24 October 2001, the KTFN identified the following concerns with Paramount's intended response plan in the event of a heritage resource discovery:

- the KTFN should be informed if heritage resources are discovered on their traditional territory;
- the KTFN, in consultation with the archaeologist, should determine if construction can continue;
- there should be provisions to accommodate KTFN's interests if they incur losses in heritage resources arising from the construction;
- Paramount must respect the need for any ceremonial activity which may arise if a cultural resource is disturbed; and

- if crew members are to be used to identify possible heritage resources, then these crew members should be members of the KTFN, paid by Paramount to fulfill this function.

In response, Paramount stated that it would comply with the *Northwest Territories Archeological Sites Regulations* which states in section 12,

> "(a) the permittee shall immediately suspend operations on the site or burial ground and notify the Board or an inspector, and (b) the Board or inspector shall notify any affected First Nation and the department of the Government of the Northwest Territories responsible therefore of the location of the site or burial ground and consult them regarding the nature of the materials, structures or artifacts and any further action to be taken."

Further to the commitments of Paramount, MVEIRB recommended in its EA Report that Paramount's proposed heritage resource discovery process be amended to include the concerns of aboriginal communities, including the hiring of local environmental monitors to identify potential heritage resource discoveries.

Views of the Board

The Board notes the concerns of the KTFN and is of the view that these concerns would likely be shared with other First Nations in the area. The Board notes that the commitments made by Paramount, as required under territorial legislation, would satisfy the first four concerns of the KTFN, and would apply to all aboriginal communities in the area whose heritage resources may be discovered during construction. As for the last concern raised by the KTFN, the Board notes that there are no previously recorded archaeological sites in the area and that during the HRIA no cultural remains were found. Additionally, Paramount concluded that the study area has a low archaeological potential due to the generally wet and low-lying condition. However, the Board shares the concern of the KTFN about the ability of the construction inspector to adequately identify heritage resources which may be uncovered during construction since, as stated by Paramount, the inspector will not be present at all excavations all the time and work crews will only have a 'hand-out' to guide them in identifying heritage resources. Should this project be approved, the Board would include a condition that Paramount employ a local qualified person to oversee the clearing, ground breaking and trenching activities for the purpose of identifying aboriginal heritage resources. The Board is of the view that such a condition would be consistent with the recommendations of MVEIRB.

The Board is of the view that, with the implementation of Paramount's proposed mitigative measures and the proposed condition, significant adverse environmental effects on any structure, site or thing that is of historical, archaeological, paleontological or architectural significance are unlikely to occur.

4.7 Effects of the Environment on the Project

Paramount identified the following potential effects of the environment on the project:

- pipe buoyancy in bogs;
- slope failure at stream crossings resulting in pipe rupture;
- scouring at watercourses affecting integrity of the pipe;
- effects of terrain and permafrost; and
- forest fires.

In addition to specific mitigative measures to minimize potential effects of the environment on the project, Paramount also stated that it would design its proposed facilities in accordance with current standards and regulations.

Pipe Buoyancy in Bogs

Much of the area, in particular the southern part of the project area, has poor drainage. Paramount estimated that about 50% to 70% of the region consists of wetlands. To counteract pipe buoyancy in bogs, Paramount has proposed to use heavy-walled pipe.

Slope Failure at Stream Crossings Resulting in Pipe Rupture

A number of the proposed stream crossing sites have moderate to steeply sloping banks, in particular the Cameron River and larger tributary crossings. Potential exists for slopes, disturbed by RoW construction and in conjunction with possible underlying sporadic permafrost, to fail. Earth movement could create stress on the pipeline causing a rupture. Paramount submitted that sporadic permafrost is restricted to bogs and speckled bog areas and does not expect to find permafrost at most stream crossings. The crossings at steeper banks would be bridged rather than cut or otherwise disturbed. The pipeline would be suspended beneath the bridge for three of the four bridge crossings. At other crossings, the RoWs would be two-toned[8] to minimize grading requirements and stabilized with rock rip rap and re-seeding.

Paramount stated that it would carry out regular inspections for potential problems and respond promptly (section 4.10). In case of a line break, emergency shutdown valves and emergency response procedures would be activated. Paramount submitted that the risk of pipeline rupture is considered to be low.

