

CEAA SCREENING FORM
Department of Indian Affairs and Northern Development (DIAND) /
National Energy Board (NEB)

1. Public Registry Required Information

Applicant: Petro-Canada, Calgary, Alberta
John Kerkhoven, Tel: 403-296-6345

FEAI Number (Reference Number) : 34275 (NEB RA # 490)

Subject Descriptors: Oil and Gas

Alias Project Title: Nuna Winter 2002/2003 Drilling Program

Lead RA and Screening Division: NEB

RA Contact: NEB, Laura Van Ham, Tel: 403-299-2769
DIAND Water Resources for NWT Water Board
Greg Cook, Tel: 867-669-2656
DIAND North Mackenzie District, Rob Walker, Tel: 867-777-5968

Lead RA Trigger Types: CEAA Law List Regulations; Inclusion List Regulations

Other Screening Trigger Types: Inuvialuit Final Agreement

EA Start Date: 21 August 2002 (NEB CEAA s.5 notification and scope)

EA Type: Screening

Physical Activity as identified from Inclusion List: Water use, land use, oil and gas operations

Physical Work Being Assessed: N/A

Phase of Project / Primary Undertaking: Access/lease construction; drilling operation; drilling waste disposal; camp operations (water use, wastewater discharge)

Multiple Activities: ☐ Yes ☒ No Indicate One: ☐

Project Category Code: Point Linear Areal (Circle one)

Geographic Place Name: Inuvik, Northwest Territory

EA Determination: 20-1-a

EA Determination Date: 10 October 2002

Estimated Follow-up program termination date: Summer 2004 (Petro-Canada, DIAND Land Use Inspector)

EA Terminated: No

2. General File Information

NWT Water Board File Number: N7L1-1788
DIAND Land Use Permit Number: N2002A0036
NEB File Number: WID # to be assigned

Type of Applications: New water licence; new land use permit; new operations authorization

Present licence/permit/lease number: N/A

Proposed Date of Activity: October 2002 to April 2003

Other RAs or Screening Divisions: Provided in Appendix D, "CEAA EA Coordination" - joint screening is underway

Other RA Types of Approval: Provided in Appendix D, "CEAA EA Coordination"

Project File Locations: NEB (Calgary); DIAND Water Resources Division for NWT Water Board (Yellowknife); DIAND North Mackenzie District (Inuvik)

DIAND District: North Mackenzie, Inuvik

3. Proponent

Petro Canada
Calgary AB

Type of Proponent: Private industry

4. Project Location (Figure 1, Attachment 1)

Topographic Map Sheet Number: 107C

Latitude / Longitude: Nuna #1 69°09.57'N - 133°20.91'W
Nuna #2 69°05.28'N - 133°20.42'W
Nuna #3 69°07.33'N - 133°17.71'W

Watershed: Mackenzie River

Street Name: N/A

Surrounding Land Status: Crown and Inuvialuit 7(1)(b) lands

Special Designation: Nil (in the vicinity of lands designated under the Community Conservation Plans)

5. Project Description

Proposed Project and Schedule:

Petro-Canada is proposing to drill one or two new exploratory wells selected from three potential locations within EL 406. Depending on final site selection, the well(s) may be drilled on either Crown or Inuvialuit 7(1)(b) lands. The final site selection will occur in October 2003. For the purpose of the CEAA EA, prospect areas, within which the final well site(s) will be located, were identified and evaluated.

Petro-Canada proposes the following schedule:

- ice access and lease construction in October to December 2002;
- mobilization and drilling at first well location in December 2002 to February 2003;
- pending results of first well, mobilization and drilling of second well in February to April 2003;
- possibility for testing and flaring;
- upon completion of the drilling program, the well(s) will be capped and temporarily or permanently abandoned;
- final clean-up is proposed for March and April 2003 and following summer 2003 melt of access and lease; and
- at a minimum, an electromagnetic survey of the sump will be conducted in summer 2004.

Water Use / Waste Disposal:

Petro-Canada states that the project would entail:

- access and wellsite(s) construction - water withdrawal from various lakes and the Mackenzie River to a maximum of 1,000m³/day;
- drilling and camp - water withdrawal likely from either lake #42 and/or #34 to a maximum of 1,000m³/day;
- screening of water intake hoses to prevent impingement or entrainment of fish;
- 60 to 80 person Arctic class Akita camp for drilling; Swimming Point for logistics and construction activities base;
- onsite treatment of rig camp wastewater to achieve water licence criteria for land disposal with a contingency to use a camp sump;
- daily incineration of solid refuse and transport of waste ash to Inuvik for disposal at the landfill site;
- construction of a 20 m wide x 60 m long x 5.4 m deep (within 30 m wide x 70 m long sump area) sump for drilling waste disposal; anticipate 1 m depth of drilling waste and 2.4 m depth freeboard and 2 m contingency;
- use of mix/bury/cover strategy for sump abandonment with sump contents at least 1.2 m below the active layer and backfill cover over the sump providing at least 2 m of overlap on all sides.

Land Use / Fuel Storage / Clean-up:

Land use requirements include:

- 10 km x 20 m overland access (total of 45.2 km of access, 35.2 km of which are proposed to be over waterbodies);
- if ice formation along access is delayed by weather, a trail with a maximum width of 10 m will be used around the perimeter of lakes to allow for safe movement of heavy equipment;
- 150 m x 150 m rig pad (with minimum 40 cm thick ice pad);
- 100 m x 80 m camp pad;
- 50 m x 50 m fuel storage pad;
- 30 m x 70 m drilling waste disposal sump area; and
- 30 m x 30 m detached helipad.

Access and other land use activities listed above will be constructed as follows:

- construction will begin when ground surface is frozen and has adequate snow cover;
- vegetation clearing, if required, will entail cutting and spreading of willows evenly across the site;
- a tracked machine will pull a rubber-tired drag over the surface and the area will be flooded;
- additional snow will be collected from either snow traps or lakes, as required;

- construction of snow and/or ice ramps where slopes and high banks hinder access;
- criteria for sump site selection include,
 - flat or gently sloping terrain with good surface drainage,
 - minimum 100 m from permanent waterbodies,
 - not located near ephemeral drainages,
 - consideration of local snow accumulation patterns and effect on thermal conditions (i.e., site will not be a snow trap),
 - avoidance of areas with a high ground ice content,
- the proposed sump location will be tested and as such refined, as necessary, using a drill to identify problem areas such as large ice lenses and gravel and obtaining measurements of permafrost temperature;
- the drilling waste disposal sump will be blasted and excavated with the excavator and the D7R, the spoil pile will be placed around the perimeter; anticipate 1 m depth of drilling waste and 2.4 m depth freeboard and 2 m contingency; and
- use of mix/bury/cover strategy for sump abandonment with sump contents at least 1.2 m below the active layer and backfill cover over the sump providing at least 2 m of overlap on all sides.

In addition to above land uses, approximately 35.2 km of 50 m wide access will be constructed over waterbodies and a 500 m long x 60 m wide airstrip(s) will be constructed on a lake(s) in vicinity of the well location(s). Petro-Canada proposes to use continuous ice profiling to ensure ice thickness is adequate to deploy equipment.

Fuel storage will entail a total of 2.1 million litres of fuel to support the drilling/construction/service rig activities, including:

- fuel storage at the Swimming Point tank farm;
- early season storage of one 3,785 litre double-walled Enviro-Tank of diesel at Petro-Canada's proposed staging area on a large, high gravel bar approximately 4 km northeast of Swimming Point to be advanced with construction; and
- four 63,595 litre tanks of diesel stored at the rig site.

Clean-up will include all equipment, survey stakes and construction debris associated with operations.

Drilling Operations:

Since water sensitive formations (i.e., containing hydratable shales and clays) are present, Petro-Canada proposes to use a KCL (potassium chloride) drilling mud system, a mixture of potassium chloride, bentonite and XC polymer to stabilize the wellbore. The KCL system, along with a mud cooler and a refrigerated conductor pipe, would also allow the mud temperature to be maintained at about -1.5 °C to protect permafrost and reduce the possibility of liberating methane gas from gas hydrates (water-methane ice). Along with stabilizing the wellbore, Petro-Canada proposes to use techniques such as centrifuging the mud to minimize the volume of drilling waste.

Testing for the presence of hydrocarbons may result in the production of gas and fluids. Any produced fluids will be either:

- burned on the flare stack; or
- burned with the aid of an incinerator; or
- re-injected back into the well bore (NEB approval required); or
- off-site disposal.

Upon completion of the drilling program, the well would be capped and suspended or abandoned. A wellhead would be the only planned permanent structure.

Accidents and Malfunctions: Unanticipated releases of mechanical fluids, fuel or hydrocarbons could contaminate soil, water or the atmosphere. Potential accidents and malfunctions that might adversely effect the environment include:

- hydraulic oil leaks from the drilling rig accumulator unit (functions with well blowout preventors);

- spillage of glycol from the mud cooler exchanger element;
- fuel or fluid leaks or spills if vehicles break through ice on a lake or channel, spills from contained tanks and spills during fueling;
- well kicks or blowouts of drilling fluids, sand or sediment, or hydrocarbon gases or fluid; and
- spillage of wastewater from a waste treatment system malfunction or discharge of improperly treated/tested wastewater.

