

Mackenzie Valley Environmental Impact Review Board

Report of Environmental Assessment

On the

Paramount Resources Ltd.

Cameron Hills Drilling Project

October 16, 2001

Mackenzie Valley Environmental Impact Review Board

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Executive Summary

The Mackenzie Valley Environmental Impact Review Board (Review Board) has been guided by the principles outlined in Sections 114 and 115 of the *Mackenzie Valley Resource Management Act* (MVRMA or Act) throughout this environmental assessment (EA). These include the need to protect the environment from significant adverse impacts, and to protect the social, cultural and economic well-being of residents and communities in the Mackenzie Valley.

Having considered the views and concerns of the participants in this process, and the evidence on the Public Registry, the Review Board made its decisions according to Section 128 of the *Mackenzie Valley Resource Management Act*.

The Review Board concludes, based on the analysis provided, that the proposed development will not likely cause a significant adverse impact on the environment or a significant public concern.

For the consideration of the Mackenzie Valley Land and Water Board, the Review Board recommends that:

1. Land use permit and water license conditions reflect the commitments (see Attachment 1) made by Paramount in their environmental reports as well as the other documentation that has been submitted.
2. The recommendations made by the Review Board and their technical reviewers in this report (see Attachment 2) are also considered during the development of land use permit and water license conditions.

To make its decision, the Review Board has relied upon the information in Paramount's environmental reports, the technical reports provided by reviewers and all of the other information on the Public Registry. The Review Board fully expects Paramount to discharge all of the mitigative measures described in its submissions. If these mitigative measures are not implemented, the Review Board's conclusions about impact significance will be affected.

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1 Development Description

The development is located on the plateau of the Cameron Hills in the Northwest Territories (NWT), about 75 km southwest of Enterprise, NWT and immediately north of the Alberta/NWT border. Highway No. 1 is east of the area.

The purpose of the development is to further evaluate the natural gas and oil reserves in Paramount Resources Ltd.'s Cameron Hills Significant Discovery Area. Hydrocarbon reserves were discovered in the area by Paramount during previous seismic and drilling programs.

The land use permit and water license applications submitted by Paramount to the Mackenzie Valley Land and Water Board (MVLWB) included drilling 9 new wells and work at 7 existing wells and also indicated that up to 10 wells would be drilled in the area over the next seven years conditional on prior drilling success. The locations of these 10 possible future wells were unknown so the Mackenzie Valley Environmental Impact Review Board (Review Board) decided to exclude these wells from the environmental assessment (EA).

On January 16th, Paramount requested that the final Work Plan and final Terms of Reference (both issued on January 15th) for the Cameron Hills EA be amended to include these possible 10 future wells. On January 25th, the Review Board rejected this amendment request and issued Reasons for Decision on January 26th 2001.

On January 16th, Paramount also requested that the final Work Plan and final Terms of Reference be amended to remove references to the work to be completed at the 7 existing wells for the reason that this work could be done under existing authorizations. On January 25th, the Review Board approved the amendment request so the work at these 7 existing wells is not covered by this environmental assessment.

As a result of these decisions by the Review Board, this environmental assessment only covers the drilling and testing of the 9 new wells and any associated activities. The complete scope of the development is provided in Section 5.1.1.

2 Physical Environment¹

The development area is located within the Cameron Hills Uplands, a major physiographic feature of the Northern Alberta Uplands Ecoregion within the Taiga Plains Ecozone. The Cameron Hills Uplands rise 400 to 500 m above the surrounding lowlands with steep slopes on the eastern and northern sides.

The Taiga Plains Ecozone represents the transitional zone between the boreal coniferous forest to the south and the tundra to the north. The Northern Uplands Ecoregion is characterized by undulating to rolling plains covered with organic deposits and underlain by sporadic discontinuous permafrost. Surface materials consist of bedrock, glacial drift and postglacial sediment.

The Cameron River flows southwesterly from its headwaters near the plateau's high point at the north-east corner and continues through the middle of the plateau within a comparatively wide, subdued floodplain before turning north, where it forms a valley about 300 m deep. The terrain north of the river is rolling or undulating with comparatively steep slopes. The terrain south of the river is generally more subdued, comprised of extensive lakes and lowlands.

Vegetation of the Taiga Plains Ecozone is characterized by an open, generally slow growing, conifer-dominated forest (predominantly black spruce). The shrub component is often well developed and includes dwarf birch, Labrador tea and willow. Bearberry, mosses and sedges are the dominant understory. Mixed wood forests characterized by white and black spruce, lodgepole pine, tamarack, white birch, trembling aspen and balsam poplar tend to establish in upland and foothill areas and southerly locales that are warmer and better drained. Sixteen rare plant species have the potential for occurrence within the development area. None of the plant species are listed by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC 2000).

Characteristic mammal species include moose, woodland caribou, wolf, black bear, red fox, marten, beaver, snowshoe hare, lynx, squirrel and a number of voles, mice and shrews. Common bird species include the common red-poll, gray jay, common raven, red-throated loon, northern shrike, sharp-tailed grouse and fox sparrow. The Canadian Wildlife Service does not have any key migratory habitat sites identified in the regional development area. Fish species found in the region include northern pike, arctic grayling, walleye, lake whitefish and lake trout. COSEWIC listed wildlife species include anatum peregrine falcon (threatened), woodland caribou (threatened), wood bison (threatened), wolverine (special concern), grizzly bear (special concern), short-eared owl (special concern) and yellow rail (special concern).

The climate is classified as sub-humid high boreal ecoclimate with cool summers and very cold winters. Mean annual precipitation ranges from 350 to 500 mm. The frost-free period is between 59 and 72 days with local variation based on topography and elevation.

¹ This description was developed based largely on documentation from Paramount and other documents on the Public Registry.

3 Socio-Economic, Political And Regulatory Environment²

The development is situated on Crown lands within the Deh Cho region of the Northwest Territories. The local and regional aboriginal and community organizations have a role in reviewing the development applications and providing advice to regulators. The Deh Cho First Nations and the Government of Canada have completed an Interim Measures Agreement (IMA), which defines the roles and responsibilities of the aboriginal organizations in regulating and planning development in the region. The IMA is recognition of the continuing consultations being undertaken on land, resources and governance issues in the region that will culminate with the Deh Cho Final Agreement.

The closest communities to the area are Enterprise, Hay River, Kakisa and Fort Providence. The regional economy is mixed with the primary land uses of the area being hunting, trapping, oil and gas development activities and some timber harvesting. Tourism to the area is growing in its importance for the local economies.

The development will require a land use permit and a water license from the Mackenzie Valley Land and Water Board (MVLWB), authorizations from the National Energy Board (NEB) to drill the wells and a benefits plan approved by Indian and Northern Affairs (INAC). Upon the completion of this environmental assessment by the Review Board, the development will re-enter the land use permitting and water licensing process at the MVLWB.

Other agencies involved in the development approvals process include Fisheries and Oceans Canada (DFO), the Government of the Northwest Territories (GNWT) and Environment Canada (EC).

² This description was developed based largely on documentation from Paramount and other documents on the Public Registry.

4 Regulatory History of the Proposed Development

On August 29, 2000 the MVLWB received a Type 'A' Land Use Permit application (Application #MV2000A0041) and a Type 'B' Water License application (Application #MV2000L1-0009) from Paramount to undertake the development.

The applications and supporting documentation were circulated to federal and territorial government departments, first nations organizations and municipal governments. The comments received were taken into consideration by the MVLWB when it completed the preliminary screening on the development.

On November 20, 2000, the MVLWB referred the development proposal to the Review Board, in accordance with ss.126 (1) of the *Mackenzie Valley Resource Management Act* (MVRMA or the Act), citing the following reasons for the referral:

- *Exact quantities of H₂S (hydrogen sulfide) and SO₂ (sulfur dioxide) that would be released into the atmosphere as a result of incomplete combustion or venting of gases from this development proposal are unknown.*
- *The potential for deposition of waste from noncombusted gases released from flaring/venting operations in relation to the project area and proposed operations were not documented.*
- *The scope of the proposed development did not document when flaring or venting would be required and with what frequency.*
- *The application did not outline what the maximum allowable limits of H₂S and SO₂ emissions would be as a result of flaring activities.*
- *Levels of all other contaminants that can be released into and potentially contaminate the environment from project flaring or venting operations are unknown.*

The South Mackenzie Panel (SMP) of the MVLWB identified the reasons and concluded that the development “*might have a significant environmental impact*” and referred the development applications to the Review Board for an environmental assessment.

The Review Board is responsible for the assessment of the environmental, socio-economic and cultural impacts of the proposed development according to Part 5 of the MVRMA. The Review Board is required by s.126 of the MVRMA to conduct an EA of the development proposal and must conduct the EA in accordance with subsection 117 (2). The Review Board is required to make a decision in accordance with ss.128 (1), to prepare and submit its report of environmental assessment in accordance with ss.128 (2), and submit its written reasons, required by s.121, to the Federal Minister of INAC and the Designated Regulatory Agency (DRA), which is the NEB.

The Review Board reviewed the following documentation:

- The Water License and Land Use Permit applications, including the accompanying environmental screening report submitted by the developer;
- The comments received from the developer, government and first nations organizations during the application review period; and
- The MVLWB preliminary screening report and the reasons for the EA referral.

Considering the size of the proposed development and the detailed information that was already available, on December 7, 2000 the Review Board decided to accept Paramount's *Environmental Screening Report on the Cameron Hills Drilling Project* as partially fulfilling the requirements of the scope of the assessment. Any

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additional information required would be obtained from Paramount in a response to the EA Terms of Reference (ToR). The Review Board issued the Terms of Reference on January 15, 2001. Paramount submitted its response on June 8, 2001.

The Review Board has completed its environmental assessment of the development. As part of the EA, the Review Board considered the following:

- Paramount's *Environmental Screening Report for the Cameron Hills Drilling Project*, dated August 2000;
- Paramount's *Environmental Impact Assessment in Response to the Terms of Reference for the Paramount Resources Ltd. Cameron Hills Drilling Project*, dated June 2001;
- Information Requests and responses;
- Technical analysis submissions; and
- All other information contained in the Public Registry established for this assessment.

A complete list of the contents of the Public Registry is available from the Review Board.

The Review Board considered the benefits of the proposed development to the residents of the Mackenzie Valley and Canada in light of the possible environmental effects and the public concerns expressed during the EA process. This report constitutes the reasons for decision of the Review Board and the report of environmental assessment and recommendations required by the Act.