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[8] Two-toning is used to limit the need for deep cuts and additional RoW on steep sideslopes. The technique involves cutting a terrace a few metres upslope of the trench to provide a level base for heavy equipment and placing fill from the cut immediately downslope of the trench to provide a level base for trench spoil. A small, secondary terrace is often required immediately adjacent to the upslope side of the trench in order to maintain a safe and stable open trench. Fill from the secondary terrace is often placed separate from the trench spoil, on the upslope side of the working area.

Scouring from Large Flood exposing the Pipe Cover Resulting in Pipe Rupture

At larger watercourses, high flows with associated bed scour could expose and damage the pipeline protective cover, possibly causing a rupture. Paramount carried out an hydrologic analysis to calculate the estimated 1:100 year instantaneous flood peak discharge using regional data of recorded annual maximum instantaneous discharges. Paramount submitted that the transborder pipeline and gathering lines would be buried to accommodate a 1:100 year flood event. Permanent bridges, including those designed to suspend the gathering lines across watercourses would also be designed to accommodate 1:100 year floods. Paramount also conducted an hydraulic analysis to assess the risk of pipe exposure due to scour. Calculated scour depths ranged from about 0.5 m to about 1.8 m and corresponding recommended burial depths ranged from 1.5 m to 2.5 m.

In letters to MVEIRB dated 26 and 27 October 2001 respectively, Environment Canada and DFO expressed concern that inappropriate parameters were used in the calculation of 1:100 year flood estimates. The two departments expressed concern that both errors and uncertainties in the calculations may have led to inadequate design of the watercourse crossings. Paramount responded to these concerns by providing a clear explanation of the methodology used to calculate the flood estimates and an explanation of the confidence limits and bridge design parameters associated with the calculations. Paramount also submitted that DFO approved the bridge designs. Subsequently, by letter dated 30 November 2001, Environment Canada also indicated that it was satisfied with Paramount's explanation.

Terrain and Permafrost

Most of the wells in the project and the associated facilities, including the central battery, satellite, and camp would be located on the plateau above the Cameron River valley and on stable ground. Paramount submitted that permafrost is expected to occur only in areas of bog or speckled bog, primarily in the southwest area of the proposed project. Thick-walled pipe would counter pipe buoyancy in bogs. Also, Paramount provided its "Operating Guidelines for Permafrost Areas", which, if implemented, would mitigate effects to permafrost. Paramount stated that it would use personnel with construction experience in northern regions and permafrost conditions to facilitate proper identification of permafrost and proper implementation of Paramount's operating guidelines. MVEIRB recommended in its EA Report that locations where permafrost is encountered should be identified and monitored.

Paramount proposed to minimize grading requirements in sloped areas by two-toning the RoW. Additional grading would be done at the battery, satellite, camp, workshop/residence, and airstrip sites. The gathering lines would be buried with some localized subsidence possibly occurring as the covering roach compacts after replacement. Stripped topsoil would be salvaged and replaced at the completion of construction or, in the case of facility sites, after decommissioning.

Paramount submitted that environmental effects of permafrost integrity and terrain on the project would be local in extent, of low magnitude, and reversible in the short-term.

Forest Fires

Paramount submitted that forest fires do occur in the Cameron Hills region but that it is experienced operating in these types of areas. The proposed project would include remote monitoring, telemetry, and emergency shutdown capabilities to enable parts of the project to be shutdown or isolated in the event of a forest fire. The pipeline and gathering system flowlines are buried for almost their entire length, further reducing the potential for damage or ruptures due to forest fires. Paramount stated that, during construction, fire-fighting equipment would be readily available and submitted that winter construction would also reduce the potential fire hazard.

Views of the Board

The Board is satisfied that Paramount's design and mitigative measures address potential effects of the environment on the project. The Board notes Paramount's commitment to design and operate the pipeline in accordance with current standards and comply with the OPR 99 under the NEB Act. The Board also notes that, through project design and site selection, Paramount would be able to avoid or adequately mitigate many of the potential adverse effects that the environment may cause to the project. The Board also recognizes that Paramount has addressed the concerns raised by DFO and Environment Canada with respect to the calculation of 1:100 year flood levels.

The Board recognizes the potential effects on the project of environmental changes that may occur as a result of degradation of permafrost, particularly on slopes. Therefore, should the proposed project be approved, the Board would impose a condition requiring Paramount to identify and monitor locations where permafrost is encountered. This is consistent with the recommendations of MVEIRB.

The Board is of the view that, with the implementation of Paramount's proposed mitigative measures, significant adverse effects of the environment on the Cameron Hills Project are unlikely to occur.