Information Sources Used:

- ☒ Other government data
- ☐ Historical maps
- ☐ Scientific reports
- ☒ Project Description for EISC

- ☒ CEAA public registry system information
- ☐ Contour maps
- ☒ Other: application & additional company information
- ☒ Oil and gas water licence questionnaire

6.a) Description of Environment

Inuvialuit Environmental & Geotechnical Inc. (IEG Inc.), on behalf of Petro-Canada, provided a description¹ of the environment for the project area based on existing literature, site reconnaissance, and communications with local experts, regulatory agencies, and professional biologists. The following description was extracted from the project description.

The proposed project is located in the Tuktoyaktuk Coastal Plain Ecoregion of the Southern Arctic Ecozone. The landscape consists of broadly rolling uplands, generally 30 m above sea level, strewn with innumerable shallow lakes and ponds. The Husky Lakes estuary is located approximately 5 km from the south most potential drilling prospect area. Lakes tend to remain ice-covered for around 250 days per year. Break-up is caused by melting rather than flooding of the ice as in the Mackenzie Delta. The region is underlain by continuous permafrost with presence of ice veins, lenses, wedges, massive ice and pingos. Tundra upland soils support tundra vegetation that provides wildlife habitat and insulative properties that limit the degradation of permafrost.

The mean annual temperature is approximately -11.5C with a summer mean of 4.5C and a winter mean of -26.5C. Mean annual precipitation is 125-200 ml, primarily as rain. The most common visual obstructions in the winter are steam fog, ice crystal haze, blowing snow and whiteouts.

The major vegetation community types are dwarf shrub-heath (77% of vegetated surface), tussock tundra (14%), sedge meadows (6%), and lake-edge communities (3%). The IEG Inc. created landscape classification identified the following landcover classes along the proposed access and well site(s): graminoid; sedge; tussock tundra; low birch / dwarf shrub; low willow alder; tall willow alder; conifer woodland; other terrestrial; and, ice, water & aquatic vegetation. The main terrestrial vegetation community in the local project area (two well sites buffered by 1 km and access road buffered by 50 m either side) is "low willow alder" followed by "low birch / dwarf shrub" and "sedge" landcover classes.

The wildlife species evaluated in the project description were selected based on their potential for overlap with the project timing and area, their importance to local subsistence harvest and recreational use, their identification as a research or management priority, and their identification by COSEWIC and include: arctic fox; caribou; grizzly bear; muskrat; red fox; wolf; wolverine.

¹ Inuvialuit Environmental & Geotechnical. 2002. Project Description for the Proposed Petro-Canada Nuna Winter 2002/2003 Drilling Program. Project#5292-02.

Bird species potentially encountered by primary project activities include: snowy owl, rock ptarmigan and willow ptarmigan. Migratory birds, including waterfowl and shorebirds, are unlikely to be encountered by the primary project activities due to the timing of their migrations (leave early September and return mid May).

Fish species of concern (i.e., because of sensitivity or subsistence importance) potentially inhabiting project area waterbodies include: arctic grayling; broad whitefish; burbot; inconnu; lake trout; lake whitefish; least cisco; northern pike; and, pacific herring.

Detail respecting the environment description presented above can be found in Section 11 of the project description.

6.b) Description of Socio-economic and Cultural Environment

The proposed project area is situated on or near thirteen Special Management Areas designated as Management Categories B and C, and adjacent to a Category D, as identified in Community Conservation Planning Areas for Aklavik, Inuvik, and Tuktoyaktuk. The conservation plans suggest that Category B lands and waters be managed so as to guarantee conservation of [cultural or renewable] resources, and Category C and D lands and waters be managed so as to guarantee the conservation of [cultural or renewable] resources.

The area is used for trapping, hunting, berry picking, recreation, and tourism including winter guided sport hunts, fishing and canoeing. No known heritage sites were identified along the proposed access routes or on the proposed well site locations.

Information Sources Used:

<input type="checkbox"/> Historical Maps (expired permits and licences)	<input type="checkbox"/> Indian Land Registry
<input type="checkbox"/> Running Maps (current permits and licences)	<input type="checkbox"/> Land Transition Management Style
<input type="checkbox"/> Interference Maps (other land dispositions)	<input checked="" type="checkbox"/> Other: <u>application & additional company information</u>
<input type="checkbox"/> Public Registry System	<input checked="" type="checkbox"/> Project Description for EISC
<input type="checkbox"/> GIS	<input type="checkbox"/> Oil and gas water licence questionnaire

7. Consultation on Project

Petro-Canada initiated public consultation with the communities and regional organizations potentially affected by the proposed project in June 2002 and informed government representatives of project details. Community, stakeholder and government meetings took place in July 2002. The consultation was intended to present the proposed project to various groups, to obtain information on the area from local residents and to hear concerns raised during project planning. Issues raised during the community consultation meetings are provided in Section 16 of the project description.

Responsible Authorities under the CEAA and Inuvialuit organizations responsible for the Inuvialuit Environmental Impact Screening and Review process under the *Inuvialuit Final Agreement* also received feedback from government and non-government organizations with respect to the proposed project. A summary of contacts is provided below. Comments and recommendations received from government organizations with respect to the project are provided, in summary, in section 8.b).

Federal Government	Contact Person Notified	Dates Comments Received
DIAND		
Water Resources	✓ D. Milburn	-14 August 2002 (water licence request for review and comments);
	G. Cook	-22 August 2002 (CEAA s.5 response)
	R. Jenkins	-28 August 2002
	J. Sanderson	-16 September 2002
Geology		
Lands	✓ R. Cockney	-13 August 2002 (land use permit request for comments);
	R. Walker	-26 August 2002 (CEAA s.5 response)
Minerals		
Ec. Dev.		
Environment	✓ M. Tapsell	-13 September 2002
I&I		
D.M.		
R.M.O./DWRO	✓ S. Gallupe	-13 September 2002
DFO/CCG	✓ P. Cott	-28 August 2002 (comments for CEAA screening);
	B. Hanna	-19 September 2002 (CEAA s.5 response);
		-27 August 2002 (Letter of Advice to Petro-Canada)
DOE	✓ P. Pacholek	-3 September 2002 (comments and recommendations for CEAA screening);
		-19 September 2002 (CEAA s. 5 response)
		-4 October 2002 (comments on Petro-Canada response to Information Request No. 1)
Health Canada	✓ J. Sandhu	-30 August 2002 (CEAA s.5 response)
DOT		
NRCan	✓ I. Lamirande	-23 August 2002 (CEAA s.5 response)
NEB	✓ L. Van Ham	-21 August 2002 (CEAA s. 5 notification and scope; general operating conditions)
		-9 September 2002 (Information Request No. 1 to Petro-Canada)
CEA Agency	✓ P. Scott	

N.W.T. Government	Contact Person Notified	Dates Comments Received
RWED	✓ J. McMullen	
Health		
Transportation		
Tourism		
MACA		
EM&PR		
PWNHC		
Aboriginal Groups	Contact Person Notified	Dates Comments Received
EISC	✓ L.Graf	12 September 2002 (EISC screening decision)
Inuvik HTC		
FJMC	✓ R. Bell	3 September 2002 (provided to EISC)
Tuk HTC	✓ P. Voudrach	11 September 2002 letter no concerns
Public/Interested Parties/Other	Contact Person Notified	Dates Comments Received

The Fisheries Joint Management Committee requested that Petro-Canada consider the importance of "fish lakes" identified by the HTC when selecting and using water source lakes. Summaries of comments and recommendations provided by government organizations are included in Section 9.b Reviewers Recommended Mitigation Measures.

The complete records of public submissions to the EISC and the NEB and Petro-Canada's consultation regarding the proposed project are available in the CEAA public registry file at the NEB.

8.a) Description of Effects (Tables A and B), Mitigation, Residual Effects and Significance.

Petro-Canada notes that the following environmental components could potentially be adversely affected by the proposed project activities, including accidents and malfunctions: permafrost and soils; aquatic resources; vegetation; wildlife; and, cultural resources. In addition, the environment has the potential to affect the project with respect to: ice formation; sensitive terrain; snow conditions; early ice break-up. Cumulative effects were evaluated for the following valued ecosystem components (VECs): aquatic resources; vegetation; and, wildlife and habitat.

Petro-Canada indicates that implementation of mitigation measures outlined in the project description will be achieved through:

- project kick-off meeting with Petro-Canada representatives and operations personnel prior to construction;

- review and understanding of key documents and elements by appropriate personnel (i.e., project description, Table 21);
- meetings focused on environmental concerns that may be encountered during upcoming tasks;
- meetings with Environmental Monitor prior to start-up to explain operations and discuss environmental concerns;
- active role of Monitors in meetings, allowing communication of concerns and field observations;
- daily contact of project supervisor and Environmental Monitor;
- posting of environmental concern maps/diagrams in accessible locations;
- employment of qualified Environmental and Wildlife Monitors to ensure implementation of mitigation measures and identification and mitigation of environmental concerns that arise during project activities; and
- clear identification of project boundaries and sensitive areas by signage and/or flagging.