5 Summary of the Environmental Assessment Process

This section of the report explains the methodology used during the environmental assessment process.

5.1 Scoping Process

The Review Board must determine the scope of the development pursuant to ss. 117 (1) as well as the scope of the environmental assessment. The Review Board makes these determinations on the basis of documents and comments submitted during the development of the Work Plan and Terms of Reference for the EA.

5.1.1 Scope of the Development

The scope of the development includes those components of the proposed development that will be included for consideration in the environmental assessment. The scope of development takes into account the principal and accessory development activities.

Principal Development

The principal development activities are drilling, completing and testing 9 new wells. Each well location will be cleared and graded as required to a maximum size of 110 m by 110 m. Access to the well sites will be through existing cut-lines where possible although some new access routes will have to be constructed. The testing will involve the flaring of natural gas.

The drilling, completing and testing of wells involves the tasks listed in Table 1.

Table 1 – Well Drilling, Completing and Testing Activities

Move in and set up drilling equipment
Drill well
Move out drilling equipment
Wait for service rig to be available
Move in service rig
Conduct wellbore operations to prepare it for perforation
Perforate the zone of interest
Run a static gradient to acquire initial parameters
Stimulate the zone
Move out service rig
Initial flow back of gas and stimulation fluids to clean up the zone to allow for accurate evaluation of the zone.
Run electronic recorders into the well to conduct an evaluation of the reservoir through production testing of the well.
Flow test the well to determine economics of project development by evaluating reservoir parameters including: <ul style="list-style-type: none"> • Permeability • Effectiveness of wellbore stimulation • Well deliverability • Potential reservoir size <p>The length of the production test is determined by:</p> <ul style="list-style-type: none"> • Threshold reserves required for the project development; and • Any declining performance seen during production testing.

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Shut in the well to acquire pressure build-up information
Pull recorders and install suspension plug
Wait for pipeline to be built to enable well to go on production.

The list of activities in Table 1 was compiled with the assistance of, and with information provided by, Paramount Resources Ltd.

Accessory Developments and Activities

The completion of the principal activities requires additional developments and activities to be undertaken. They include the following:

- Re-use a temporary winter access road, approximately 33 km in length, from Indian Brook, Alberta on Highway 35, to a point approximately 10 km into the NWT. This winter road access will follow the same alignment as the winter road previously permitted and used in the 1999-2000 winter season.
- Air access will be via a temporary winter airstrip equipped with lights and a radio beacon.
- Construct three ice bridges: two on the Cameron River and one on a tributary of the Cameron River. Other water crossings will be over streams that are expected to freeze to the bottom.
- Construct up to six temporary 20-man camps. The camp locations will take advantage of previous camp or airstrip locations. Water for the camps may come from an existing well or new wells will be drilled at each camp location.
- Obtain drilling water from a specific unnamed lake near the well sites and, if required, from the water wells.
- Dispose of drill wastes in two remote sumps. Some clearing and leveling will be required around the sumps.
- Use an existing borrow pit. Soil excavated from the borrow pit will be used during the closure of the drilling fluid and sewage sumps using the mix, bury and cover method.

The well drilling, well completions, well testing and camp operations will occur within an area delineated as follows: on the north by latitude 60° 20', on the south by latitude 60° 00', on the east by longitude 117° 15', and on the west by longitude 117° 50'.

Concern Identified by Indian and Northern Affairs Canada

In its August 22, 2001 submission to the Review Board, INAC identified a concern with the Review Board's determination of the scope of the development. INAC refers to Paramount's Cameron Hills Gathering System and Pipeline Development, which was in environmental assessment pursuant to ss. 126 (3) of the MVRMA. INAC states that it was apparent that linkages existed between the drilling project and the gathering system and pipeline development and that the two developments should be combined in a single environmental assessment. INAC also states that it is unclear what criteria the Review Board is using to combine related developments into one environmental assessment.

The MVRMA does not specify how the Review Board might combine multiple developments into a single EA. For the purposes of these developments, the Review Board utilized the *Canadian Environmental Assessment Act* (CEAA) criteria of interdependence, linkage and proximity.

Interdependence and linkage between two developments must exist in both directions for the criteria to be used to combine the developments into a single EA. Neither of the criteria can be applied in this case. Interdependence does not exist because the drilling project can proceed without the gathering system and pipeline development. Linkage does not exist because undertaking the drilling project does not mean that the gathering system and pipeline development is inevitable. The proximity criteria would apply in this case but,

as is noted in CEAA guidelines, proximity alone is rarely sufficient to result in the combining of two or more developments into a single EA.

The Review Board was not convinced by INAC's suggestion that the two developments needed to be combined in a single EA. The drilling EA was nearing completion when the gathering system and pipeline development entered the EA process. Combining the two developments into a single EA would have resulted in significant delays for the completion of the drilling project EA. As well, there was no indication that assessing each development separately would result in a less comprehensive environmental assessment for either development. The Review Board also notes that the effects of each development were included in the cumulative effects assessment of the other.

In the future, the Review Board will consider combining two or more developments into a single EA where the test outlined by the application of the three CEAA criteria is met. Any argument advanced for the combining of EA proceedings for separate developments should show how these criteria apply as well as the benefits which may be derived from the change.

5.1.2 Scope of the Assessment

The scope of the assessment is the determination of which components of the environment will be examined during the environmental assessment. In determining the scope of the assessment, the Review Board was conscious of its obligation under ss.117 (2) of the MVRMA to consider:

- the impact of the development on the environment, including the impacts of malfunctions or accidents that may occur in connection with the development and any cumulative impact that is likely to result from the development in combination with other developments;
- any comments submitted by members of the public; and
- any other matter determined to be relevant.

After considering the information placed on the Public Registry, the Review Board decided on the following scope of the assessment:

Physical and Biological Environment

Air Quality and Climate

air quality

release of air contaminants (dust, particulate exhaust fumes and other air contaminants)

Terrain

surficial geology

bedrock or soils

Vegetation and Plant Communities

local plant communities

rare or highly valued species

long-term, direct and indirect, habitat loss or alteration

Water Quality and Quantity

water quality impacts including contaminant loading and dispersion (including surface runoff and airborne contaminants)

water quantity impacts

Aquatic Resources and Habitat

aquatic organisms and their habitat

Wildlife and Wildlife Habitat

wildlife

wildlife habitats

migratory birds

vulnerable or endangered Wildlife in Canada, (COSEWIC) list

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Noise

- Changes to ambient noise levels
- Continuous exposure versus acute noise

Human Environment

Cultural and Heritage Resources

- Places of cultural, spiritual and/or archaeological significance

Socio-Economics

- Income
- Employment
- Local Business Opportunities
- Community Quality of Life

Land and Resource Use

- Traditional land use and occupation
- Existing land use and occupation
- Wilderness outfitting including commercial and sport fishing
- Availability, abundance and quality of wildlife, fish and vegetation for harvesting
- Recreational activities
- Protected areas

Visual and Aesthetic Resources

- Visual and aesthetic
- Design components that mitigate visual and aesthetic impacts.

Cumulative Impacts

Natural environment

Socio-economic and cultural environment

Other Relevant Matters

Developer Identification and Performance Record

Tenure

Regulatory Regime

Environmental Assessment Methodology

Public Consultation

Environmental Considerations in the Development Design

Accidents and Malfunctions

Alternatives

Abandonment and Restoration

Follow-up Programs

Using Paramount's *Environmental Screening Report for the Cameron Hills Drilling Project* and the Reasons for Decision by the MVLWB, the Review Board undertook an evaluation to determine which items in the scope had already been adequately addressed by the developer and which items needed to be addressed. The result of this review was that Paramount was directed to provide the Review Board with additional information in the following areas:

- Developer Identification and Performance Record
- Tenure
- Regulatory Regime
- Socio-economics
- Accidents and Malfunctions
- Public Consultation
- Alternatives
- Air Quality and Climate

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- Cumulative Impacts

5.2 Work Plan and Terms of Reference

The Work Plan established the milestone dates and identified the Review Board's expectations for the completion of the environmental assessment. The Terms of Reference detailed the scope of the development and the scope of the assessment and provided directions to Paramount and others regarding their roles, responsibilities and deliverables in the EA process.

On Dec. 19, 2000 draft versions of both documents were released for public comment on the documents as a whole but specifically on the timeline, the scope of the development, the scope of the assessment and the directions to Paramount. The documents were placed on the Review Board's Public Registry and web site and were distributed to government, first nations and others.

The Review Board considered all comments received and finalized the Work Plan and Terms of Reference on January 15, 2001. As a result of amendment requests by Paramount and a 4.5-month delay by Paramount in submitting their report, the Review Board had to issue amended final versions of the Work Plan and Terms of Reference on June 15, 2001.

5.3 Response to the Terms of Reference

On June 8, 2001 Paramount submitted a report (*Environmental Impact Assessment in Response to the Terms of Reference for the Paramount Resources Ltd. Cameron Hills Drilling Project*) that addressed each of the items identified by the Review Board. This report also included an Executive Summary that encompassed the previous environmental information accepted by the Review Board as well as the new information included in the current report.

5.4 Conformity Analysis

The Review Board undertook a conformity analysis to ensure that Paramount had provided the information requested in the Terms of Reference. EC and INAC submitted conformity comments. Both departments stated that Paramount appeared to have satisfied the requirements of the Terms of Reference.

After considering the comments received from government and the Review Board's own review of the submission, the Review Board decided that the EA submission by Paramount was in conformity so a deficiency statement was not issued.

5.5 Analysis of the Environmental Reports

An analysis of Paramount's reports was initiated concurrent with the conformity analysis and was co-ordinated by the Review Board staff. The analysis included opportunities for regulatory authorities (RA's), expert advisors, first nations, communities, the public and other interested parties to ask questions of the developer and present their information to the Review Board. The objective of this phase of the EA was to find and focus on unresolved or unclear issues, and to provide the Review Board with the additional information and expert advice that would contribute to its decision.

Information exchange during the technical analysis occurred primarily through the use of Information Requests (IRs)³. The IRs helped to facilitate the technical analysis of the proposed development by allowing parties to formally request additional or clarifying information of any other party. Eleven IRs were approved and issued by the Review Board and directed to Paramount. Two of the IRs originated with the GNWT, 6 were from

³ Information requests are an interrogatory in the form of written questions and answers.