4.8 Accidents and Malfunctions

During construction and operation, spills of a hazardous material could occur during re-fueling, or due to mechanical failure. During operation, Paramount identified the following accidents and malfunctions that may occur:

- pipeline and equipment leaks and ruptures;
- emergency flaring; and
- facility explosions and fire.

Spills

Soil contamination affecting soil productivity or entry into a watercourse may occur as a result of a spill or leak of a hazardous material. Potential adverse environmental effects to fish include direct mortality, sub-lethal physiological effects and reduced survivorship, habitat avoidance, and loss of food resources. Spills into watercourses which have downstream users may create a risk to public health and safety. The magnitude and duration of the effects of accidental spills are

dependent upon the nature of the material spilled, the quantity spilled, the location of the spill, and the time of year the incident occurs.

Winter conditions during construction would facilitate containment and recovery of spilled material and reduce the likelihood of migration to aquatic habitats or soil contamination. Further, siting of the well site and central battery facilities away from watercourses and on level, cleared land would also minimize migration and facilitate clean-up. Paramount stated that it would report all reportable spills to Alberta Environment and the MVLWB.

Environment Canada. indicated that it expected Paramount's Emergency Response Plan to include a comprehensive spill contingency plan. As a result, Paramount submitted its Spill Contingency Plan to Environment Canada as part of its Emergency Response Plan in November 2001.

Leaks and Ruptures

A pipeline failure could result in soil or watercourse contamination from liquids and poisoning to wildlife from exposure to sour gas. Paramount submitted data from the AEUB Report 98-G indicates that failure rates for multiphase pipelines averaged 7.7 failures per 1000 km in the period from 1993-1997. Ninety-five percent of the releases were less than 100 cubic metres of liquid or gas. Corrosion accounted for approximately 63% of the failures. Paramount submitted several mitigative strategies which would lead to a low probability for pipeline failures or equipment leaks. Among the items listed by Paramount were use of pipeline coatings, corrosion inhibition chemicals, protective devices to prevent overpressuring, monitoring and inspection and corporate policies to address safety and environmental protection. In the event of a failure, Paramount indicated that it would have low pressure shutdown devices, secondary containment around storage tanks, spill kits at work sites and telemetry monitoring with alarms. Further, Paramount stated that it would site storage tanks more than 100 m from watercourses.

Paramount submitted its Emergency Response Plan to the Board for approval on 1 November 2001. Paramount submitted a copy of the Emergency Response Plan to Environment Canada on the same day. Paramount indicated that it has a Safety Manual and handbook for contractors, a Task Competency Manual for operators and an Emergency Response Plan that are being currently updated. In its EA Report, MVEIRB recommended that Environment Canada and GNWT be consulted during preparation of the Emergency Response Plan. Comments would be provided to the Board.

Emergency Flaring

Paramount indicated that depressuring may be required in the event of a malfunction and emergency situation, or for maintenance purposes. Depressuring would require flaring of gas and lead to short-term air emissions. Paramount submitted that these events are anticipated to be infrequent because of proper monitoring, inspection, maintenance and use of automatic shutdown devices. Paramount also submitted that, to limit the amount of flaring, surface facilities could be isolated from the pipelines and that parts of the gathering system could be isolated into smaller sections.

Fires and Explosions

Paramount submitted that facility or equipment fires and explosions could cause forest fires, expel emissions to the environment, contaminate soils, and cause bodily harm to wildlife and personnel. Paramount also submitted that the probability of these events occurring would be low with the implementation of various mitigative techniques such as use of monitoring equipment, routine inspections and maintenance, use of a non-explosive medium for pressure testing, employment of automatic shutdown devices, and use of safe work procedures and emergency response plans.

Views of the Board

The Board is of the view, that with the implementation of Paramount's proposed mitigation measures, adverse effects of any accidental spill on soil, wildlife or aquatic resources would likely be short-term and reversible. The Board notes that, for construction, spill prevention and response measures are typically described in the EPP. As discussed in section 4.10, should the proposed project be approved, the Board would require Paramount to submit its EPP to the Board for approval, prior to construction. The Board expects that Paramount would consult with Environment Canada and GNWT in the preparation of the spills section of that document. Comments would be provided to the Board.