Effects of the Project:

Permafrost and Soils - Disturbance of soil or the insulating organic layer, including erosion and surface water ponding, could result in summer thermal degradation of permafrost or disturbance of the soil profile. The only planned disturbance to surface soil and organics are the excavation of the drilling waste, and if required, camp sumps and the drilling of the well bore. Environment Canada's letter dated 4 October 2002 identifies concerns regarding the proponent's ability to ensure the permanent integrity of sumps in the Mackenzie Delta. Petro-Canada proposes the following mitigation (see also Tables 20 and 21, Attachment 2):

- limit the dimensions of access and activity areas (e.g., well site, camp, sump, fuel storage, helipad) to that required to accommodate equipment and safe working conditions (Section 5);
- access and lease construction to minimize disturbance by heavy equipment and general vehicle traffic to underlying soil and permafrost (Section 5);
- use of a KCL drilling mud system (Section 5);
- application of appropriate drilling and, if used, camp waste disposal sump location selection criteria, construction and abandonment methods (Section 5);
- testing of drilling wastes at the sump prior to restoration of the site; and
- continued work with INAC, ILA, EC and the HTC's to develop a monitoring plan for the sumps; however, at a minimum, electromagnetic monitoring of the drilling waste disposal sump location, and remediation measures as appropriate, in the summer of 2004.

Petro-Canada's evaluation of the residual effects is provided in Tables 20 and 21 (Attachment 2). The RAs have considered Environment Canada's comments, in addition to other recent concerns regarding use of sumps, and adapted the recommended conditions of the regulatory approvals to further address potential environmental effects. However, even in the absence of more stringent regulatory approval conditions, the potential adverse environmental effect of the proposed sump is not considered significant. The RAs are of the view that provided the identified mitigative measures are implemented and the conditions of the regulatory approvals are adhered to, the proposed project is not likely to result in significant adverse effects to permafrost or soils.

Aquatic Resources - The proposed project could impact aquatic resources by removal of aquatic habitat due to water drawdown in lakes, erosion of streambanks and destabilization of slopes and introduction of sediments and/or pollutants to waterbodies. Environment Canada's letter dated 4 October 2002 identifies concerns regarding the proponent's ability to ensure the permanent integrity of sumps in the Mackenzie Delta. Petro-Canada proposes the following mitigation (see also Tables 20 and 21, Attachment 2):

- completion of volumetric calculations for each of the lakes identified for potential water withdrawal;
- evaluation of potential effects on overwintering fish populations based on volume calculations and proposed water withdrawal volumes;
- discussion with DFO regarding the use of identified waterbodies as water sources (propose to remove an insignificant (i.e., in terms of potential effect on fish populations) proportion of water from any lake;
- construction of snow and/or ice ramps at waterbody boundaries;

- fitting of all intake lines with screens of sufficient size to prevent impingement or entrainment of fish;
- use of secondary containment for storage tanks;
- sump construction on flat or gently sloping terrain in areas that promote surface drainage and are 100 m from permanent waterbodies and away from identifiable ephemeral drainages;
- implementation of emergency response measures for spills or deleterious substance release; and
- implementation of mitigation measures provided above for the site selection, construction and abandonment of sumps.

Petro-Canada's evaluation of the residual effects is provided in Tables 20 and 21 (Attachment 2). The RAs have considered Environment Canada's comments, in addition to other recent concerns regarding use of sumps, and adapted the recommended conditions of the regulatory approvals to further address potential environmental effects. However, even in the absence of more stringent regulatory approval conditions, the potential adverse environmental effect of the proposed sump is not considered significant. The RAs are of the view that provided the identified mitigative measures are implemented and the conditions of the regulatory approvals are adhered to, the proposed project is not likely to result in significant adverse effects to aquatic resources.

Vegetation - Clearing of vegetation for construction of access and other surface leases will primarily result in the loss of the above ground, woody vegetation. There is potential for loss of root systems and herbaceous layer communities if the organic layer is disturbed through clearing or access/surface lease preparation and use. The ice layer constructed to mitigate for effects on vegetation and organic layer will result in delayed melt-out, and as such vegetation growth, during the following growth seasons.

The IEG Inc. landscape classification was used to identify vegetation communities underlying the proposed access road and two well sites (direct project footprint) and percent of respective landcover classes affected with respect to a Local Area (two well sites and access road plus 1 km) and a Regional Area (area occupied by oil and gas leases in the Mackenzie Delta). On the Local Area scale, the direct project footprint potentially effects $\geq 10\%$ of four landcover classes including:

- Graminoid - potentially effects 14% of this class found in the Local Area;
- Ice, Water & Aquatic Vegetation - potentially effects 13.9% of this class found in the Local Area;
- Tussock Tundra - potentially effects 10.8% of this class found in the Local Area; and
- Tall Willow Alder - potentially effects 10% of this class found in the Local Area.

On a Regional Area scale, less than 0.01% of all landcover classes are potentially effected by the direct project footprint.

Petro-Canada proposes the following mitigation (see also Tables 20 and 21, Attachment 2):

- vegetation clearing, compression or destruction of the peat layer, or the exposure of mineral soils will be minimized by proposed project timing, location and equipment including,
 - winter timing to make use of frozen ground condition,
 - minimized length of overland access (i.e., maximize use of waterbodies),
 - project location in area of low growing vegetation cover,
 - surface preparation measures to avoid disturbance to vegetation and organic layer (Section 5),
 - avoidance of sensitive areas such as steep slopes, and
- if vegetation clearing is required, cut material will be spread evenly over the site and frozen into place during access construction.

Petro-Canada's evaluation of the residual effects is provided in Tables 20 and 21 (Attachment 2). The RAs are of the view that provided the identified mitigative measures are implemented and the conditions of the regulatory approvals are adhered to, the proposed project is not likely to result in significant adverse effects to vegetation.

Wildlife - Petro-Canada anticipates that the effects of this project on wildlife will be limited to temporary habitat alteration (i.e., vegetation clearing will remove some forage), sensory disturbance due to noise (i.e., drilling operation and associated traffic), increased potential for mortality (i.e., wildlife/traffic collisions) and attraction of nuisance wildlife to camp (i.e., waste management). Wildlife species evaluated by Petro-Canada include: arctic fox; caribou; grizzly bear; muskrat; red fox; wolf; wolverine; migratory birds; and, ptarmigan.

Petro-Canada proposes the following mitigation (see also Tables 20 and 21, Attachment 2):

- Petro-Canada and contractors will abide by speed limits and travel frequency will be limited to the extent possible;
- camp wastes will be properly contained and incinerated daily and wildlife will not be fed;
- mitigation measures outlined for vegetation and soils will also mitigate potential effects on wildlife habitat;
- project timing results in avoidance of wildlife interactions during some critical time periods such as migration and breeding;
- known bear dens will be avoided by a 50 m setback at all times; if a bear is disturbed out of its den, a 300 m to 500 m pullback of construction activity will occur to allow the bear to return;
- avoidance of den locations for other species identified by Wildlife Monitor (e.g., red fox, arctic fox, wolverine);
- mitigation measures to protect aquatic resources will also minimize effects of water withdrawal on water dependent species (e.g., muskrat); and
- Environmental and Wildlife monitors will be employed to identify any wildlife concerns and work with Petro-Canada to ensure mitigation.

Petro-Canada's evaluation of the residual effects is provided in Tables 20 and 21 (Attachment 2). The RAs are of the view that provided the identified mitigative measures are implemented and the conditions of the regulatory approvals are adhered to, the proposed project is not likely to result in significant adverse effects to wildlife.

Cultural Resources - Petro-Canada indicates that the proposed project area offers limited potential for encountering heritage resources and that no heritage sites were identified on the direct project footprint. In the event sites are discovered during prior to or during project activities, Petro-Canada proposes the following mitigation (see also Tables 20 and 21, Attachment 2):

- 100 m and 30 m buffer between the direct project footprint and heritage sites on Inuvialuit owned and Crown land respectively; and
- suspension of work or activity contact appropriate agencies in the event of a discovery.

Petro-Canada's evaluation of the residual effects is provided in Tables 20 and 21 (Attachment 2). The RAs are of the view that provided the identified mitigative measures are implemented and the conditions of the regulatory approvals are adhered to, the proposed project is not likely to result in significant adverse effects to cultural resources.

Traditional and Other Land Uses - Petro-Canada identifies the potential for the proposed project to affect traditional and other land uses occurring in the project area including: hunting; trapping; fishing; recreation; winter guided sport hunting; and, cabin users. Petro-Canada proposes the following mitigation (see also Tables 20 and 21, Attachment 2):

- undertaken and ongoing consultation with local communities, local Hunters and Trappers Committees and nearby cabin owners to make land users aware of proposed activities, to identify concerns and propose mitigation;
- placement of construction signs on access routes; and
- maintenance of snowmobile trails across access routes.

Petro-Canada's evaluation of the residual effects is provided in Tables 20 and 21 (Attachment 2). The RAs are of the view that provided the identified mitigative measures are implemented and the conditions of the regulatory approvals are adhered to, the proposed project is not likely to result in significant adverse effects to traditional and other land

uses.

Effects of Accidents and Malfunctions:

Petro-Canada notes the following potential effects of accidents and malfunctions:

- release of fuels and other fluids into the environment (e.g., hydraulic oil, glycol, fuel);
- well kicks and blowouts; and
- wastewater treatment malfunction.