Environment Canada and 3 were from Mandell Pinder Barristers and Solicitors⁴. Paramount responded to each IR in a July 27th letter to the Review Board.

Technical analysis reports were submitted to the Review Board by each of INAC, EC, GNWT, DFO and the counsel for the KTFN. To address issues of public consultation, socio-economics and land use that were raised in the KTFN's technical review, the Review Board asked Paramount to submit additional information. This additional information was provided on September 24th. The Review Board allowed the other EA participants the opportunity to submit comments in response to Paramount's September 24th submission but no comments were received.

5.6 Development Impact Boundaries

The ToR did not specify the spatial or temporal boundaries to be used when considering the maximum zone of influence or the duration and occurrence of impacts of the proposed development. The Review Board expects this determination of appropriate boundaries to be made by the proponent.

Paramount described the spatial and temporal boundaries that they used for their cumulative effects assessment in Section 10.1 of their EA report. Paramount selected an area of 84,865 hectares that they considered was appropriate to encompass the potential cumulative impacts resulting from this development and others in the area. Paramount selected their temporal boundaries to include the impacts of past and current developments, developments that have been approved and developments that could potentially occur in the near future.

The Review Board notes that the developer did include the gathering system and pipeline development in its cumulative effects assessment as well as future work at existing and new wells and future seismic programs. The Review Board also notes that both DFO and EC expressed satisfaction that Paramount had included the gathering system and pipeline development in its cumulative effects assessment.

The Review Board is of the opinion that the boundaries established by Paramount are appropriate.

5.7 Determining Significance

Section 128 of the MVRMA requires the Review Board to decide, based on the evidence provided, whether or not a development will likely have a significant adverse impact or significant public concern and report their conclusion to the Federal Minister and the DRA. In this process, the Review Board has no objection to the proponent or others applying professional judgement in providing their evidence to the Review Board or to the use of previously completed reports. In fact, these process efficiencies are encouraged as long as the basis for the conclusion is documented, the expertise applied is identified and, if possible, the person and/or source of information responsible for the conclusion are also identified.

In determining impact significance, the Review Board considers the following factors:

- magnitude
- geographic extent
- timing
- duration
- frequency
- irreversibility of impacts; and
- probability of occurrence and confidence level.

The Review Board notes that Paramount considered similar significance factors in the preparation of their EA report. The Review Board also notes that the GNWT was satisfied that the information provided by Paramount on environmental assessment methodology was sufficient.

⁴ Submissions to the Review Board from Mandell Pinder are on behalf of the Ka'a'Gee Tu First Nation.

6 Review Board Conclusions and Recommendations

Section 4 of the Terms of Reference provided instructions to Paramount on the issues/items that should be included in the EA Report. However, as noted in Section 3 of the ToR, the information requested in the ToR was meant to address issues/items that had not been addressed in the existing environmental documentation that was adopted by the Review Board as constituting a portion of Paramount's total EA submission.

All of the information submitted is on the Public Registry and is available for public access. This report discusses only those issues/items that generated comments from reviewers or were deemed by the Review Board to warrant explanation or analysis in this report.

The discussion in each of the following sections includes:

- the instructions provided in the Terms of Reference, if any;
- a summary of Paramount's submission;
- a summary of comments received from technical reviewers;
- Review Board conclusions; and
- Review Board recommendations, if any.

The Review Board's conclusions and recommendations are based upon a consideration of all of the information listed on the Public Registry.

6.1 Public Consultation

Paramount shall summarize consultations undertaken with the affected municipalities, first nations organizations, governments, etc. indicating what concerns were raised and how they have been addressed.

Paramount states that community consultation has been incorporated into all aspects of the project. The information gathered from potentially affected communities was incorporated into the project planning.

Paramount initiated an early public notification program on the Cameron Hills project on May 10th, 2000. This program has included contacting local communities, trappers, aboriginal groups, regulatory agencies, local government representatives, federal and territorial government departments and area oil and gas industry participants.

Paramount has been in on-going discussions with various communities including the Hay River Reserve, Hay River, Kakisa, Fort Providence, West Point, Trout Lake, Enterprise, Indian Cabins, Dene Tha' and Assumption. Paramount has 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 August 22nd and 23rd 2000 to advise area stakeholders about the project and to invite them to contact Paramount should they have any questions or concerns. Paramount continues to provide information through a Project Update that is circulated to all stakeholders. 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 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 state that the majority of the responses and reactions to the project have been positive. Some questions/concerns that were raised included commercial opportunities, training and employment, increased

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public access to the area, disturbance to area trappers and disposal of produced water. Paramount's responses to these items are discussed in other sections of this report, as shown in the following list:

Produced Water – see Section 6.5 Water Quality and Quantity

Commercial Opportunities – see Section 6.8 Socio-Economics

Training and Employment – see Section 6.8 Socio-Economics

Increased Access – see Section 6.9 Land and Resource Use

Disturbance to Trappers – see Section 6.9 Land and Resource Use

The only reviewer to provide any comments on public consultation was counsel for the Ka'a'Gee Tu First Nation (KTFN). They presented 6 major concerns with the public consultation that has occurred. These concerns are:

1. Paramount has not recognized or addressed the fact that the development area overlaps with the traditional and contemporary use area of the KTFN.
2. Paramount has not studied either the areas of potential impact of their development on the KTFN or mitigation measures.
3. The KTFN have not had the resources to conduct a study that would demonstrate their occupation of the area and the impact of the development on them.
4. The KTFN has repeatedly requested that Paramount conduct a traditional use and ecological knowledge study of the area that focuses on the KTFN, but Paramount has refused or failed to do so. As such, Paramount has not determined if it's proposed activities violate or are irreconcilable with the KTFN's aboriginal rights.
5. Paramount has not followed-up with studies when advised by the KTFN that the development may have potential impacts on the KTFN.
6. The KTFN provided Paramount with a draft Mutual Benefits Agreement but Paramount has not responded.

In summary, the KTFN are not satisfied with Paramount's consultation efforts, oppose the development at this time and recommend that the Review Board not approve the development until Paramount has addressed their concerns. The KTFN also made 6 recommendations. Five of the six recommendations are discussed in other sections of this report, as they are not directly related to Paramount's public consultation efforts – see Section 6.7 Wildlife and Wildlife Habitat and Section 6.9 Land and Resource Use. The sixth recommendation is for Paramount to identify funding resources so that the KTFN can participate effectively in the review of the development.

In Paramount's September 24th letter to the Review Board, Paramount provided additional information about the public consultation efforts that have been made by the company and also provided responses to each of the recommendations made by the KTFN.

6.1.1 Conclusions

Utilizing the information provided by the KTFN and Paramount, the Review Board undertook an evaluation of each of the concerns identified by the KTFN. The Review Board's findings for each concern are briefly presented below.

Concern #1

In numerous documents, Paramount has clearly identified the KTFN as a land user that could potentially be impacted by the development. Paramount has taken steps to inform the community about the development and attempted to engage the KTFN in discussions about potential development impacts to the community and the environment.

Concern #2

In its environmental reports and other documents, Paramount has identified potential impacts to local communities, including the KTFN, and has made a commitment to a number of mitigation measures. These measures are included in Attachment 1 of this report.

Concern #3

The Review Board is in agreement with Paramount that it is not the company's responsibility to fund or to find funding for the KTFN's review of the development. The responsibility for finding and accessing such funding lies with the KTFN, the Deh Cho First Nations and Indian and Northern Affairs Canada.

Concern #4

There is no evidence on the Public Registry that demonstrates that Paramount has refused to participate in a traditional knowledge study. The evidence does indicate that Paramount had requested the community's participation in a traditional knowledge study as early as October 4, 2000 and has provided opportunities for community members to provide their knowledge to Paramount. These opportunities include an open house in Kakisa, other meetings with community representatives and flights with community members over the development area. The evidence also shows that Paramount met with community representatives from August 8th to 10th 2001 to gather traditional knowledge. A traditional knowledge report is being prepared based on this meeting.

Concern #5

In reviewing the evidence on the Public Registry, the Review Board has not been able to identify environmental impacts that were identified by the community and that were not addressed by Paramount. Regardless, the Review Board notes that the KTFN, through their counsel, did submit three Information Requests to Paramount and that Paramount provided responses. If the community had additional questions about potential development impacts, these questions could have been answered by using additional Information Requests.

Concern #6

With its September 24th letter to the Review Board, Paramount submitted a January 8, 2001 letter from Paramount to the KTFN that acknowledges Paramount's receipt of the KTFN's draft Mutual Benefit Agreement. The letter provides comments on issues that were raised in the draft and suggests further discussions.

Summary

The Review Board recognizes that the KTFN are not satisfied with the public consultation efforts undertaken by Paramount. However, in the Review Board's view, the evidence on the Public Registry does not support the concerns that have been raised by the KTFN. As such, the Review Board finds that the consultation effort undertaken by Paramount is acceptable and sufficient for purposes of this EA. Paramount has ensured that the potentially impacted communities have had the opportunity to make known their concerns with regard to this development. Paramount has considered those concerns and has proposed a series of mitigation measures in response to them.

6.1.2 Recommendations

The Review Board recommends that Paramount continue to closely consult and work with the potentially impacted communities to ensure that potential impacts are minimized.

6.2 Accidents and Malfunctions

Paramount shall identify the probability of accidents and/or malfunctions occurring related to the proposed development including, but not limited to, fuel and other hazardous material spills. The potential magnitudes of, and contingencies to deal with, these accidents and/or malfunctions should also be discussed.

Paramount describes the company policies that are in place to prevent the occurrence of accidents and malfunctions. However, they acknowledge that there is an inherent potential for accidents or malfunctions to occur during drilling and well evaluations, either from mechanical failure or human error.

Paramount made inquiries into incident rates with the Alberta Energy and Utilities Board (AEUB) and determined that, in 1999-2000, there was a 0.05% incident rate for a blow-out or gas blow during well drilling and a 0.08% incident rate for blow-outs and gas blows during well completions. Based on this data, Paramount concludes that the potential for accidents or malfunctions during drilling and well evaluations for the Cameron Hills development is very low.

Paramount inquired with the AEUB, Alberta Workplace Health and Safety, Canadian Association of Petroleum Producers (CAPP), PSAC and the Alberta government regarding accidents and malfunctions related to flaring during well evaluations. No information was available. Paramount continues on to state that most impacts related to accidents or malfunctions during flaring would typically be expected to be negative in direction, local in extent, of low magnitude, short in duration and could be reversed in the short term. Although there is the potential of a high magnitude impact such as human injury, Paramount believes that the procedures in place minimizes the potential of an event occurring to a point where it is considered to be not significant.