The Board notes that pipeline failure could occur but that the location of the proposed facilities is not in close proximity to any communities and Paramount would include pipeline monitoring and shut off controls in its facilities design. The Board notes that, as required by section 39 of OPR 99, Paramount would be required to develop a monitoring and surveillance program for the protection of the pipeline, the public and the environment and, as required by section 40 of OPR 99, develop a pipeline integrity management program. Further, the Board recognizes Environment Canada's concern with respect to Emergency Response, and notes that, pursuant to sections 32 to 35 of OPR 99, Paramount would be required to develop, regularly review, implement and update as required, an Emergency Procedures Manual and program. Prior to operation of the wells, gathering system, and battery, Paramount would be required to obtain approval for several plans pursuant to the *Canada Oil and Gas Production and Conservation Regulations* (Production and Conservation Regulations). These documents would include a Safety Plan which would itself include an Emergency Response Plan and Corporate Safety Program.

The Board notes MVEIRB's recommendation that Environment Canada and GNWT be consulted during the preparation of the Emergency Response Plan. Given that Paramount has already submitted its Emergency Response Plan to the Board and Environment Canada, in order to accommodate MVEIRB's recommendation, the Board would direct the company to ensure it has filed a copy of the Emergency Response Plan with the GNWT and to provide the Board with confirmation that any concerns raised by Environment Canada and GNWT have been addressed.

The Board is satisfied that, in the event of an accident or malfunction, the procedures and mitigative measures described by Paramount would ensure that clean-up is well coordinated; that the affected area is limited in size; and that any adverse environmental effects would be temporary.

The Board is of the view that, with the implementation of Paramount's proposed mitigative measures, significant adverse environmental effects resulting from accidents and malfunctions are unlikely to occur.

4.9 Cumulative Environmental Effects

The CEAA requires that the Board consider the potential environmental effects of the proposed Cameron Hills Project in combination with other projects and activities that have been or will be carried out.

The Board used a framework for evaluating Paramount's cumulative effects assessment (CEA) that consists of the following steps: scoping, analysis of effects, identification of mitigation, evaluation of significance, and follow-up. This is consistent with, but not limited to, the steps described in the Canadian Environmental Assessment Agency's (CEA Agency) Practitioners Guide[9].

Approach

Paramount identified, in its CEA scoping, past, present and known or probable future projects. Paramount submitted that the project-related cumulative effects that would potentially occur would be primarily from future projects. Potential future developments include the drilling, tying-in and production of up to 10 additional wells, a 3D seismic program with line spacings at 240 m and 300 m for receiver and source lines respectively, and the potential transborder pipeline and Alberta gathering system described below. The extent of past and current developments and activities was determined through field reconnaissance, historical data, forest management plans, and an interpretation of maps and aerial photographs.

For the purpose of the CEA, the approximate 197,000 ha study area included natural boundaries and/or a buffer zone, and encompassed:

- the proposed gathering system and facilities;
- the potential transboundary pipeline from the central battery to 5-24-126-22 W5M in Alberta; and
- the Alberta gathering system from 5-24 to the Bistcho, Alberta Plant.

Paramount submitted that its spatial boundary was appropriate because a larger area would diminish the relative effects of the proposed project to an insignificant number. Paramount's temporal boundaries considered existing man-made disturbances and those projects that are known to be considered for the near future or have been approved.

Paramount's CEA analysis identified the following potential issues: disturbance to vegetation and wildlife habitat; disturbance to wildlife; access; emissions; and aesthetics. Paramount

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9 Heggman, G., C. Cocklin, R. Creasey, S. Dupuis, A. Kennedy, L. Kingsley, W. Ross, H. spaling and D. Stalker. 1999. Cumulative Effects Practitioner's Guide. Prepared by AXYS Environmental Consulting Ltd. and the CEA Working Group for the Canadian Environmental Assessment Agency, Hull Quebec.

submitted that, because air emissions from its proposed project would occur a significant distance away from other sources, no project-related cumulative effects on air quality would occur.

Access and Disturbance to Vegetation and Wildlife Habitat

Paramount indicated that new disturbance resulting from the proposed Cameron Hills Project would total approximately 133.5 ha. Further, the total area of existing and potential disturbance was projected by Paramount to be approximately 2,928 ha or about 1.49 % of the 196,684 ha study area. The GNWT cited Dyer et. al. (2001)(see section 4.5.7 Wildlife) regarding woodland caribou responses to industrial development and the reduction of use of habitats adjacent to seismic lines, roads and well sites (drilling and operational). The GNWT conducted a further analysis based on the Dyer et. al. (2001) findings and estimated that the total affected area resulting from all existing disturbances would be 69,531 ha, or 33.4% of the cumulative effects study area.