Petro-Canada proposes the following mitigation:

- regular and structured procedural checks of the drilling rig accumulator unit be a designated crew member to ensure proper functioning (i.e., no hydraulic fluid leak);
- addition of a glycol reservoir storage component as part of the mud cooler unit to reduce the need for manual fill of glycol on site;
- incorporation of a false floor in the mud cooler to contain errant glycol;
- use of a new mud cooler and diligent maintenance program;
- ice profiling and maximum load size restrictions to ensure safe passage of vehicles and equipment over waterbodies;
- secondary containment, to 110% of the capacity of each tank, for all fuel storage tanks;
- elevated level of well control through premium technology, equipment and key personnel to prevent well kicks and blowouts (e.g., maintenance of constant hydrostatic well balance, quadruple redundant blowout preventor, automatic well choking technology);
- the wastewater system will be managed by a one person, to lessen the chance for accident or malfunctions;
- use of a camp sump as a contingency in the event the wastewater system malfunctions;
- in the event the camp sump contingency is unavailable, wastewater will be trucked to and disposed of in the nearest municipal wastewater treatment system; and
- implementation of the Emergency Response Plan in the event of an accident or malfunction.

The RAs are of the view that provided the identified mitigative measures, and the Emergency Response Plan as required, are implemented and the conditions of the regulatory approvals are adhered to, the accidents and malfunctions associated with the proposed project are not likely to result in significant adverse effects to the environment.

Effects of the Environment:

Petro-Canada notes that potential effects of the environment on the project include:

- delayed ice formation resulting in late project start-up and advanced precaution measures;
- sensitive terrain in the project area that may impact project planning;
- drainage from areas of deep snow accumulation across project leases;
- little or no snow resulting in exposure of portions of the lease site due to wind or delaying project operations
- drifting snow hampering containment and collection of garbage; and
- early break-up.

Petro-Canada proposes the following mitigation:

- electronic and physical ice profiling would be used throughout the program to ensure safe ice conditions
- flooding will be carried out as needed to ensure thickening of ice on access routes and airstrips;
- sensitive terrain (slopes, cabins, historic sites, dens sites, etc.) was avoided through route and well site selection and mitigation measures are in place in the event such terrain features are discovered during project activities;
- where unavoidable, steep slopes and banks will be accessed by building up snow/ice ramps to prevent disturbance or erosion;
- project planning to avoid siting well sites downhill from deep snow accumulation areas;

- access and lease preparation methods to make use of existing snow cover (Section 5);
- use of snow fences and/or hauling of snow from lake surfaces to cover lease areas in situations of inadequate snow cover;
- removal of all equipment and materials immediately following project completion;
- aerial survey of the program area following completion to pick up waste and debris left behind; and
- if early break-up occurs, the rig will be demobilized and testing will be completed the following season.

Cumulative Effects:

Petro-Canada states that the goal of the cumulative effects assessment is to identify, as best as possible, the additive contribution of a project to past, existent or reasonably foreseeable projects to determine the overall effect on valued ecosystem components (VECs). Petro-Canada evaluated cumulative effects for the following VECs:

- aquatic resources;
- vegetation; and
- wildlife and habitat.

Petro-Canada's VEC selection was based on:

- the potential for project effects on plant, fish and wildlife to affect traditional lifestyle and subsistence economy of the Inuvialuit;
- community input; and
- local traditional ecological knowledge.

Petro-Canada delineated the spatial boundary as the area occupied by lease holdings in the Mackenzie Delta (Regional Area), an area that encompasses most of the past, current and imminent project activities spanning areas required by populations of wide ranging species.

The temporal boundary was selected by considering past, current and reasonably foreseeable projects and activities that exert residual effects on identified VECs.

Aquatic Resources - Residual effects of the project that have the potential to overlap with other project effects include: disturbance to bed and banks and resultant sedimentation of waterbodies; release of other deleterious substances to waterbodies; and, drawdown of waterbodies used as water sources.

With implementation of Petro-Canada's mitigative measures for disturbance to waterbody bed and banks and emergency response measures for release of deleterious substances, and considering the low density of projects potentially contributing to such effects, the incremental addition of residual project effects is not considered to be significant.

There is potential for multiple project requirements for water withdrawal from Petro-Canada's proposed water source waterbodies. Individual project planning for water withdrawal (use of river channels where possible, identification of appropriate source lakes, volume withdrawal control, appropriate screening of intake hoses), consultations with DFO, and operator commitments to share access in the region will mitigate for cumulative effects. Given mentioned mitigation, adherence to the conditions of the regulatory approvals, as well as the anticipated low density of projects using Petro-Canada's proposed source waterbodies, cumulative effects are not considered to be significant.

Vegetation - Residual effects of the project that have the potential to overlap with other project effects include the area of the direct project footprint. Calculations of the percent of Petro-Canada's project contribution to the cumulative direct project footprint of recent proposed exploration activity (i.e., last three exploration seasons, 1999 to 2002) in the Regional Area indicates that Petro-Canada's program proportional contributions to effects on vegetative landcover classes are less than 0.006%. The cumulative direct project footprint does not exceed 2.33% of any

particular landcover class in the Regional Area. In addition, direct project footprint does not reflect that for most recent project activities the vegetation and underlying organic layer remains intact under the direct project footprint. Considering this, Petro-Canada's proposed mitigation measures for minimizing impacts to vegetation, adherence to the conditions of the regulatory approvals, and the relative percentage of vegetation landcover classes effected, cumulative effects on vegetation are not considered significant.

Wildlife and Habitat - Potential cumulative effects on wildlife could result from Petro-Canada's project overlapping with other oil and gas projects, local vehicle traffic and activity, and include: sensory disturbance (in or out of dens); increase in winter road network available to local hunters; increased mortality by vehicle/wildlife collisions; changes to prey species distribution caused by project effects; and effects on vegetation that also relate to wildlife habitat potential. However, given Petro-Canada's specific project mitigation for effects on wildlife outlined above, adherence to the conditions of the regulatory approvals, and the anticipated low density of other projects and activity effects overlapping with Petro-Canada's project, cumulative effects are not considered to be significant.

8.b) Reviewers' Comments and Recommended Mitigation Measures

The following is a summary of some of the comments recommended mitigation measures provided by reviewers. For the complete and unabridged recommendations, refer to the information on the public registry.

Department of Fisheries and Oceans:

Petro-Canada has committed to implementing DFO's recommended mitigation measures outlined in a Letter of Advice and summarized in the following:

- Access route construction should minimize unnecessary clearing of vegetation and soil compaction. Riparian vegetation provides cover and enhances bank stability.
- Water intakes should be properly screened with fine mesh of 2.54 mm to prevent the entrainment of fish. Refer to the DFO Protocol for Water Withdrawal for Oil & Gas Activities in the Northwest Territories as well as the Freshwater Intake End-of-Pipe Fish Screen Guideline (DFO, 1995) which is available upon request.
- "Mushroom shoes" or "boots" on the blades of vehicles, such as bulldozers, are recommended as a protective measure to minimize ground disturbance and erosion.
- Cutting of crossing approaches is not permitted unless approved in writing by DFO. Refer to the DFO Protocol for Temporary Winter Access Water Crossings for Oil & Gas Activities in the Northwest Territories.

Note: The use of material other than ice or snow to construct a temporary crossing-over of any ice-covered stream is prohibited under Section 11 of the Northwest Territories Fishery Regulations, unless authorized by a Fishery Officer.
- Winter crossings should not impede water flow and should be v-notched or otherwise removed prior to spring break-up. If winter crossings are not removed they have the potential to block fish passage often necessary to access spawning grounds.
- Reclamation activities should include bank stabilization and re-vegetation as required. This work should be completed prior to spring thaw.
- Depositing deleterious substances into fish bearing waters is prohibited as stated under subsection 36(3) of the *Fisheries Act*. The following additional mitigation measures are intended to prevent the deposition of deleterious substances and possible habitat disturbance or loss:
 - All activities including maintenance procedures and vehicular refueling should be controlled to prevent the entry of petroleum products, debris, slash, rubble, or other deleterious substances into the water.
 - All wastes, drill cuttings, sewage and wastewater containments, should be located a minimum of 100 metres from any water body including ephemeral drainages if possible, and be sufficiently bermed or otherwise contained to ensure that these substances do not enter any waterbody. Due to concerns with the potential for sump failures (e.g., resulting from permafrost degradation) DFO encourages alternate waste disposal methodologies.

- It states on page 11 of the project description that "if wastewater is not meeting criteria, chlorination will be used for treatment and subsequent dechlorination of the treated wastewater will be conducted before disposing to land." DFO strongly recommends against chlorination as a treatment option unless it can be ensured that the treated wastewater cannot enter a waterbody. Chlorine is very toxic to freshwater fish and a guideline of 0.5 micrograms per litre is recommended by CCME for the protection of aquatic life.
- Fuel storage should have secondary containment (such as doubled walled tanks, berms etc.) that is sufficient to ensure that fuel will not be able to enter any waterbody.
- No material should be left on the ice when there is the potential for that material to enter the water (i.e. spring break-up).
- A spill contingency plan should be made available to all persons required to work on site and followed in the event of a spill, and all spills of oil, fuel, or other deleterious material should be reported immediately to the 24-Hour Spill Line at (867) 920-8130.