Paramount states that an emergency response plan, including spill contingencies, will be in place and rigorously enforced. All contractors will have safety training and certification along with health and safety plans and procedures. The equipment and set-up will be checked for safety on a routine basis by the safety supervisor.

Environment Canada is satisfied that Paramount's proposed emergency response and spill contingency plans are suitable. EC states that it expects to receive copies of these documents when they are completed.

The GNWT recommends that a site-specific spill contingency plan be supplied. The plan should provide specific instructions to employees about how to proceed in the case of a spill, taking into account site-specific topography, soils, etc.

6.2.1 Conclusions

The Review Board concludes, based on the analysis provided, that the mitigation measures proposed by Paramount are sufficient to ensure that the proposed development will not likely have a significant adverse impact due to accidents and malfunctions.

6.2.2 Recommendations

The Review Board recommends that the MVLWB ensure to the extent of its jurisdiction, through the use of permit and license conditions, that Paramount fulfils the commitments made in the EA report, including the imposition of safety training and adherence to established procedures to ensure a safe work environment. The MVLWB should also consider the recommendation made by the GNWT.

6.3 Alternatives

Paramount shall provide an explanation of the alternatives to the principal and accessory parts of the development. Specific questions that the Review Board will expect to have answered include:

- *What are the alternatives to and justifications for requiring well clearings to have a maximum size of 110 m x 110 m? Can these clearing sizes be reduced?*
- *What are the alternatives to and justifications for using up to 6 campsites? Can or should the number of camps be reduced?*

In their EA report, Paramount discussed alternatives to flaring during well evaluations, alternatives to extracting oil and gas by drilling, alternatives to the selected well site size, and alternatives to the selected campsites.

In discussing alternatives to flaring, Paramount discussed in-line testing, venting, incineration and flaring. Paramount asserts that flaring maximizes the environmental protection while at the same time allowing flexibility for varying flow rates during the test.

In their discussion on well site size alternatives, Paramount listed the factors that they considered when selecting the well site size and shape and stated that to safely complete the project, each well site required a size of 110 meters x 110 meters. The Review Board found that Paramount's discussion on well site size alternatives was too brief and requested additional information. Paramount replied that the Review Board should place Paramount's response to the Review Board's Liard East EA IR on well site sizes on the Public Registry for the Cameron Hills EA.

The Review Board was satisfied that Paramount's July 9th IR response provided substantial justification for their requested well site sizes. The overriding factor cited by Paramount that prevented size reductions was the requirement to comply with regulations that specify minimum distances between equipment, the well, the flare, combustible material and other items contained on the well site. These regulations are in place to ensure a safe work environment and to prevent accidents. While the Review Board agrees with these considerations, the Review Board is also of the opinion that minimizing environmental impacts and efficiency of land use should be factors that are considered when selecting well site sizes.

The Review Board notes that Paramount has conceded that, depending upon the circumstances encountered, it may be possible to support a lease size of 110 m x 90 m. The Review Board also notes that Paramount will evaluate the use of non-square (i.e. rounded corners) sites.

The Review Board contacted the National Energy Board, the Alberta Energy and Utilities Board, Alberta Environment and the British Columbia Oil and Gas Commission regarding the selection of well site sizes. None of these bodies have regulations or guidelines that require developers to look at ways to reduce well site sizes in forested areas. The primary focus of each organization is to ensure that well sites are large enough to permit a safe work environment.

In their discussion on the number of campsites, Paramount lists the factors that were used to select the campsites. Paramount states that using fewer camps would likely require clearing additional trees and would require additional vehicle traffic as the camps would have to be larger and more centrally located. Paramount proposes that only the minimum number of camps will be used (i.e. up to 6 camps) and that existing clearings will be used to the maximum extent feasible.

In their discussion on alternatives to drilling, Paramount states that there are no viable alternatives to economically extract oil and gas at the depths (1200 to 1800 m) of the Cameron Hills reservoirs.

6.3.1 Conclusions

The Review Board is satisfied with the alternatives analysis provided by Paramount. The Review Board has concluded that the chosen alternatives will not likely result in significant adverse impacts.

6.3.2 Recommendations

The Review Board recommends that the MVLWB require a well site layout for each well prior to Paramount clearing any land for the well drilling activities. This layout should demonstrate how Paramount is complying with applicable safety regulations and should also demonstrate how Paramount is taking into consideration the principles of minimizing environmental impacts and employing land use efficiency.

6.4 Air Quality and Climate

An analysis should be undertaken to determine the possible impacts of the proposed development on air quality. All well test flaring must comply with the NWT one-hour air quality standard for sulphur dioxide (450 µg/m³). The analysis should include:

- I. Provide reports from preliminary sampling that estimate gas composition. What is the hydrogen sulphide and the carbon dioxide content of the gas? Provide an estimate of the emission rates of hydrogen sulphide, sulphur dioxide, carbon dioxide and volatile organics.*
- II. Provide details about the equipment that will be used for the test burn including the flare stack size, stack combustion efficiency and the anticipated gas flow rates during tests including the maximum rates. Describe the efficiency of flare combustion under various stable and unstable meteorological conditions*
- III. Discuss the potential accidental releases or venting of unburned gases and describe steps that will be used to prevent these releases.*
- IV. Discuss the meteorology and climatology of the area including parameters that would affect the dispersal of pollutants such as wind speed, wind direction and atmospheric stability. Describe efforts to obtain the representative meteorological data that would be needed for dispersion modeling of air emissions in a complex terrain.*
- V. Conduct dispersion modeling in compliance with recognized guidelines such as the Alberta Energy and Utilities Board Guide 60.*
- VI. Discuss baseline air quality conditions including a discussion of emissions from other existing and proposed sources within the region.*
- VII. Discuss ambient ground-level concentrations of sulphur dioxide and hydrogen sulphide that could results during the well tests.*
- VIII. Assess the impacts of flaring activities on wildlife including vegetation and migratory birds as well as any impacts on human health and surrounding surface water quality. This impact assessment should:*
 - Identify the development activity;*
 - Identify the potential impacts of this activity (along with any supporting evidence);*
 - Propose mitigative measures (along with evidence that the mitigative measures will work); and*
 - Predict the significance of residual impacts that cannot be mitigated.*

IX. A discussion of efforts taken to minimize the release of any air contaminants and to mitigate the impacts of any emissions.

Paramount provided a significant level of detail in their EA report describing the baseline weather conditions in the area, flare efficiencies, air quality criteria, dispersion modelling, predicted air quality impacts and predicted impacts on other components of the environment. However, only the predicted air quality impacts will be discussed here. The potential impacts on the other components of the environment are discussed in other sections of this report.

Paramount predicted the maximum ground level 1-hour sulphur dioxide (SO₂) concentrations under various atmospheric stability situations, for each of the four seasons and according to growing seasons. The maximum 1-hour value was obtained was 256.7 µg/m³, which is approximately 57% of the Northwest Territories' maximum allowable 1-hour SO₂ concentration of 450 µg/m³. The maximum 24-hour value obtained was 133.2 µg/m³, which is approximately 89% of the Northwest Territories' maximum allowable 24-hour SO₂ concentration of 150 µg/m³.

Paramount predicted the maximum "worst case" 1-hour ground level concentrations of hydrogen sulphide (H₂S), carbon disulphide (CS₂), benzene and nitrogen dioxide (NO₂) concentrations to be 3.93 µg/m³, 15.04 µg/m³, 27.49 µg/m³ and 4.64 µg/m³, respectively. These values are all within their respective maximum allowable 1-hour concentrations of 14 µg/m³, 30 µg/m³, 30 µg/m³ and 400 µg/m³, respectively.

Environment Canada is satisfied that the air quality modelling and the environmental impact predictions provided by Paramount are realistic.

INAC is of the opinion that the technical information provided by Paramount is sufficient. Anticipated environmental impacts from flaring can be mitigated by normal operating practices and through the terms and conditions of the permit and license.

The GNWT reviewed the information provided by Paramount and was satisfied that the air quality impacts were properly modelled. The GNWT notes that conservative assumptions were employed and that the GNWT agrees with Paramount that no significant impacts on air quality will result provided that the commitments made by Paramount are employed.

Based on the requirements of the Alberta Energy and Utilities Board's (AEUB's) Guide 60, the GNWT recommends that a recent gas analysis should be obtained to verify the amount of H₂S that will be flared. The GNWT also recommends that if the H₂S content of the gas is found to exceed 50 moles of H₂S per kilomole of gas, then Paramount should be required to suspend operations and revise the air quality modelling. The analysis conducted should be supplied to the MVLWB and the GNWT.

The GNWT recommends that if the flaring activities are demonstrated to be having an impact on the environment or if a valid concern with flaring is raised, Paramount should install air monitoring equipment to record contaminant deposition rates and ambient air quality.

6.4.1 Conclusions

The Review Board concludes, based on the analysis provided, that the mitigation measures proposed by Paramount are sufficient to ensure that the proposed development will not likely have a significant adverse impact on air quality.

6.4.2 Recommendations

The Review Board recommends that the MVLWB ensure, through the use of permit and license conditions, that Paramount fulfils the commitments made to keep air emissions below the air quality standards. The MVLWB should also consider the recommendations made by the GNWT.

6.5 *Water Quality and Quantity*

Not requested in the Terms of Reference.

Paramount states that when annual concentrations of SO₂ and NO₂ are sufficiently high, they have been linked to the deposition of acidic compounds. This can have a direct effect on water bodies and streams that are highly sensitive to acidic inputs. With the short duration of the flaring in this development, the annual depositions of these compounds are expected to be very low and potential effects of acidic deposition is considered to be negligible. No residual impacts on water quality due to flaring are predicted.

Paramount proposes to implement a variety of mitigative measures to protect water quality such as maintaining buffers between development activities and water bodies, segregating cement returns from the drilling sump, properly abandoning sumps and adhering to all conditions in the land use permit.

Water produced from subsurface reservoirs will be disposed of through deep well disposal, back into a formation already containing saline formation water. It will not be disposed of into the watershed.