Dyer et. al. (2001) found that woodland caribou use of habitat within 100 m of seismic lines to be significantly reduced as compared with undisturbed habitat. Avoidance of roads was influenced by the density (or shielding) of adjacent vegetation and traffic levels. Dyer et. al. (2001) emphasized that, in its study, the avoidance demonstrated by woodland caribou was rarely total habitat alienation and also noted that additional research is required with respect to caribou responses to sedentary development as opposed to the associated vehicular traffic.

Dyer et. al. (2001) discussed potential effects of avoidance of habitat, including displacement into less suitable habitat, including use of areas with deeper snow or reduced food resources. Dyer et. al (2001) also suggested that displacement and crowding may make caribou more susceptible to predation and identified increased hunting mortality resulting from increased access as a potential factor influencing woodland caribou populations. Dyer et. al. (2001) stated that there may be thresholds to industrial development in caribou habitat, beyond which demographic effects would become apparent but noted that these thresholds have yet to be developed. They recommended that until more is known about the demographic response of caribou to industrial development, a conservative and adaptive approach be taken. Dyer et. al. (2001) recommended that disturbance effects be mitigated through complete roll-back of trees and debris onto seismic lines and RoWs, and prompt revegetation of linear corridors with trees.

Paramount submitted that it minimized the physical footprint of its proposed project, including habitat fragmentation, to the extent possible and as such, minimized the magnitude and geographic extent of potential project-related cumulative effects. Further, project-related cumulative effects would be reversible following decommissioning and reclamation. Paramount submitted that, due to the relatively small amount of additional land disturbance, no significant, long-term cumulative impacts with respect to vegetation and habitat would be expected.

Paramount submitted that linear developments such as seismic lines and RoWs would not be expected to hinder woodland caribou movement as the RoWs would likely only be encountered sporadically during the animal's movement. Paramount also noted that, with the exception of the well and central battery sites, natural vegetation cover would reestablish on the RoWs during the project lifespan and that regenerating areas, although not matching pre-clearing composition, could provide alternate habitat for many wildlife species. Paramount submitted that the carrying

capacity of the immediate project area may decrease until vegetation regeneration commences, but that the carrying capacity at a regional scale would not be affected Paramount noted that existing seismic lines in the project area demonstrate adequate regrowth of vegetation.

Paramount indicated that project-related disturbance to wildlife could interact cumulatively with other activities such as seismic programs and well drilling/testing. Paramount submitted that the localized nature of project-related noise and the short construction period combined with naturally low wildlife density and availability of abundant higher quality habitat in adjacent areas would limit the magnitude of adverse cumulative effects. Paramount also submitted that wildlife would return to a given area following disturbance, such as construction.

Aesthetics

Paramount recognized that physical disturbances from existing and future developments currently (and will) cumulatively affect the natural aesthetics of the project area. Paramount noted its use of existing disturbed areas, the low level of use of the immediate project area, and that the project area is obscured from land-based viewpoints such as Highway 35. Further, Paramount noted that its RoWs would be allowed to revegetate naturally and that aesthetic effects would persist for the lifespan of the project and then be reversible.

Other Comments Received

DFO and the Department of Indian Affairs and Northern Development (DIAND) submitted that they were of the view that Paramount had satisfactorily documented potential cumulative effects in the study area. DIAND further concluded that Paramount demonstrated that cumulative impacts on terrain, land-use, and water VECs would not be significant. Environment Canada and GNWT expressed concern regarding the uncertainty of cumulative effects assessment in general. Both departments recognized the need for further development of techniques for conducting cumulative effects assessments.

The KTFN submitted that they do not want new cut lines to be established. The KTFN recommended that new cut lines only be authorized on condition that Paramount decommission existing lines in order to establish new lines which would be friendlier to the environment.

Views of the Board

The Board is of the view that Paramount has conducted an adequate cumulative effects assessment from a project-specific basis. The Board notes the existing lack of thresholds for disturbance related to oil and gas activity and development in woodland caribou ranges. The Board also notes the low numbers of woodland caribou reported to occur in the project area, the limited access and that, during operation, human activity on the RoWs and at well sites would be infrequent. The Board is of the view that Paramount has, through its project siting and design, minimized potential cumulative effects of its proposed project associated with woodland caribou habitat alteration and disturbance.