Environment Canada:

Petro-Canada has committed to implementing EC's recommended mitigation measures summarized in the following (exceptions noted):

- Unless approved,, no deposition of deleterious substances into water is allowed.
- Waste tracking, or manifesting, should be implemented to ensure proper use, storage, and management of materials, which information is also needed by first responders in the event of an accident.
- The in ground drill sump or fuel caches are not to be located within the normal high water mark of any water body or drainage system.
- To minimize surface disturbance within continuous/discontinuous permafrost zones here, in ground sumps should be excavated deeper rather than wider with an adequate freeboard.
- Operators in the Delta should consider the closed loop drill system as an alternative option to sumps as this involves substituting a conventional drill sump (i.e., an unlined pit) with a series of storage tanks. Tanks preclude the need for constructing and reclaiming a pit, prevents releases drilling waste contaminants to soil and ground water, and results in more efficient use and reuse of drilling fluids. This is useful where low volumes of drill fluids are needed, or where the site lacks suitable subsoil to contain sump materials.

Note Exception: Petro-Canada has indicated that it will not utilize the closed loop drilling fluid system for the project.

- Winter stream crossings are to constructed entirely of ice/snow, and removed or notched prior to break up.
- To minimize linear disturbance and habitat fragmentation, the average width of the right of ways (ROWs) should be restricted.
- Existing lines and ROWs should be used where possible to reduce impacts and lessen the recovery period of disturbed areas.
- If clean up is planned for the summer months, it is recommended that this activity occur in August rather than July, to reduce potential disturbance to birds.
- The emergency response plan should be clear about whose responsibility it is to report spills.

Environment Canada (EC) also provided comments on Petro-Canada's response to Information Request No. 1, specifically related to the proposed in-ground sump method for drilling waste, and potentially camp waste, disposal. EC considers the Delta region of the Mackenzie River to be an area of high risk to the stability of any permanent infrastructure, including drilling and camp waste disposal sumps.

EC requested that proponents provide the following data with respect to the precise location selected for the sump:

- background information i.e. soil type, local geography, storm surge events, hydrological information, permafrost depth and temperatures, and active layer depth and temperatures along the centre line transect of the proposed sump and a transect to establish background conditions,

- sump closure report to include: waste manifest appropriate to establish a complete characterization of sump contents including toxicity and heavy metals; sump design and construction; operational procedures used; sampling locations; opening and closure conditions and start-up and completion dates,
- follow-up monitoring plans, i.e. electromagnetic survey schedules, mitigation measures for sump failure and proposed long term monitoring schedule.

With respect to criteria for determination of the suitability of the soil type and thermal conditions for the sump location, EC identifies several factors in addition to the criteria proposed by Petro-Canada (testing for large ice lenses, gravel and permafrost temperatures): active layer thickness; ice (water) content; permeability (natural and unfrozen state); permafrost thickness; hydrogeological conditions; snow cover/accumulation; vegetative cover; prevailing winds; drainage characteristics; topography; surface stagnant water; access to adequate capping material; flood events; and, susceptibility to erosion and/or slumping. With respect to these criteria, EC requests a written rationale defining the selection criteria for the use of an in-ground sump and the detailed life cycle analyses of proposed alternatives.

EC states that its support of sump construction is contingent upon being provided with qualified scientific data and certified engineering designs from the proponent demonstrating that:

- 1) there will be successful long term total containment of sump(s) contents,
- 2) sump(s) site selection will be appropriate,
- 3) design criteria is adequate and innovative,
- 4) the toxicological risk is eliminated or it can be demonstrated that the waste deposited into the sump(s) is non-deleterious,
- 5) the footprint is minimized, and
- 6) that design modifications demonstrate a full appreciation of infrastructure development in a "high risk" sensitive environment.
- 7) Petro-Canada's written declaration of acceptance of perpetual environmental and financial responsibility for all in ground sumps.

Department of Indian Affairs and Northern Development:

The following comments were prepared in response to Petro-Canada's water licence application:

- Support the company's plans to conduct site evaluations for drill waste sump placement, monitoring and testing sump contents prior to closure, however, all such results should be provided to regulatory agencies for evaluation, and sump surroundings should be restored physically should any evidence of failure be observed.
- A camp sump is proposed only as a contingency for waste water containment, but if only to be used in the short term at all, then perhaps other storage alternatives should be considered, e.g., holding tanks.
- Dechlorination is planned should the treatment system fail to meet licence criteria; however, there should be a further contingency developed should the company experience problems with the dechlorination system.
- In addition to double walled tanks for fuel storage, snow berms should be constructed around the tank to prevent migration of any spills.
- The emergency/contingency plan would benefit from the inclusion of environmental mapping of the project site, to improve implementation of response measures etc.
- District Inspector: the licence should require the submission of follow up monitoring data to show that the drill sump has a frozen core, and that conductivity readings are not elevated outside the sump cap area.
- All vehicles should be equipped with absorbent materials, drip trays, shovels, and disposal bags for handling any spills.
- A sump contents characterization, (i.e., total wastes) should be required prior to abandonment, as well as a toxicity assessment of their proposed drilling materials (either LC50 test or microtox, or both).
- No disposal of hydrocarbons is to be allowed into any sump.
- Total chlorides in the drilling sump must be less than 100,00 ppm before fresh water dilution treatment.
- All sump locations must be free of ice lenses and be constructed of impermeable materials.

- While waiting for the active layer to be frozen is important in protecting underlying vegetation, so is adequate snow cover; this should also be a condition to be met before construction will begin.
- The proponent has stated several times that it will minimize the overland ice road as this is the most significant impact of the project. However it also states that it will go around the lakes if the ice is not frozen enough to allow transport of trucks and equipment. As all cumulative impacts were assessed for this project using the over-water route and mitigation for vegetation disturbance is the use of over water access, the proponent should wait until sufficient ice has formed before beginning operations.
- There were also a number of community concerns raised regarding the footprint of the access route so it should be minimized as stated in the project's mitigative measures section (e.g., the overland widths are 20m while Chevron's overland roads have a width of only 15m.)
- There should be mitigative measures included to prevent spills from the mobile fuel tank (no waste management plan was included, although mentioned). Will the fuel storage at the rig site be bermed..if not, perhaps it should be?
- Is more than one airstrip really necessary...should minimize disturbance.
- Would trucking sewage to a townsite not be a better option than chlorinating and then dechlorinating?

DIAND land use permit recommended conditions are included in Attachment 3.

Government of Northwest Territories, Department of Resources, Wildlife and Economic Development:

- The proponent, during sump construction, should be required to remove the top layers of soil prior to blasting and excavation. This soil layer should be placed over the sump to enhance vegetation growth.
- Sumps should be built in low permeability soils to prevent seepage from the sump.
- The final well locations should be approved by the Board and the Inspector before drilling begins.
- Well testing and flaring must meet NWT standards.
- Drilling fluids should be tested to ensure the potential toxicity of the wastes has been assessed before being disposed of into the sump.
- The proponent should make every effort to reduce the amount of drilling fluids used in order to decrease the size of the sump.
- The proponent should access the well sites via existing trails where vegetation has been removed. If existing trails cannot be accessed, the proponent should avoid areas where vegetation will be disturbed.

Government of Northwest Territories, Health:

- Given the camp size proposed, compliance with the Revised Public Health Regulations of the Northwest Territories is expected.
- An environmental health inspection of camp facilities may occur sometime during the operating season.

9. Significance

After taking into account the above mitigation measures, are any of the adverse environmental effects significant?

☐ Yes ☒ No

If yes, identify which one(s) and proceed to 11; if no, proceed to #12

10. Likelihood of Occurrence

Of the identified adverse significant environmental effects in #10 are any likely to occur?

☐ Yes

☐ No

If yes, which one(s)?

Public consultation on screening report deemed necessary? ___ Yes X No
Deadline for comments on screening report N/A
Public Comments Received on Screening Report? ___ Yes X No

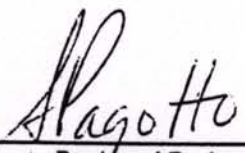
Remedial actions will be taken, in consultation with appropriate authorities, to correct any issues discovered during the Petro-Canada or regulator's inspections.

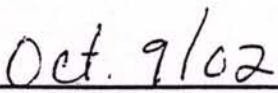
13.a) CEAA Determination and Authorization - NWT Water Board

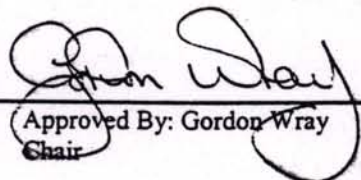
Determination:

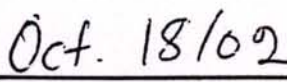
- ___ Section 20 (1)(a) - Project may proceed as it is not likely to cause significant adverse environmental effects.
- ___ Section 20 (1)(b) - Project may not proceed as it is likely to cause significant adverse environmental effects that cannot be justified.
- ___ Section 20 (1)(c)(i) - Project must be referred to the Minister of Environment as it is uncertain whether the project is likely to cause significant adverse environmental effects.
- ___ Section 20 (1)(c)(ii) - Project must be referred to the Minister of Environment as it is likely to cause significant adverse environmental effects.
- ___ Section 20 (1)(c)(iii) - Project must be referred to the Minister of Environment as public concerns warrant the reference.