The water quantity impacts will be related to the use of water for drilling, road construction/maintenance and camp use. A lake water source will be used to provide water for the drilling and road construction if the lake is determined to hold adequate water volumes so that the extraction of the required volumes will not result in impacts to fish habitat. In the event that the drawdown effect could jeopardize aquatic habitat, the water for drilling and road construction will be obtained from an existing well located near well site A-04 or from the wells that will be drilled at the campsites. Paramount predicts that there will be no residual impacts due to water withdrawal.

The GNWT is satisfied with the submission by Paramount.

INAC states that the main water related activities identified were water withdrawals for camp, road building and drilling, local and remote sumps for drill fluids, sewage and grey water sumps, and stream crossings. The associated impacts will be minimal if mitigative measures are applied. INAC also notes that the submission and approval of required emergency response or contingency plans, abandonment and restoration plans, monitoring programs, etc., during the regulatory phase should adequately address any other concerns that might be identified by regulators.

EC states that provided the precautions and mitigation efforts described by Paramount are applied to the access roads and well sites, EC concurs that project effects on water quality will likely be minimal.

DFO states that if the mitigation measures outlined in the reports as well as those outlined in the DFO letter of advice to Paramount dated Oct. 2, 2000 are adhered to, impacts from the development on water quality should be minimal. These mitigation measures include:

- No refuelling to take place within 100 metres of a water body;
- A minimum buffer of 100 metres between camps and watercourses;
- Drill cuttings and associated wastes to be disposed of in such a way that they do not enter any water body; and

- Fuel caches and sumps to be located at least 30 metres from the high water mark of any water body and bermed or otherwise contained to ensure that these substances do not enter any water body.

6.5.1 Conclusions

The Review Board concludes, based on the analysis provided, that the proposed development will not likely have a significant adverse impact on water quality and quantity.

6.5.2 Recommendations

The Review Board recommends that the MVLWB ensure, through the use of permit and license conditions, that Paramount fulfils the commitments made in its reports to maintain water quality and quantity. The MVLWB should also consider the mitigation measures recommended by DFO.

6.6 *Aquatic Resources and Habitat*

Not requested in the Terms of Reference.

Paramount states that while historical information on the Cameron River is lacking, regional information indicates that the main fish species found in the region include arctic grayling, lake whitefish, lake trout, walleye and northern pike. However, no commercial or subsistence fishing activity is present in the Cameron Hills area. The area supports primarily warm water fish species and has moderate to low fishery potential. In general, fisheries resources in the area are limited. Viable habitats to support fish communities with top predator species are not available. Specifically, habitat for spawning, rearing and over-wintering of these species were not encountered. Even habitat capable of supporting forage fish communities is unavailable.

Paramount states that the potential impacts on aquatic resources and habitat due to flaring would be related to altered water quality through acid deposition. Since no acidic deposition is predicted, no residual impacts on aquatic resources and habitat are predicted related to flaring.

Paramount proposes to employ a variety of mitigative measures to prevent potential impacts on aquatic resources and habitat due to development activities. These measure include using a 5 mm intake screen on water pumps to prevent potential entrainment of fish, limiting lake drawdown due to water withdrawal and the use of proper construction, operation and abandonment procedures for winter road water body crossings. No disturbance to fish habitat is expected and consequently no long-term detrimental impacts on fish or fish habitat are predicted due to winter road water body crossings.

DFO recommends that the water level in Lake UNL-1 should not be lowered by more than 2 cm. It is the position of DFO that inputs from groundwater and an adjacent bog make it likely that the lake would be used for over-wintering habitat. It must be ensured the any water removal will not cause a significant drawdown or reduction in littoral habitat.

DFO states that the mitigative measures proposed for the stream crossings should result in the avoidance of any negative impacts to fish and fish habitat at the crossing locations.

6.6.1 Conclusions

The Review Board concludes, based on the analysis provided, that the proposed development will not likely have a significant adverse impact on aquatic resources and habitat.

6.6.2 Recommendations

The Review Board recommends that the MVLWB ensure, through the use of permit and license conditions, that Paramount fulfils the commitments made in its reports to protect aquatic resources and habitat. The MVLWB should also consider the mitigation measure recommended by DFO.

6.7 *Wildlife and Wildlife Habitat*

Not requested in the Terms of Reference.

Air emissions due to flaring could potentially produce direct impacts on wildlife, such as by causing respiratory problems, and could also potentially produce indirect impacts on wildlife as a result of habitat changes.

Given the low emissions predicted by the air quality modelling, Paramount predicts that there will be no direct residual impacts on wildlife due to flaring. As there were no direct impacts predicted on vegetation or water quality due to flaring, Paramount also predicts that there will not be any indirect residual impacts on wildlife due to flaring.

With respect to migrating birds, exposure to emissions would be unlikely, as the well evaluations will occur in the winter when the migratory bird species are not in the area.

Year-round resident birds may be impacted by the noise and light generated during the flaring but this impact is expected to be local in extent, short-term in duration and will cease when the test is complete. Based on the low densities of resident birds and the local extent of the disturbance, this impact is considered to be not significant.

Paramount predicts that large wildlife species such as lynx and caribou, which are less tolerant of disturbance, will avoid active areas of drilling and well evaluation activities due to vehicular and flaring noise and light at these areas. The distance of avoidance is expected to be in the range of 100 to 1000 meters depending on the individual and the species. The low densities of these species in the development area during the winter months are expected to mitigate this impact. Smaller species are not expected to be as impacted as the larger species. Any avoidance by all species is predicted to last for the duration of the evaluation and it is predicted that species will return to the area after the work has been completed. No residual impacts are predicted.

Other potential impacts are habitat loss/alteration and fragmentation, increased human access to the area for hunting, disturbance during sensitive life cycle periods (i.e. over-wintering), barriers to movement, mortality due to collisions and increased predation. Mitigation used will include avoiding key habitat, using existing trails and cutlines as much as possible, limiting well site sizes to that required for safety considerations and maintaining all activities within surveyed leases and rights-of-way. The residual impacts are predicted to be negative, but short to medium-term in extent. The impacts are predicted to be of low magnitude, can be reversed in the medium-term and are considered not significant.

The GNWT agrees with Paramount that there are not likely to be any residual impacts due to flaring on wildlife and wildlife habitat. The GNWT notes that the development will be carried out in an area that is considered prime habitat for neither caribou nor moose. While moose may benefit to some extent from the emergence of early successional vegetation that results from clearing, caribou will not. Caribou prefer mature forest stands and fen complexes, which will to some extent be modified by the proposed development. However, given the limited extent of development in the area and the limited duration of the development, the GNWT does not expect that these impacts will have significant effects on the woodland caribou population in the Cameron Hills.

EC restricted its review to assessing the impacts of flaring on migratory birds. EC agrees that the impacts on migratory birds due to flaring will be minimal.

The KTFN recommends that Paramount develop a plan for disciplining employees who hunt or disturb the animals, which includes complaint and reporting system. In response, Paramount notes that their Corporate Safety Manual includes a disciplinary action section and that the environmental screening report states “Construction and drilling crews will be instructed not to harass wildlife in any manner, and strict policies prohibiting the presence of dogs and the use of firearms on the project will be reviewed”. The Review Board notes that the environmental screening report also states “no hunting will be allowed by company employees in the project area”.

6.7.1 Conclusions

The Review Board concludes, based on the analysis provided, that the proposed development will not likely have a significant adverse impact on wildlife and wildlife habitat.

6.7.2 Recommendations

The Review Board recommends that the MVLWB ensure, through the use of permit and license conditions, that Paramount fulfils the commitments made in its reports and other documentation to avoid impacts to wildlife and wildlife habitat. The MVLWB should also consider the recommendation of the KTFN that Paramount develop a system for traditional land users to report impacts on wildlife due to Paramount’s or its contractor’s employees.

6.8 Socio-Economic Matters

Paramount shall provide details on the socio-economic effects of the project on the local communities. This should include information such as identifying the local businesses that will be involved in the project, the likely increase in local employment, implications for community quality of life effects as well as the documentation and details behind any other predicted socio-economic effects and mitigation measures.

The communities most likely to be affected by the proposed development include Kakisa, Hay River Reserve, Fort Providence, West Point First Nation, Enterprise, Hay River and Indian Cabins. Paramount has consulted with community leaders and members throughout the project planning. This consultation identified the following potential impacts, both positive and negative, that might occur as a result of the development:

- Employment and contracting opportunities for northerners and northern business;
- Increased interaction with the communities;
- Short-term increased utilization of existing businesses and services;
- Continued accessibility to hunting and gathering areas for traditional land users;
- Short-term increased demands on local construction capabilities and skilled labor resources;
- Population increases in the region in the short term; and
- Potential minimal impact to traditional land uses such as trapping, hunting, fishing and gathering.

Paramount stated that they would involve the local area goods and services providers to the greatest extent practical. For phases of construction requiring primary contractors, the successful companies’ names will be published in the Project Updates and distributed to the public to allow local individuals and companies to apply for work with the contractors.

The selected primary contractors will have to outline their local hiring strategy. Paramount representatives provided their telephone numbers, mailing address and e-mail addresses for easy contact. Paramount stated that qualified people would have the opportunity to apply for jobs at the project. Paramount also suggested

that indirect jobs due to the increased industrial activity might result and encourage further development in the area and increase the potential for long-term jobs as opposed to short-term jobs associated with a single development.

Paramount concludes that the predicted overall socio-economic effects are positive and sub-regional, but short-term, low in magnitude and not significant.

The GNWT concludes that the socio-economic impacts of the development are uncertain although they are likely to be positive and insignificant in a regional context. The GNWT appreciates that the developer plans to implement a reporting system to track northern employment and business expenditures associated with this development. The GNWT recommends that the developer should produce such a report and provide it to the GNWT. The GNWT states that this information will be useful in assessing the effects of similar developments in the future as oil and gas development in the region continues.

6.8.1 Conclusions

The Review Board concludes, based on the analysis provided, that the proposed development will not likely have a significant adverse impact on the socio-economic environment.

6.8.2 Recommendations

The Review Board recommends to Paramount that it produce the requested report for the GNWT.

6.9 Land and Resource Use

Not requested in the Terms of Reference.

Paramount states that the Cameron Hills is an area where aboriginal traditional land use takes place as well as activities such as oil and gas activity. Timber cutting has occurred on the east and north slopes during the winter months with permits issued in 1999 for 35,000 m³ of wood. Although the capability for recreation in the area is generally low, activities such as camping, canoeing, viewing, photography, snowshoeing, snowmobiling and angling can all be accommodated in the area.