The Board notes the KTFN's request that new cut lines only be authorized on condition that Paramount decommission existing lines in order to establish new lines which would be friendlier to the environment. The Board notes that soil disturbance during cutting of seismic lines is

extremely localized and as such, the 'building blocks' for natural revegetation (i.e. soil, propagules, roots, and seeds) are preserved to a great extent. Further, the Board notes that natural regeneration of existing seismic lines is occurring subject to site and climatic conditions. Based on the evidence submitted for the proposed project, the Board is not persuaded that carrying out reclamation efforts on existing cut lines would, in this instance, measurably accelerate existing regeneration processes. Therefore, the Board would not impose such a condition as requested by the KTFN. However, the Board notes Paramount's commitment to monitor vegetation re-establishment on its RoWs (section 4.10).

The Board notes the concerns of Environment Canada and the GNWT concerns regarding the uncertainties inherent in this type of cumulative effects assessment. The Board notes that the MVRMA, to which the Cameron Hills Project is also subject, includes provisions for cumulative impact monitoring and requires the establishment of the Mackenzie Valley Cumulative Impact Monitoring Program (MVCIMP). The proposed Cameron Hills Project could form a component of the MVCIMP. The Board encourages Paramount to participate in the MVCIMP and in completing the NWT's Cumulative Effects Assessment and Management strategy and framework, as invited by Environment Canada.

The Board is of the view that, with the implementation of Paramount's proposed mitigative measures, the Cameron Hills Project, in combination with other projects and activities that have or will be carried out, is not likely to cause significant adverse cumulative environmental effects.

4.10 Inspection and Monitoring Programs

Paramount described its proposed inspection and monitoring programs for both construction and operation of the proposed project.

Paramount submitted that it would hire a construction inspector with a minimum of 8 years pipeline construction experience to verify implementation of its environmental protection commitments. This inspector would have knowledge of all aspects of construction, including environmental and heritage resource requirements.

Paramount stated that, post-construction (during operation), it would periodically monitor its facilities to assess the condition of the trenchline (including subsidence), borrow pits and watercourse crossings and identify the need for any remedial measures. Paramount also stated that, during its routine inspections, it would monitor for slope stability, erosion, and the success of vegetation re-establishment. Specifically, Paramount described the erosion indicators it would monitor and the process by which it would document issues and recommended actions.

As discussed in section 4.5.1 Air Quality, Paramount stated that it would install 2 stations to monitor total sulphation, at or near the H-03 central battery, which would be the area of greatest SO_2 concentration. Further, Paramount would take fluid samples from its wells on an annual basis. As discussed in section 4.5.8 Noise, Paramount does not intend to conduct direct noise monitoring, but indicated that it would consider all noise-related complaints from users of the land and respond as appropriate. As discussed in section 4.5.8, should the proposed development be approved, Paramount would be required to monitor noise levels at appropriate times, locations, and operating parameters.

Paramount obtained information on traditional activities such as hunting, fishing, berry picking and trapping from local communities and stated that it would assess and measure those activities by direct consultation with users of the land. Paramount submitted that it would continue to consult with communities and discuss project effects in order to monitor community impacts. Paramount outlined the steps that it would carry out if problems occur and stated that, when a project-related effects demonstrated, it would work with the community in an attempt to enhance positive effects and mitigate negative effects.

Views of the Board

The Board notes Paramount's commitments to construction practices and mitigation measures to minimize adverse effects on the environment are contained in its Application and responses to information requests. The Board also recognizes standard industry practice and the effectiveness of having all commitments placed in one document, an EPP, for use by construction personnel. The Board notes that, to obtain a Production Operation Authorization for the Cameron Hills Gathering System, Paramount must, pursuant to the COGOA *Production and Conservation Regulations*, obtain approval of its EPP prior to operation. Further, Paramount stated that it would file its EPP for the transborder pipeline prior to construction.

The Board notes that, should Paramount's transborder pipeline be approved, it would be subject to the OPR 99 under the NEB Act. Pursuant to section 48 of OPR 99, Paramount would be required to develop and implement an environmental protection program to anticipate, prevent, mitigate and manage conditions which have a potential to adversely affect the environment. Further, pursuant to section 8 of OPR 99, Paramount would be required to submit its environmental protection program to the Board for approval. Therefore, should the proposed project be approved, the Board would impose a condition requiring Paramount, prior to construction, to submit its environmental protection program for approval. In addition, Paramount would be conditioned to file construction progress reports, which would, among other things, address environmental issues, compliance, and resolution of issues.