Authorization:


Reviewed By (screener): Greg Cook
Environmental Assessment Coordinator


Date


Approved By: Gordon Wray
Chair


Date

13.b) CEAA Determination and Authorization - DIAND North Mackenzie District

Determination:

- ___ Section 20 (1)(a) - Project may proceed as it is not likely to cause significant adverse environmental effects.
- ___ Section 20 (1)(b) - Project may not proceed as it is likely to cause significant adverse environmental effects that cannot be justified.
- ___ Section 20 (1)(c)(i) - Project must be referred to the Minister of Environment as it is uncertain whether the project is likely to cause significant adverse environmental effects.
- ___ Section 20 (1)(c)(ii) - Project must be referred to the Minister of Environment as it is likely to cause significant adverse environmental effects.
- ___ Section 20 (1)(c)(iii) - Project must be referred to the Minister of Environment as public concerns warrant the reference.

Authorization:

Reviewed By (screener): Rob Walker
Resource Management Officer

Date

Approved By: Rudy Cockney
District Manager

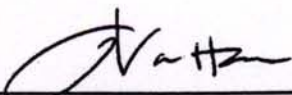
Date

13.c) CEEA Determination and Authorization - National Energy Board (Lead RA)

Determination:

- ☒ Section 20 (1)(a) - Project may proceed as it is not likely to cause significant adverse environmental effects.
☐ Section 20 (1)(b) - Project may not proceed as it is likely to cause significant adverse environmental effects that cannot be justified.
☐ Section 20 (1)(c)(i) - Project must be referred to the Minister of Environment as it is uncertain whether the project is likely to cause significant adverse environmental effects.
☐ Section 20 (1)(c)(ii) - Project must be referred to the Minister of Environment as it is likely to cause significant adverse environmental effects.
☐ Section 20 (1)(c)(iii) - Project must be referred to the Minister of Environment as public concerns warrant the reference.

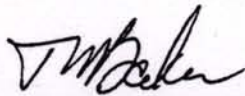
Authorization:



Prepared By (screener): Laura Van Ham, M.E.Des.
Environmental Specialist

23 October 2002

Date



Approved By: T. M. Baker
Chief Conservation Officer

23 October 2002

Date

Appendix A: Subject Descriptors

Choose from this list and insert as a "Subject Descriptor"

agriculture
buildings
communications
defence
☒ energy
forestry
☒ industry
inland waters
mining
oceans
☒ oil and gas
parks
transportation

Appendix B: Geographic Place Name

see list provided Inuvik

Appendix C: Screening Checklist and Cumulative Effects Checklist

see Tables A and B

Appendix D: CEAA EA Coordination

CEAA Section 5 Notification

Pursuant to section 5 of the CEAA Federal Coordination Regulations, potential responsible authorities (RAs) and federal authorities (FAs) were requested on 21 August 2002 to review the proposed project and, pursuant to subsection 6(1) of the CEAA Federal Coordination Regulations, inform the lead RA by 3 September 2002 whether they are a responsible authority or could provide specialist advice. The responses are provided in the following table:

Role of Federal Departments/Agencies

Department/Agency (District)	Responsible Authority	Specialist Department	No Involvement
Environment Canada (Yellowknife)		X	
Fisheries and Oceans (Inuvik)		X	
Health Canada (Edmonton)		X	
Indian and Northern Affairs (Inuvik)	X		
National Energy Board (Calgary)	Lead RA		
Natural Resources Canada (Ottawa)		X	
NWT Water Board	X		

Federal Approvals

INAC: *Territorial Lands Act* Land Use Permit
National Energy Board: *Canada Oil and Gas Operations Act* 5(1)(b) Authorization
NWT Water Board: *NWT Waters Act* Type B Water Licence

Section 8 Requirements of the CEAA Federal Coordination Regulations

With respect to section 8 of the FCR, the RAs prepared a joint determination of the scope of the project, the factors to be considered, and the scope of those factors as follows:

A. Scope of the Project

2. Undertaking in relation to the physical work or physical activity triggering the CEAA.

The RAs consider the principal project to be the proposed well drilling, testing and abandonment or suspension related to hydrocarbon exploration in the Mackenzie Delta region, Northwest Territories.

3. Other associated physical works or physical activities that must be undertaken to carry out the project.

The RAs note that for the project to proceed to completion, the physical works and activities listed in Table A below would need to be undertaken.

4. Other undertakings in relation to the physical works and activities identified in items (1) and (2) above.

No further hydrocarbon exploration-related activities have been identified in relation to the physical works and activities for the proposed Project. Any additional hydrocarbon exploration activities would be subject to future examination under the *NWT Waters Act*, *Canada Oil and Gas Operations Act* and/or *Territorial Lands Act* and, consequently, under the CEAA.

B. Factors to be Assessed

The factors considered within the scope of an environmental assessment are those set out in subsection 16(1) of the CEAA.

C. Scope of the Factors to be Assessed

The following spatial and temporal boundaries, as defined in the Inuvialuit Environmental and Geotechnical Inc. Project Description² for the project, were used.

1. Spatial Boundaries

- Local: Impacts are limited to the drilling lease and rights-of-way.
Subregional: Impacts may extend beyond the limits of the drilling lease and rights-of-way, but are limited to within 1 to 50 km of the rights-of-way and camp.
Regional: Impacts may extend beyond 50 km from the drilling lease and rights-of-way to the entire region.

² Inuvialuit Environmental and Geotechnical Inc., August 2001, "Project Description for the Proposed Petro-Canada Kurk/Kugpik Summer 2002 Drilling Program".

2. Temporal Boundaries

- Immediate: Impact duration is limited to less than two days.
- Short-term: Impact duration is longer than two days but less than one year.
- Medium-term: Impact duration is one year or longer but less than ten years.
- Long-term: Impact duration extends ten years or longer.

Section 9 Requirements of the CEAA Coordination Regulations

The RAs agreed to a CEAA determination date of 10 October 2002 for taking a course of action under subsection 20(1). Each RA for this joint screening made its own independent CEAA determination.

Table A. Identification of Project Components and Environmental Effects

Identify all components of the project under screening and their potential adverse environmental effects

Project Components

(✓ check all the items appropriate to this project)

- ☒ access road
- ☒ construction
- ☒ abandonment/removal
- ☐ modification e.g., widening, straightening
- ☒ automobile, aircraft or vessel movement
- ☒ blasting (sumps)
- ☐ building
- ☐ burning
- ☒ burying (sumps)
- ☐ channelling
- ☐ cut and fill
- ☒ cutting of trees or removal of vegetation
- ☐ dams and impoundments
- ☐ construction
- ☐ abandonment/removal
- ☐ modification
- ☐ ditch construction
- ☐ drainage alteration
- ☒ drilling other than geoscientific
- ☐ ecological surveys
- ☐ excavation
- ☐ explosive storage
- ☒ fuel storage
- ☒ garbage
- ☒ disposal of hazardous waste
- ☒ disposal of sewage
- ☒ waste generation
- ☐ geoscientific sampling
- ☐ trenching
- ☐ diamond drill
- ☐ borehole core sampling
- ☐ bulk soil sampling
- ☒ gravel
- ☐ hydrological testing
- ☒ site restoration
- ☐ fertilization
- ☐ grubbing
- ☐ planting/seeding
- ☐ reforestation
- ☐ scarify
- ☐ spraying
- ☐ recontouring
- ☐ slash and burn

- ☐ soil testing
- ☒ topsoil, overburden or soil
- ☐ fill
- ☐ disposal
- ☐ removal
- ☒ storage (replacement over sumps)
- ☒ stream crossing/bridging (ice roads)
- ☐ tunneling/underground
- ☒ other, explain well testing

☒ accidents or malfunctions including: risk of spills and leaks; risk of well kick or blowout; risk of discharge of improperly treated wastewater.

☒ effects of environment on project including: weather conditions; early break-up; sensitive terrain; lack of snow.

Project Effects

(✓ check all the items appropriate to this project)

Biophysical Environment

1. ☒ deposit into surface water
2. ☐ deposit into ground water
3. ☒ change in surface water flow
4. ☐ change in ground water flow
5. ☐ change in water temperature
6. ☐ change in drainage pattern
7. ☒ change in air quality
8. ☐ change in air flow
9. ☐ micro-climate change
10. ☒ ice fog
11. ☒ change in ambient noise levels
12. ☒ change in slope stability
13. ☐ change in soil structure
14. ☒ alteration of permafrost regime
15. ☒ destabilization/erosion
16. ☐ soil compaction
17. ☐ loss of access to non-renewable resource
18. ☐ depletion of non-renewable resource

- 19. __ removal of rare/endangered plant species
- 20. __ introduction of species
- 21. __ toxin/heavy metal accumulation
- 22. __ removal of rare/endangered wildlife species
- 23. __ change in wildlife health
- 24. ☒ impact to large mammals
- 25. ☒ impact to small mammals
- 26. ☒ impact to fish
- 27. ☒ impact to birds
- 28. __ impact to other wildlife
- 29. ☒ impact in a calving, nesting or spawning area
- 30. __ removal of wildlife buffer zone
- 31. ☒ change in wildlife habitat/ecosystem
- 32. ☒ other: removal of vegetation & habitat

Directly-related Socio-economic and Cultural Environment

- 33. ☒ impact to trappers
- 34. ☒ impact to hunting
- 35. ☒ impact to outfitters
- 36. ☒ recreational or back country use
- 37. ☒ impact to fishing
- 38. ☒ impact to First Nation traditional use
- 39. ☒ impact to community
- 40. __ impact to industry
- 41. __ impact to community health
- 42. __ change in work force economics
- 43. __ change in housing or infrastructure
- 44. __ change in regional transportation
- 45. __ other, explain _____
- 46. ☒ impact to traditional use area
- 47. __ impact to historical site or cultural landmark
- 48. ☒ impact to local aesthetics
- 49. __ impact to archaeological or historical site
- 50. __ other,
explain _____

Table B. Identification of Other Resource Uses And Their Environmental Effects

Identify relevant past, current and future (pending applications) physical works and activities and their potential adverse environmental effects.