Paramount has identified two trappers, Dennis Strang and Roy Buggins, who trap in the immediate development area. Paramount has contacted both trappers to review the development, identify concerns and discuss mitigative measures. The trappers will be contacted by Paramount prior to drilling and well evaluation activity and provided an updated project schedule. If the well drilling and evaluation activities impact the trappers, they will be compensated for any demonstrable loss.

Paramount concludes that the development is not expected to have an adverse impact on the pursuit of traditional activities or the retention of traditional skills. It is not expected to result in new forms of socio-cultural change although the project may contribute to changes already underway such as the transition to a more diversified economy.

Paramount explained that access to the development area by road would only be achieved during the winter months when the winter road was open and that access during this timeframe would be controlled or monitored by using a staffed or locked gate. Paramount notes that the access to the development area will be unchanged from previous winter road access. Spring, summer and fall access will also remain unchanged from previous years as no additional routes to the development area are being established. Paramount considers the residual impact to be positive, local, medium-term and not significant.

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All new access routes within the development area were selected after consideration of local residents and the area trappers. Construction will be completed in a timely manner to reduce the amount of disturbance time. Wildlife pathways will remain open during and after the drilling and evaluation program. All crews will respect traditional areas.

To mitigate potential impacts to land and resource use, Paramount will adhere to the commitments made in its reports and adhere to all conditions of the land use permit.

The GNWT concludes that the information provided by Paramount is sufficient to support the conclusions regarding environmental impacts.

The KTFN are concerned that Paramount has not completed a traditional land use study to evaluate the concerns of the community and the potential impacts on the community. The KTFN identify three community families that use the Cameron Hills area and state that others in the community also use the area. The traditional land use activities include fishing, trapping, gathering foods and medicines, setting camps, hunting birds and other game and other cultural activities. These traditional land users were not identified or consulted by Paramount for the preparation of the environmental reports. These harvesters could advise Paramount why they do not hunt or trap in some of the areas affected by Paramount's proposed activities, in accordance with their laws to leave undisturbed certain areas as a conservation measure. The KTFN state that Paramount's conclusion that the development will not have an adverse impact on traditional land use is made without any study of the KTFN harvesters.

The KTFN state that during a May meeting with the Paramount, the KTFN volunteered to provide community representatives who would participate in a traditional knowledge study but they needed resources to participate. Paramount went out on the land with some elders in mid-August but the study has not been completed.

The KTFN expressed concern that access will be increased to the area for non-Band members, potentially resulting in increased pressure on the hunting and fishing resources of the area.

The KTFN made the following four recommendations for how Paramount should proceed:

1. Meet with the KTFN to jointly develop plans to minimize access and provide compensation for adverse effects due to increased access.
2. Meet with the KTFN trappers to develop a plan to ensure that trapping activities will not be affected.
3. Develop a compensation and mitigation plan to address interference with trapping activities.
4. Commission a traditional use and ecological knowledge study in conjunction with the KTFN which builds on existing research and determines the relationship between their land use and Paramount's development. This should include a compensation benefits component.

In its Sept. 24th letter to the Review Board, Paramount responded to each of these four recommendations from the KTFN. Summaries of these responses are:

1. Paramount has met with KTFN representatives on several occasions to review the development including associated access. Access to the area will remain unchanged from previous winter road access. Compensation should not be required as no significant impacts are predicted.
2. Paramount will meet with the trappers identified by the KTFN who are actively trapping in the development area.
3. Paramount has, in its environmental report, committed to compensating trappers for any demonstrable loss resulting from the drilling and evaluation activities.

4. Paramount met with the KTFN Chief and elders in August 2001. Traditional knowledge of the area was shared and a report is being generated. Benefits to northerners are addressed in Paramount's Benefits Plan that has been submitted to INAC.

6.9.1 Conclusions

In evaluating the evidence, the Review Board has considered the opinions expressed by the KTFN and Paramount and the evidence on the Public Registry. The Review Board's conclusions on the issues of concern are presented below.

Increased Access to the Area

The concern of the KTFN is that non-Band members will use increased access to the development area to hunt and fish in the area. The evidence presented does not demonstrate that there will be increased access to the development area. Paramount is proposing to use an existing access route. No new access routes to the development area will be created. The current access route will be gated and locked by Paramount to prevent its use by others.

Considering that there will be no new access to the development area, the Review Board does not support the KTFN's recommendation that Paramount meet with the KTFN to discuss mitigation and compensation for increased access.

The Review Board notes that access within the development area will be increased, as some new access roads will be cleared. However, as there is no new access to the area, the increased access within the area is not likely to attract individuals who do not already use the area.

Impacts on and Compensation to Trappers

The KTFN is concerned that the community's trappers have not been consulted by Paramount to determine the potential impacts of the development on their trappers and discuss mitigation and compensation. The KTFN recommends that Paramount meet with their trappers to discuss these issues.

The Review Board notes that the first consultation between Paramount and the KTFN occurred on June 22, 2000, however, the KTFN did not identify their community trappers to Paramount until August 2001. During this period, there were opportunities at which the KTFN could have provided this information to Paramount during meetings and it also could have been provided at any time in writing.

The Review Board notes that as early as July 26, 2000 Paramount was meeting with trappers from other local first nation communities about potential developments in the Cameron Hills area. These consultations included reviewing the development, identifying the locations of trap lines and reviewing fur records.

Given that the KTFN did not identify their trappers to Paramount until August 2001, it was not possible for Paramount to have consulted these trappers while preparing its environmental report, which was submitted to the Review Board in June 2001. However, the Review Board notes that Paramount has committed itself to notifying trappers prior to accessing the area, to keeping trappers informed of the development schedule and to compensate trappers for any demonstrable loss. Paramount has also committed itself to meeting with the KTFN trappers to obtain their information and discuss the development. Given these commitments and the previous consultation by Paramount with other trappers, the KTFN's second and third recommendations have, in the Review Board's view, been satisfied.

The Review Board is aware that a "demonstrable loss" as that term is used by Paramount only refers to direct damage to a trapper's assets resulting from development activities. Thus, the scope of the company's commitment is limited. It does not, for example, include compensation for impacts on the level of harvesting.

However, the Review Board has no evidence to indicate the existence of any legal mechanism applicable in the development area that would require Paramount to compensate for such losses, if they occur.

Traditional Knowledge and Land Use Study

The KTFN recommends that Paramount should commission a traditional use and ecological knowledge study, in conjunction with the KTFN, which builds on existing research and determines the relationship between their land use and Paramount's development.

The KTFN notes that the community's traditional land users were not identified or consulted by Paramount for the preparation of the environmental assessment reports. The KTFN states that Paramount's conclusion that the development will not have an adverse impact on traditional land use is made without any study of the KTFN harvesters. The KTFN acknowledges that Paramount met with the KTFN's elders in August 2001 but notes that the study has not been completed.

The Review Board is aware of the efforts that have been made by Paramount to acquire traditional knowledge from the KTFN over the last 16 months and has determined that these efforts have been sufficient to satisfy the requirement of this environmental assessment. In reviewing the consultation record, the Review Board notes that Paramount has been able to acquire traditional knowledge in a co-operative manner from other first nations in the development area. The Review Board notes that the first consultation between Paramount and the KTFN occurred on June 22, 2000, however, the KTFN did not identify their community's traditional land users to Paramount until August 2001. During this period, there were opportunities at which the KTFN could have provided this information to Paramount during meetings and it also could have been provided at any time in writing.

The Review Board acknowledges that it would have been preferable for Paramount's traditional knowledge study with the KTFN to be completed prior to the completion of this environmental assessment. The Review Board recognizes that a study report is currently being prepared but, based on the evidence produced in this EA and the mitigation measures and other commitments made by Paramount, the Review Board is of the view that no significant adverse environmental impacts will occur. The Review Board has, therefore, decided that it will not delay the conclusion of this environmental assessment until the completion of the traditional knowledge study. The evidence on the Public Registry suggests that sufficient information has been provided to reasonably predict and mitigate development impacts.

The KTFN states in its Aug. 21, 2001 letter to the Review Board that consultation must be meaningful. The Review Board notes, however, that meaningful consultation must involve a good faith effort by both the company and the first nation. Consultation is a two way street, not an opportunity to veto a development. The Review Board is encouraged to see that the KTFN and Paramount are now working cooperatively. These efforts should continue.

The Review Board cannot fail to note that the consultation process between Paramount and the KTFN appears to have suffered as a result of the KTFN's assertion that Paramount should recognize the KTFN as the primary traditional land user among the affected first nation communities. Paramount stated that it was not in a position to determine which first nation community was the primary traditional land user of the Cameron Hills area and that it must consult with all potentially affected communities. The Review Board agrees with the position expressed by Paramount. It would, in the Review Board's view, be inappropriate for Paramount to pretend that it could determine which first nation community is the primary traditional land user in the development area. The various local first nation communities, the Deh Cho First Nations and Indian and Northern Affairs Canada are better placed to resolve such an issue.

The KTFN also recommended that there be a compensation benefits agreement between the KTFN and Paramount. However, the imposition of such an agreement is not within the jurisdiction of the Review Board. The Benefits Plan filed by Paramount with the Minister of INAC under the *Canadian Oil and Gas Operations Act* may assist in alleviating these concerns, however, that plan has not been placed in evidence before the Review Board.

Summary

The Review Board concludes, based on the evidence provided, that the proposed development will not likely have a significant adverse impact on land and resource use.

6.9.2 Recommendations

The Review Board recommends that the MVLWB ensure, through the use of permit and license conditions, that Paramount fulfils the commitments made in its reports and other documentation to avoid impacts to land and resource use.

The Review Board also recommends that if the INAC Benefits Plan does not adequately address the issue of trapper compensation, the GNWT should consider assisting trappers with their compensation concerns.

6.10 Cumulative Impacts

Paramount shall review their cumulative effects assessment and update it (Ch.8, Environmental Screening Report for the Cameron Hills Drilling Project), as required, to include Paramount's proposed seismic program in the Cameron Hills.

Paramount shall analyze and report on the cumulative impacts where impacts on biological receptors such as vegetation and wildlife are identified as a result of production testing (flaring) and/or venting.

Paramount updated their cumulative effects assessment as directed. Paramount concludes that in conjunction with conscientious construction and operation standards, mitigation plans and emergency response plans, the drilling project and additional development in the area will be completed in a manner that minimizes the potential for cumulative effects. All potential residual cumulative effects are predicted to be not significant.