Pursuant to section 54 of OPR 99, Paramount must retain a person to inspect construction to ensure it complies with the terms and conditions of any Order issued by the Board and the person must have sufficient expertise, knowledge and training to competently carry out the inspection. Paramount stated that during the course of field activities, its Project Manager or Corporate Compliance Manager (or designate) would inspect the project to ensure that the requirements were being met.

The Board also recognizes the need for qualified environmental inspection personnel, particularly when only one is proposed. Therefore, should Paramount's applications be approved, the Board would impose a condition requiring Paramount to file with the Board the qualifications and experience of the Environmental Inspector assigned to the project. The Board also notes that, as required by section 46 of OPR 99, Paramount must develop and implement a training program for its employees directly involved in the operation of its facilities, which must include training on responsible environmental practices. Further, with respect to aboriginal heritage resources, should this project be approved, the Board would include a condition that Paramount employ a local qualified person to oversee the clearing, ground breaking and trenching activities (see section 4.6.2).

The Board notes that, in its EA Report, MVEIRB recommended that the Board ensure that Paramount fulfils the commitments made regarding follow-up programs. Should Paramount's applications be approved, the Board would condition Paramount to implement or cause to be implemented all of the policies practices, and procedures for the protection of the environment included in or referred to in its application and evidence.

The Board is of the view that, with the regulatory requirements and the above conditions, Paramount's proposed inspection and monitoring programs are acceptable.

4.11 Abandonment and Restoration

Post-construction restoration of the gathering system flowlines and transborder pipeline project are discussed in the relevant sections above. Post-project restoration of RoWs and permanent facilities are discussed by Paramount in its applications, however, abandonment of the facilities would be subject to application to the Board under the NEB Act, and also would be subject to CEAA and the MVRMA, as appropriate. At the time of such application, the Board would assess final restoration in greater detail.

Paramount submitted that it would adhere to regulations in force at the time of abandonment. Using current regulations as a basis, Paramount submitted that pipelines would be disconnected from facilities, purged, and capped. The above-ground facilities would be removed and the salvaged organic layer and slash would be spread back over the disturbed areas as appropriate. Bridges would be dismantled and removed, but piles would be left in place to minimize potential for disturbance to the banks of watercourses. Paramount also indicated that the all-season road between the camp and airstrip and the airstrip would be left in place for use by others in fire fighting, prospecting, and other endeavors. In its EA Report, MVEIRB submitted that commitments made by Paramount to properly abandon and restore the development area should be fulfilled.

Environment Canada indicated that it encourages the concept of progressive reclamation as facilities are no longer needed.

Views of the Board

The Board has considered the post-construction restoration proposed by Paramount as adduced through evidence on the public registry (see section 4.5 and 4.6). Post construction reclamation of RoWs constitute one aspect of progressive reclamation. Should Paramount wish to abandon parts of its operation (e.g. an individual well, or a single gathering system flowline), restoration would be required to meet all relevant territorial, provincial, and federal laws and regulations. The Board is of the view that the general commitments made by Paramount regarding abandonment of facilities are appropriate at this time. Further, the Board is of the view that potential environmental effects of abandonment would likely be similar to those resulting from construction.

The Board is satisfied that adverse environmental effects during abandonment are not likely to be significant.

5.0 PROPOSED ORDER CONDITIONS

Should the Board grant an exemption order for the applied-for Cameron Hills Transborder Pipeline proposed by Paramount Transmission Ltd. (PTL) pursuant to section 58 of the *National Energy Board Act*, the Board would impose the following conditions with respect to environmental matters.

General

1. PTL shall implement or cause to be implemented all of the policies, practices, and procedures for the protection of the environment referred to in its application and related correspondence.

2 PTL shall cause the approved facilities to be designed, manufactured, located, constructed and installed in accordance with those specifications, drawings and other information or data set forth in its application and related correspondence.

Prior to Construction

3. PTL shall file with the Board for approval, at least 14 days prior to the commencement of clearing or other construction activities unless the Board otherwise directs, an Environmental Protection Plan, including an updated Environmental Assessment Commitments Table.

4. PTL shall file with the Board, at least 7 days prior to the commencement of clearing or other construction activities, the qualifications and experience of the Environmental Inspector(s) assigned to the project.