Other Resource Uses

(✓ check all the items appropriate to this project)

- ☐ agriculture
- ☐ forestry
- ☐ commercial
- ☐ domestic

☒ fishing

☒ hunting/subsistence

☒ other: biophysical, heritage inventory, aquatics, Cape Bathurst caribou and grizzly bear denning studies

☐ urbanization

- ☐ commercial / residential (cottages)
- ☐ built structures
- ☐ infrastructure

☐ mining

- ☐ exploration
- ☐ open pits
- ☐ underground

☐ quarries

☒ transportation/communications

- ☒ roads / trails
- ☒ channels / canal
- ☐ telephone lines, satellite dishes, cables
- ☐ beacons

☐ solid waste disposal

☐ energy project

- ☐ hydro
- ☐ pipeline
- ☐ transmission line

☒ other water licenses, permits, leases

☐ land claims

- ☐ selected
- ☐ withdrawn
- ☐ special management
- ☐ heritage sites
- ☐ cultural sites

☐ other private lands held under tenure

- ☒ recreational
- ☒ trapping
- ☐ mineral processing
- ☐ airport
- ☒ recreation
- ☒ other: biophysical/heritage inventory

☒ other: oil and gas exploration activities, including past, present and imminent drilling and seismic projects.

Effects from other Resource Uses

(✓ check all the items appropriate to the scope of this project)

Biophysical Environment

1. ☒ deposit into surface water
2. ☐ deposit into ground water
3. ☒ change in surface water flow
4. ☐ change in ground water flow
5. ☐ change in water temperature
6. ☒ change in drainage pattern
7. ☒ change in air quality
8. ☐ change in air flow
9. ☐ micro-climate change
10. ☒ ice fog
11. ☒ change in ambient noise levels
12. ☒ change in slope stability
13. ☐ change in soil structure
14. ☒ alteration of permafrost regime
15. ☒ destabilization/erosion
16. ☐ soil compaction
17. ☐ loss of access to non-renewable resource
18. ☐ depletion of non-renewable resource
19. ☐ removal of rare/endangered plant species
20. ☐ introduction of species
21. ☐ toxin/heavy metal accumulation
22. ☐ removal of rare/endangered wildlife species
23. ☐ change in wildlife health
24. ☒ impact to large mammals
25. ☒ impact to small mammals
26. ☒ impact to fish
27. ☒ impact to birds
28. ☐ impact to other wildlife
29. ☒ impact in a calving, nesting or spawning area
30. ☐ removal of wildlife buffer zone
31. ☒ change in wildlife habitat/ecosystem
32. ☐ other, explain _____

Directly-related Socio-economic and Cultural Environment

- 33. ☒ impact to trappers
- 34. ☒ impact to hunting
- 35. ☐ impact to outfitters
- 36. ☐ recreational or back country use
- 37. ☒ impact to fishing
- 38. ☒ impact to First Nation traditional use
- 39. ☒ impact to community
- 40. ☐ impact to industry
- 41. ☐ impact to community health
- 42. ☐ change in work force or community economics
- 43. ☐ change in housing or infrastructure
- 44. ☐ change in regional transportation
- 45. ☐ other, explain _____
- 46. ☒ impact to traditional use area
- 47. ☒ impact to historical site or cultural landmark
- 48. ☒ impact to local aesthetics
- 49. ☐ impact to archaeological or historical site
- 50. ☐ other, explain _____

**ATTACHMENT 1
Project Area Map**

Insert Figure 1 from:

Inuvialuit Environmental & Geotechnical. 2002. Project Description for the Proposed Petro-Canada Nuna Winter 2002/2003 Drilling Program. Project #5292-02.

ATTACHMENT 2
Proponent's Potential Impact and Mitigation Evaluation

Insert Tables 20 and 21 from:

Inuvialuit Environmental & Geotechnical. 2002. Project Description for the Proposed Petro-Canada Nuna Winter 2002/2003 Drilling Program. Project #5292-02.

ATTACHMENT 3
RECOMMENDED CONDITIONS ANNEXED TO AND FORMING PART
OF LAND USE PERMIT NUMBER N2001A0036

31 (1) (A) - LOCATION AND AREA

- | | | |
|-----|--|--|
| 1.1 | The Permittee shall not conduct this land use operation on any lands not designated in the accepted application, unless otherwise authorized in writing by the Engineer. | PLANS |
| 1.2 | The Permittee shall not conduct any part of the land use operation within three hundred (300) metres of any privately owned land or structure, unless otherwise authorized in writing by the Engineer. | PRIVATE
PROPERTY |
| 1.4 | The Permittee shall not construct parallel lines or roads, unless authorized by the Engineer. | PARALLEL
ROADS |
| 1.7 | The Permittee shall remove from Territorial Lands, all scrap metal, discarded machinery and parts, barrels and kegs, buildings and building material. | REMOVE
WASTE
MATERIAL |
| 1.8 | The Permittee shall not construct an adit or drillsite within 50 metres of the normal high water mark of a stream unless approval in writing is obtained from the Engineer. | LOCATION
OF ADITS
AND
DRILLSITE |

31 (1) (B) - TIME

- | | | |
|-----|--|---------------------------------------|
| 2.1 | The Permittee's Field Supervisor shall contact or meet with a Land Use Inspector at the Inuvik office of the Department of Indian Affairs and Northern Development, telephone number (867-777-3361), at least 48 hours prior to the commencement of this land use operation. | CONTACT
INSPECTOR |
| 2.2 | The Permittee shall advise a Land Use Inspector at least ten (10) days prior to the completion of the land use operation of (a) his plan for removal or storage of equipment and materials, and (b) when final clean-up and restoration of the lands used will be completed. | REPORTS
BEFORE
REMOVAL |
| 2.3 | The Permittee shall submit a progress report to the Engineer every 7 days during this land use operation. | PROGRESS |
| 2.4 | The Permittee shall notify a Land Use Inspector at least ten (10) days prior to backfilling any sump. | BACKFILLING
NOTIFICATION |
| 2.5 | The Permittee shall not conduct any overland movement of equipment or vehicles before 0800 hours local time on Nov 15, unless otherwise authorized in writing by a Land Use Inspector. | START-UP
DATE |

2.6	The Permittee shall not conduct any over land movement of equipment and vehicles after 0800 hours local time on (Apr 15), unless otherwise authorized in writing by a Land Use Inspector.	SHUT-DOWN DATE
2.7	The Permittee shall not conduct any over land movement of equipment and vehicles between Apr 15 and Nov 15, unless otherwise authorized by a Land Use Inspector in writing.	SHUT-DOWN PERIOD
2.9	The Engineer, for the purpose of this operation, designates April 15 th , as spring break-up.	SPRING BREAK-UP
2.10	The Permittee shall remove all ice bridges prior to spring break-up or completion of the land use operation unless otherwise approved in writing by a Land Use Inspector.	REMOVE ICE BRIDGE
NOTE: all blasting in streams requires a Department of Fisheries and Oceans Authorization.		
2.11	The Permittee shall remove all snow fills from stream crossings prior to spring break-up or completion of the land use operation, unless otherwise approved in writing by a Land Use Inspector	REMOVE SNOW FILLS
2.12	The Permittee shall restore all sumps prior to spring break-up, unless otherwise authorized in writing by a Land Use Inspector.	SUMPS/SPRING BREAK-UP
2.14	The Permittee shall dispose of all brush and timber prior to removal of men or equipment from the land use area.	BRUSH DISPOSAL
2.15	The Permittee shall commence and foster re-vegetation on all parts of the land used, as may be directed by a Land Use Inspector, within one year of the completion of the land use operation.	RE-ESTABLISH VEGETATION
2.16	The Permittee shall complete all clean-up and restoration of the lands used prior to the expiry date of this Permit.	CLEAN-UP
2.17	The Engineer reserves the right to impose closure of any area to the Permittee in periods when dangers to natural resources are severe.	CLOSUR E
31 (1) (C) - EQUIPMENT		
3.1	The Permittee shall not use any equipment except of the type, size, and number that is listed in the accepted application, unless otherwise authorized in writing by the Land Use Inspector.	ONLY APPROVED EQUIPMENT
3.2	The Permittee shall equip bulldozer blades used in this operation with "mushroom" type shoes or a similar type of device which shall be extended 20 centimetres below the	BULLDOZER BLADES AND SHOES

cutting edge of the blade.