The GNWT agrees that the development will not reduce caribou habitat effectiveness on a regional scale to such an extent that a negative impact on woodland caribou would be likely. The GNWT states that it would be of value to future resource management to conduct a thorough habitat effectiveness assessment for the region. This would enable managers to provide a quantitative estimate of the decrease in habitat effectiveness that can be expected from future projects.

EC states that cumulative effects assessment is a very difficult concept for both developers and reviewers to comment on and reach a consensus. EC acknowledges Paramount's commitment to utilizing existing seismic cut lines and apparent awareness of potential cumulative impacts, however, EC notes that Paramount's determination of no significance is open to challenge. Without having a cumulative effects strategy in place for the NWT with thresholds and indicator species identified, the prediction of cumulative impacts will remain subjective. EC encourages all developers to participate in completing the Cumulative Effects Assessment Management Framework (CEAMF) so that all of those involved will have greater certainty and clarity in conducting good environmental assessments.

DFO is satisfied that Paramount has done a thorough job of documenting potential cumulative impacts from existing and potential disturbances in the cumulative effects assessment study area.

INAC states that it has determined that the developments in the area are not likely to cause a significant adverse impact on the environment.

6.10.1 Conclusions

The Review Board concludes, based on the analysis provided, that the proposed development, in conjunction with other developments, will not likely result in significant adverse cumulative impacts.

6.10.2 Recommendations

The Review Board does not have any recommendations to make but does support the position expressed by EC that a cumulative effects assessment strategy that identifies thresholds and indicator species needs to be put into place.

6.11 Abandonment and Restoration and Follow-up Programs

Not requested in the Terms of Reference.

Following completion of the drilling and testing programs, Paramount will remove all equipment, materials and other debris from the project area. All sites will be stabilized and reclaimed to a condition that will mitigate residual impacts, promote revegetation and not impair pre-disturbance land use activities.

Drilling and camp sumps will be restored in a manner consistent with land use permit conditions. This will consist of backfilling, re-contouring, rolling back slash and re-vegetating if required. Borrow pits will be recontoured and/or terraced as necessary to promote site stability and all cuts and fills will be backsloped to a slope ratio of not less than 3:1 or as required in land use or quarry permits. Slash rollback and revegetating will be as described for the sumps. If the banks at any stream crossings are disturbed, they will be stabilized with seeding or riprap.

Any surface contamination due to spills will be restored suitable to the regulatory agencies.

Any unsuccessful wells will be abandoned in accordance with NEB requirements immediately following the drilling operations and the site will be reclaimed.

DFO notes that the developer does not state when or how often the site visits to monitor reclamation will occur. DFO recommends that the rehabilitation of disturbed streambeds should be monitored as well to ensure that reclamation measures such as revegetation and bank stabilization are effective.

The GNWT accepts the measures proposed by Paramount as the most practical for reclaiming disturbed sites. However, the GNWT recommends that Paramount should undertake proactive abandonment and restoration of their leases. Operational leases should be reduced in size to leave the smallest possible footprint. The GNWT notes that Paramount intends to conduct reclamation site inspections. The GNWT recommends that the Department of Resources, Wildlife and Economic Development be provided with a copy of Paramount's revegetation assessment.

The GNWT recommends that Paramount adhere to AEUB Guides 50 and 58 for the disposal of drilling waste, including testing waste liquids for contaminants.

EC considers any commitments on abandonment and restoration made during the course of the EA to be binding on the developer.

6.11.1 Conclusions

The Review Board concludes, based on the analysis provided, that Paramount has provided adequate information on how the development area will be abandoned and restored.

6.11.2 Recommendations

The Review Board recommends that the MVLWB ensure, through the use of permit and license conditions, that Paramount fulfils the commitments made in its reports and other documentation to properly abandon and restore the project area. The MVLWB should also consider the recommendations made by the GNWT and DFO.

7 Review Board Environmental Assessment Decision

The Review Board concludes, based on the analysis provided, that the proposed development will not likely cause a significant adverse impact on the environment or a significant public concern.

For the consideration of the Mackenzie Valley Land and Water Board, the Review Board recommends that:

1. Land use permit and water license conditions reflect the commitments (see Attachment 1) made by Paramount in their environmental reports as well as the other documentation that has been submitted.
2. The recommendations made by the Review Board and their technical reviewers in this report (see Attachment 2) are also considered during the development of land use permit and water license conditions.

To make its decision, the Review Board has relied upon the information in Paramount's environmental reports, the technical reports provided by reviewers and all of the other information on the Public Registry. The Review Board fully expects Paramount to discharge all of the mitigative measures described in its submissions. If these mitigative measures are not implemented, the Review Board's conclusions about impact significance will be affected.

Attachment 1 – Commitments Made by Paramount

Paramount has made numerous commitments in its documentation. The Review Board expects that Paramount will fulfill all of these commitments unless they are replaced by more stringent mitigative measures that are conditions of a regulatory instrument.

For ease of use, the Review Board has listed Paramount's commitments in the following list. In the event that a commitment was made by Paramount that is not shown in the list, Paramount will still be required to adhere to that commitment.

General

- The development will occur under frozen ground conditions in the winter months.
- The local communities will be notified prior to commencement of activities so that anyone utilizing the area will be aware of the construction/drilling activities and to ensure appropriate avoidance or precautionary measures can be implemented.
- All work connected to the development will comply with the recommendations and conditions identified in the Land Use Permit, Water License and other relevant permits, as well as any other regulatory requirements.
- Access road, camp and well lease construction will comply with applicable INAC guidelines.
- If any heritage resources are encountered, work will halt and the local communities, the MVLWB, the Prince of Wales Northern Heritage Centre and INAC will be notified immediately to discuss mitigation options.
- Concerns identified from the traditional knowledge study will be incorporated into the development to ensure that the potential for negative impacts to traditional land use is minimized.
- Following completion of the drilling and testing operations, all equipment, materials and other debris from the development will be removed and transported out of the area.
- All sites associated with the construction and drilling program will be stabilized and reclaimed to a condition that will mitigate residual impacts, promote re-vegetation and not impair pre-disturbance land use activities.
- In conjunction with the Emergency Response Plan (ERP), Paramount will ensure staff and associated contractors are adequately trained, including first aid, to deal with emergency situations. The ERP will be rigorously enforced. The contractors must have approved health and safety plans and procedures.
- Any relevant industry standards pertaining to safety and environmental protection will be incorporated into the operation of the development. This applies to Paramount and its contractors.
- No form of illicit drug or alcohol use will be tolerated by anyone while engaged in field operations.
- The well drilling and evaluation equipment and the equipment set-up will be checked for safety on a routine basis by the contractor's safety supervisor.
- Paramount will continue to provide regular community development updates to communities and regulatory agencies.

Winter Access Roads

- A combination of snowmobiles/all-terrain vehicles and lightweight tracked vehicles will be initially used to compact the snow and subsurface vegetation on the access rights-of-way to induce subsurface frost penetration.
- Snow plowing in low-lying areas will be limited and a minimum of 15 cm of snow will be left to protect the surface vegetation.
- When feasible and required, natural openings will be utilized for push-outs or passing lanes. If brush clearing is required, brush will be mowed with a hydro-axe or brush flail to mitigate disturbance to the surface organic layer.

- Generated debris and slash will be windrowed and utilized for roll-back.
- Construction of the winter snow road will be consistent with the methodology and guidelines in the GNWT Department of Transportation Handbook.
- Frost penetration will be sufficient on access rights-of-way to support the weight of drilling equipment and traffic prior to accessing the development area.
- If necessary, an ice-capped snow road will be built to mitigate surface disturbances.
- Water for winter road construction will be obtained from the water source lake and/or the drilled water wells.
- While the winter access road from Indian Cabins is open, access will be monitored with a staffed or locked gate.

Water Crossings

- The work will be scheduled during frozen drainage conditions.
- Ice bridge construction will be consistent with the methodology and guidelines identified in the GNWT Department of Transportation Handbook.
- Only clean snow and ice are to be used for construction of water crossings.
- It is prohibited to deposit any deleterious materials onto the ice or into the water of a watercourse or water body. If this should occur, the material will be immediately removed with measures taken to contain any pollutants.
- Crossings will be removed completely or a “V” notch will be placed in the middle of the crossing to allow flow.
- No refueling will be allowed within 100 m of the watercourse crossing sites.
- Vehicles will be checked for oil and/or fuel leaks that could find their way into streams.
- If necessary, a pre-disturbance bank profile will be re-established which may include using riprap, organic cribbing, bundled logs or other stabilization measures.
- No sump fluid, treated or otherwise, will be discharged to surface waters.

Well Sites

- Only the minimal area necessary to safely allow the drilling operations will be cleared.
- All construction/drilling activities will be confined to the surveyed well site boundaries.
- The potential of using a non-square lease will be evaluated for environmental advantages.
- All timber will be felled onto the lease and away from undisturbed timber adjacent to the surveyed boundaries.
- Standing timber and shrubs within the surveyed boundaries will be cleared with brush rakes and the resulting slash will be pushed into windrows for eventual roll-back at the end of the development.
- Equipment operators will be instructed to keep the bottom edge of the brush rake elevated approximately 20 cm above the surface to avoid unnecessary disturbances to the ground layer.
- A cutter blade outfitted with mushroom shoes will be used for clearing understory vegetation and non-salvageable timber.
- Slash windrows will be located along the high side of the lease with a break maintained between it and the standing forest.
- No slash material will be pushed into or against standing timber adjacent to surveyed boundaries or into natural drainages or wetland features.
- A compacted snow pad will be used to level micro-relief variations to the maximum extent feasible, thus avoiding leveling or surface disturbance of the surface organic soil layer. Should insufficient snow be available on the well site, water will be trucked in to create an ice pad.
- Residual slash will be walked down into the snow to help create a protective surface buffer.
- If leveling is required, the organic material will be stripped and salvaged prior to any grading activity for replacement during reclamation.