During Construction

5. PTL shall maintain a file in each construction office containing:

   a) copies of:

      i) the Environmental Impact Assessment for the Cameron Hills Transborder Pipeline Project

      ii) the Environmental Protection Plan;

      iii) the updated Environmental Assessment Commitments Table;

      iv) the Emergency Response Plan; and

   b) copies of all applicable permits or authorizations containing environmental conditions.

6. PTL shall file with the Board for approval, at least 14 days prior to the commencement

of reclamation activities, its proposed seed mixtures and a monitoring plan to assess the growth and species composition of vegetation on seeded areas. The plan shall be developed in consultation with the Government of the Northwest Territories (GNWT), Environment Canada and the local aboriginal communities, where appropriate.

7. PTL shall employ a qualified local person to oversee the clearing, ground breaking and trenching activities for the purpose of identifying aboriginal heritage resources.

8. PTL shall file construction progress reports with the Board on a weekly basis in a form satisfactory to the Board. The reports shall include information on the activities carried out during the reporting period, environmental and safety issues and non-compliances, and the measures undertaken for the resolution of each issue and non-compliance.

Prior to Operation

9. PTL shall file with the Board for approval, at least 14 days prior to the commencement of operation, a wildlife monitoring program to be developed in consultation with the GNWT, Environment Canada and the local aboriginal communities, where appropriate.

Post Construction

10. PTL shall file with the Board:

    (a) within six months after the commencement of operation a report identifying and describing each permafrost location encountered, including depth, extent, terrain, vegetation and mitigation implemented; and

    (b) on an annual basis for a period of five years following construction, a report containing the results of monitoring at each permafrost location identified that includes slope stability, trench subsidence, evidence of floating pipe, vegetation re-establishment and heat effects to vegetation composition.

11. PTL shall file with the Board, within six months after the commencement of operation a report on the results of the archaeological/heritage monitoring, including the treatment of any archaeological/heritage site encountered during construction and any consultation with regulatory authorities and any affected First Nation.

12. PTL shall file with the Board for approval within six months following the completion of construction and on an annual basis for five years following construction, a report:

    (a) analyzing in detail the effectiveness of roll-back of slash in limiting unauthorized access along the pipeline right-of-way;

    (b) including a plan to be developed in consultation with the appropriate provincial or territorial authorities, containing additional measures to be employed to further limit access along the pipeline right-of-way where problems have been observed; and

(c) describing the results of PTL's assessment of the establishment of vegetation cover on areas disturbed during construction.

6.0 FINAL COMMENTS AND CEAA DETERMINATION

6.1 MVEIRB Report on Environmental Assessment of the Cameron Hills Project

MVEIRB released its Report on Environmental Assessment for the Cameron Hills Project on 3 December 2002. MVEIRB made a finding pursuant to subparagraph 128(1)(b)(ii) of the MVRMA, recommending that any approval granted to Paramount be made subject to the imposition of certain measures intended to prevent significant adverse impacts. After consultation with MVEIRB, the Board, as a designated regulatory authority under the MVRMA, adopted the recommendation of the Review Board subject to modification of certain measures as described in MVEIRB's letter to the Board dated 8 January 2002.

The Board considered the MVEIRB's report in its conduct of the environmental screening for the Cameron Hills Transborder Pipeline. The measures outlined in MVEIRB's report that are pertinent to the Board's mandate under CEAA are discussed in the relevant sections above.

6.2 CEAA Determination

In completing this Screening Report, the Board has examined the environmental information provided by Paramount in its applications, responses to information requests and other submissions, the report of the MVEIRB and, as required by subsection 16(1) of the CEAA, has considered the following factors:

(a) the environmental effects of the project, including the environmental effects of malfunctions or accidents that may occur in connection with the project and any cumulative environmental effects that are likely to result from the project in combination with other projects or activities that have been or will be carried out;

(b) the significance of the effects referred to in (a);

(c) comments from the public;

(d) measures that are technically and economically feasible and that would mitigate any significant adverse environmental effects of the pipeline; and

(e) other matters that the Board considered to be relevant to the screening, as identified in the Scope of the Environmental Assessment (section 2).

The Board is of the view that, taking into account the implementation of the proposed mitigation measures and those set out in the exemption order conditions noted in section 5 of this Report, the proposed Cameron Hills Project is not likely to cause significant adverse environmental effects. This represents a decision pursuant to paragraph 20(1)(a) of the CEAA.

The Screening Report and the CEAA determination were approved by the Board on 21 January 2002.

7.0 CONTACT

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