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- A snow/ice berm may be constructed on the low sides of the well site to contain any accidental surface spills or container leaks.
- Above ground tanks will be used to contain drilling fluids, which, in turn, will be transported to the remote sumps.
- Only a fresh water, environmentally friendly Gel/Chem mud system will be used.
- Drilling waste will be sampled and analyzed to ensure that it does not contain mud contaminants that exceed regulatory parameters or guidelines.
- Upon completion of the drilling program, the mix/bury/cover disposal technique will be utilized for disposal of the muds.
- If a well proves to be viable, the well will be completed and production tested prior to the end of the winter drilling season.
- Water for drilling will be obtained from the source lake of water wells. Drilling fluid will be reused from well to well to reduce water consumption.
- Cement returns will be segregated from the drilling sump to avoid a pH problem during disposal. The cement returns will be buried on-site, below a minimum of 1 m of cover once they have set up.
- All chemicals will be marked as per WHMIS requirements and stored in an appropriate location prior to use.
- Produced water and other liquids will be tanked and tested to determine disposal options, pending regulatory approval. Excess water will be sampled and analyzed on-site to confirm it is non-toxic and conforms to regulatory requirements.
- Litter and debris will be stored in covered bins for disposal off the well site at an approved landfill location.
- Following drilling and testing operations, the organic material and desirable soil that was salvaged from the sump location will be spread during reclamation. Natural encroachment will be encouraged.
- All well sites will be monitored during construction, reclamation and one year after construction to determine if remedial seeding, site stabilization or other additional reclamation work is required.
- Unsuccessful wells will be abandoned and reclaimed in accordance with NEB requirements immediately following drilling operations.
- Until such time as the Northwest Territories has its own Drilling Waste Management guidelines in place, Paramount will adhere to the AEUB Guide 50 – Drilling Waste Management and AEUB Guide 58 – Oilfield Waste Management Requirements for the Upstream Petroleum Industry.
- All potential contaminants and other drilling wastes will be characterized, manifested and transported to an approved waste facility for disposal in accordance with the Transportation of Dangerous Goods Regulations.

Temporary Camps

- Surface disturbance mitigation measures and clearing techniques will be as previously described for other development elements.
- A disposal sump will be used for disposing grey water.
- Camp fuel storage at each camp will use two above ground tanks that will be stored in a common area. Containment berms will be constructed of impervious material around the perimeter of the storage site and the tanks will be placed on impermeable liners. Berms will be large enough to contain 110% of the bulk storage capacity.
- All combustible garbage will be burned in a diesel-fired incinerator on-site.
- Metal, plastics and other wastes will be contained in bins for removal to approved landfills.
- Secured storage containers for fuels, filters, used motor oil and special handling wastes will be placed away from low-lying areas and appropriate containment measures such as catch trays and berms will be used as necessary.
- Oily wastes will be transported to an approved recycling or disposal facility.

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- Good housekeeping practices will be enforced.
- Following camp closure and regulatory approval, the sewage will be properly treated and the sumps backfilled and compacted. Furthermore, all equipment, garbage, wastes and structures will be removed from the site.
- If required, disturbed areas within the campsites will be re-seeded with an approved seed mix if natural regeneration is unsuccessful. The campsites will be monitored during construction, reclamation and one year after construction to determine if remedial seeding or other work is required to promote site stability and enhance local flora establishment.

Air and Noise

- Vehicles, heavy equipment and diesel-powered generators will adhere to the appropriate federal, territorial and provincial emission standards and will be equipped with mufflers.
- The flare stack will be of sufficient height and design to ensure efficient combustion and to maintain ground level concentrations below NWT air quality standards.
- AEUB Guide 60 – Upstream Petroleum Industry Flaring Guide will be adhered to during well evaluations.
- Only the amount of gas required to accurately assess the technical and economic validity of each well will be flared.

Wildlife

- All efforts will be made to reduce contact with wildlife and not restrict wildlife movements.
- Work crews will be instructed not to harass wildlife in any manner.
- Firearms are not permitted on-site unless authorized by the GNWT for personal safety reasons.
- No dogs will be allowed.
- No feeding, hunting or harassment of wildlife will be tolerated.
- All garbage will be collected and stored properly so as not to attract nuisance animals such as wolverines or fox.
- Food waste will be placed in secured containers that will be either transported to an approved disposal location or incinerated daily on-site.
- Kitchen sumps will be treated with lye or lime to render them unattractive to scavenging wildlife species such as wolverines and wolves.
- Safety in Bear Country practices will be followed in the event that bears are encountered. GNWT bear safety literature will be distributed to development personnel.
- In the event that a bear den is encountered, the appropriate Resources, Wildlife and Economic Development (RWED) Renewable Resources Officer will be notified.
- Drivers will be instructed to maintain safe and appropriate speeds and to be aware of potential wildlife encounters on roads.
- Drivers will not herd or chase animals down the road and will be instructed to stop and turn the headlights off for a moment to allow the animals to disperse off the road.
- Snow windrows will be created adjacent to the road corridors during the construction and operation phases. The windrows will have gaps (8 m) at regular intervals (every 300 to 500 m) to allow animal movement and to provide escape routes off the roads.

Land and Resource Use

- All crews will respect traditional areas.
- Every effort will be made to avoid destroying traps or snares during construction of access routes.
- Trappers that have set lines in the area will be contacted prior to Paramount working in an area.
- If trap lines are affected by the development, the trappers will be compensated for any demonstrable loss.
- Snowmobile trails and game trails will not be blocked.
- Activity will be restricted to within approved leases and rights-of-way.

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- Paramount will meet with the trappers identified by the Ka'a'Gee Tu First Nation.

Socio-Economics

- Northern businesses will be contracted to provide goods and services whenever possible on the basis of availability, reliability, qualified personnel and cost competitiveness. Paramount will make every reasonable effort to notify local communities and companies about opportunities.
- The names of successful contractors will be published in the Project Updates and distributed for the benefit of those interested in employment and sub-contracting opportunities.
- Successful contractors will be required to outline in their bid documents their hiring strategy for local communities and describe their contribution to the communities.
- The number of jobs provided to northerners, the number of contracts awarded to northern businesses and the total dollar value of these contracts will be tracked to ensure that local and regional skills are recognized and retained for future consideration.
- The primary contractors will adhere to the terms of the Benefits Plan.

Water Source Location

- Vehicles and heavy machinery will not be refueled within 100 m of the water source and vehicles will be routinely checked for oil and fuel leaks. Absorbent pads and/or socks will be readily available to pick up any spilled fuel or lubricant.
- It will be prohibited to deposit any deleterious materials on the ice or in the water of a watercourse or water body.
- At no time will any sump fluid, treated or otherwise, be discharged to surface waters.
- Water usage and withdrawal will be staggered through the winter as the wells are drilled.
- Water pumps with intake screens of 5 mm will be used to prevent potential entrainment of over-wintering fish.
- Should any soil or other materials be inadvertently introduced into the watercourse or water body, they will be removed as soon as possible.
- Equipment operators will be careful to avoid gouging or otherwise disturbing banks or lake/stream bottoms.
- If water wells are used for drilling water, care will be taken to ensure water withdrawal is completed at a rate to protect water well integrity.

Remote Sumps

- Cleared material will be stockpiled for the duration of the drilling operations and utilized for roll back over the site upon sump closure.
- If the site soil conditions at either site are not suitable, alternate remote sump locations will be evaluated and determined in consultation with the local land use inspector.
- Prior to sump excavation, the organic material and topsoil horizons will be stripped from the sump location and stored in a pile or windrow.
- The underlying subsoils will be excavated and stored in a spoil pile but kept separate from the previously windrowed/piled organic material.
- If the subsoil is pervious, the sump will be sealed with bentonite or other liner prior to use.
- Sumps will be restored in a manner suitable to INAC using the standard mix, bury and cover method.
- Sump edges will be overlapped during backfill operations.
- Before backfilling, any snow cover on the sump surface and salvaged pile materials will be removed to the extent feasible.
- Backfill material will be compacted during each lift replacement and a cap 1 to 1.5 m in height will be created over the sump.
- The sump locations will be re-contoured, as necessary. This will include rolling back any salvaged slash

or organic debris.

- Remedial seeding will occur if required.
- Site visits will occur to evaluate reclamation work and implement any additional mitigation measures.

Borrow Pits

- Borrow pits will be re-contoured and/or terraced as necessary.
- All cuts and fills will be backsloped to a slope ratio of not less than 3:1.
- Slash roll back and re-seeding would occur as for the sumps.

Spills

- Fuel tanks will have secondary containment.
- Waste disposal bags and spill kits will be in the area and readily accessible.
- Any spills will be evaluated and appropriate remedial measures implemented.
- The spill area will be restored in a manner suitable to INAC and other relevant regulatory agencies.

Attachment 2 – Recommendations Made by the Review Board and other Reviewers

Review Board

- Paramount should continue to closely consult and work with the potentially impacted communities to ensure that potential impacts are minimized.
- The MVLWB should require a well site layout for each well prior to Paramount clearing any land for the well drilling activities. This layout should demonstrate how Paramount is complying with applicable safety regulations and should also demonstrate how Paramount is taking into consideration the principles of minimizing environmental impacts and employing land use efficiency.
- If the INAC Benefits Plan does not adequately address the issue of trapper compensation, the GNWT should consider assisting trappers with their compensation concerns.

GNWT

- Paramount should provide a site-specific spill contingency plan.
- Paramount should obtain a recent gas analysis to verify the amount of H₂S that will be flared. If the H₂S content of the gas is found to exceed 50 moles of H₂S per kilomole of gas, then Paramount should be required to suspend operations and revise the air quality modeling. The analysis conducted should be supplied to the MVLWB and the GNWT.
- If the flaring activities are demonstrated to be having an impact on the environment or if a valid concern with flaring is raised, Paramount should install air monitoring equipment to record contaminant deposition rates and ambient air quality.
- The report that Paramount will prepare to track community economic benefits should be provided to the GNWT.
- The GNWT should be provided with a copy of Paramount's revegetation assessment.
- Paramount should undertake proactive abandonment and restoration.
- Paramount should adhere to AEUB Guides 50 and 58.

DFO

- No refueling should be allowed within 100 metres of a water body.
- A minimum 100 m buffer between camps and watercourses should be maintained.
- Drill cuttings and associated wastes should be disposed of in such a way that they do not enter any water body.
- Fuel caches and sumps are to be located at least 30 metres from the high water mark of any water body and bermed or otherwise contained to ensure that these substances do not enter any water body.
- The water level in Lake UNL-1 should not be lowered by more than 2 cm.
- Paramount should monitor the rehabilitation of disturbed streambeds to ensure that reclamation measures such as revegetation and bank stabilization are effective.

KTFN

- Paramount should develop a system for traditional land users to report impacts on wildlife due to Paramount's or its contractor's employees.