- 3.3 The Permittee shall use a forced-air, fuel-fired incinerator to incinerate all combustible garbage and debris.

INCINERATORS

(1) (D) - METHODS AND TECHNIQUES

- 4.2 The Permittee shall construct and maintain winter roads with a minimum of fifteen (15) centimetres packed snow at all times during this land use operation. If this cannot be done, then the Permittee shall construct Ice Roads in a manner approved by a Land Use Inspector.

SNOW ROADS/
ICE ROADS

- 4.13 The Permittee shall not store material on the surface ice of streams.

STORAGE
ON ICE

**31 (1) (E) - TYPE, LOCATION, CAPACITY
AND OPERATION OF FACILITIES**

- 5.1 The Permittee shall not locate any sump within thirty (30) metres of the normal high water mark of any stream or as per DFO Guidelines.

SUMPS
FROM WATER

- 5.2 The Permittee shall maintain all drill wastes at least 1.2 metres below the lowest elevation of contiguous surrounding ground surface at all times.

SUMPS
FREEBOARD

- 5.4 The Permittee shall backfill all sumps in such a manner that drill waste is maintained below the 1.2 metre freeboard.

BACKFILL
SUMPS-HOW

- 5.5 The Permittee shall:

BACKFILL
SUMP
OVERLAP

- (a) Place all excavated material over the sump area to ensure ponding does not occur. (2 metre height)

- (b) Overlap the material a minimum of two (2) metres beyond the edges of the existing sump wall.

- 5.7 The Permittee shall ensure that the land use area is kept clean and tidy at all times.

CLEAN WORK
AREA

**31 (1) (F) - CONTROL OR PREVENTION OF FLOODING,
EROSION AND SUBSIDENCE OF LAND**

- 6.1 (a) The Permittee shall, where flowing water from bore holes is encountered, plug the bore hole in such a manner as to permanently prevent any further outflow of water.

PLUG
ARTESIAN
WELLS

- (b) The artesian occurrence shall be reported to the Engineer within forty-eight (48) hours.

- 6.2 The Permittee shall remove any obstruction to natural drainage caused by any part of this land use operation.

NATURAL
DRAINAGE

6.4	The Permittee shall not use any material other than water in the construction of ice bridges	ICE BRIDGE MATERIAL
6.5	The Permittee shall not allow any ice bridge to hinder the flow of water in any stream.	ICE BRIDGE
6.10	The Permittee shall remove snow fills in stream crossings as the land use operation progresses, unless otherwise authorized in writing by a Land Use Inspector.	REMOVE WATER CROSSINGS
6.15	The Permittee shall insulate the ground surface beneath all structures and facilities associated with this land use operation with a minimum 15 cm ice pad.	INSULATE GROUND SURFACE
6.16	The Permittee shall prepare the site in such a manner as to prevent rutting of the ground surface.	PREVENTION OF RUTTING
6.17	The Permittee shall not move any equipment or vehicles unless the ground surface is in a state capable of fully supporting the equipment or vehicles without rutting or gouging.	VEHICLES MOVEMENT FREEZE-UP
6.18	The Permittee shall suspend overland travel of equipment or vehicles if rutting occurs.	SUSPEND OVERLAND TRAVEL
6.21	The Permittee shall establish vegetation on all areas stripped of vegetation during this land use operation to a minimum of seventy (70%) per cent ground cover, unless otherwise authorized in writing by the Engineer.	REVEGETATE STRIPPED AREA
31 (1) (G) - USE, STORAGE, HANDLING AND DISPOSAL OF CHEMICAL OR TOXIC MATERIAL		
7.1	The Permittee shall not use chemicals in connection with the land use operation without the prior approval of the Engineer.	APPROVAL OF CHEMICALS
7.2	The Permittee shall not use the following materials during the drilling operation without the prior written approval of the Engineer: Chlorinated phenols (Dowicide B, etc.) Compounds composed primarily of heavy metals Asbestos	PROHIBITED CHEMICALS
7.5	The Permittee shall deposit all drill waste containing poisonous or persistent chemical additives into a sump.	DRILL WASTE DISPOSAL
7.6	The Permittee shall deposit all drill waste into a sump.	DRILL WASTE
7.7	The Permittee shall not allow any drilling waste to spread	DRILL WASTE

	to the surrounding lands.	CONTAINMENT
7.8	The Permittee shall burn all garbage and debris at least daily.	GARBAGE DISPOSAL
7.10	The Permittee shall remove all noncombustible garbage and debris from the land use area to a disposal site approved in writing by a Land Use Inspector.	REMOVE GARBAGE
7.12	The Permittee shall dispose of all combustible waste petroleum products by removal.	WASTE PETROLEUM DISPOSAL
7.14	The Permittee shall dispose of all fluids used to wash machinery and equipment in a sump, unless otherwise authorized in writing by a Land Use Inspector.	RIG WASH DISPOSAL
7.15	The Permittee shall report all spills immediately in accordance with instructions contained in "Spill Report" form N.W.T. 1086(10/79). 24 hour spill report line (867)920-8130.	REPORT CHEMICAL AND PETROLEUM SPILL
7.17	The Permittee shall dispose of all sewage in a manner approved by a Land Use Inspector.	SEWAGE DISPOSAL
31 (1) (H) - WILDLIFE AND FISHERIES HABITAT		
8.1	The Permittee shall not unnecessarily damage wildlife habitat in conducting this land use operation.	HABITAT DAMAGE
8.3	The Permittee shall not obstruct the movement of fish while conducting this land use operation.	FREE FISH MOVEMENT
8.11	Your operation is in an area where bears may be encountered. Proper food handling and garbage disposal procedures will lessen the likelihood of bears being attracted to your operation. Information about the latest bear detection and deterrent techniques can be obtained from the Department of Resources, Wildlife and Economic Development at (867) 777-7308 or 777-7230	BEAR/MAN CONFLICT
31 (1) (I) - OBJECTS AND PLACES OF RECREATIONAL, SCENIC AND ECOLOGICAL VALUE		
9.3	The Permittee shall not operate any machinery or equipment within one hundred (100) metres of the base of a pingo.	PINGOS
9.4	The Permittee shall not feed wildlife.	NO FEEDING WILDLIFE
31 (1) (J) - SECURITY DEPOSIT		
31 (1) (K) - PETROLEUM FUEL STORAGE		

- | | | |
|---|--|-------------------------|
| 11.2 | The Permittee shall not place any petroleum fuel storage containers within thirty (30) metres of the normal high water mark of any stream. | FUEL
BY
STREAM |
| 11.3 | The Permittee shall locate mobile fuel facilities on land when stationary for any period of time exceeding twelve (12) hours. | FUEL ON
LAND |
| 11.4 | The Permittee shall not allow petroleum products to spread to surrounding lands or into water bodies. | FUEL
CONTAINMENT |
| 11.6 | The Permittee shall construct a dyke around each stationary fuel container or group of stationary fuel containers where any one container has a capacity exceeding 4 000 litres. | DYKE/FUEL
CONTAINERS |
| 11.7 | The Permittee shall line the dyke and area enclosed by the dyke with a type of plastic film liner approved by the Engineer. | LINE
DYKE |
| 11.8 | The volume of the dyked area shall be 10% greater than the capacity of the largest fuel container placed therein. | CAPACITY |
| 11.9 | The Permittee shall ensure that the dyke and the area enclosed by the dyke shall be impermeable to petroleum products at all times. | IMPERMEABLE
DYKE |
| 11.10 | The Permittee shall: | CHECK
FOR LEAKS |
| | (a) examine all fuel storage containers for leaks a minimum of once every day. | |
| | (b) repair all leaks immediately. | |
| 11.12 | The Permittee shall not use bladders for storing and/ or transporting petroleum products. | BLADDERS
PROHIBITED |
| 11.15 | The Permittee shall seal all container outlets except the outlet currently in use. | SEAL OUTLET |
| 11.16 | The Permittee shall mark all fuel containers with the Permittee's name. This includes 45 gallon drums. | MARK
CONTAINERS |
| 31 (1) (L) - DEBRIS AND BRUSH DISPOSAL | | |
| 12.11 | The Permittee shall spread all cut debris and brush over the areas cleared, prior to completion of the operation or expiry of the Land Use Permit. | SPREAD
BRUSH |
| 31 (1) (M) - MATTERS NOT INCONSISTENT WITH THE REGULATIONS | | |
| 13.5 | The Permittee shall display a copy of this Permit in a conspicuous place in each campsite established to carry out this land use operation. | DISPLAY
PERMIT |

- 13.7 The Permittee shall provide in writing to the Engineer, at least forty-eight (48) hours prior to commencement of this land use operation, the following information:
- IDENTIFY
AGENT**
- (a) person, or persons, in charge of the field operation to whom notices, orders, and reports may be served;
- (b) alternates;
- (c) all the indirect methods for contacting the above person(s).
- 13.9 The Permittee shall, while conducting the operation, make every effort to avoid covering or destroying traps or snares that may be found in the area.
- TRAPS
PROTECTION**
- 13.10 The Permittee shall restore any trails used by trappers or hunters by slashing any and all trees that may fall across these paths or trails and by removing any other obstructions such as snow piles or debris that may be pushed across the trails.
- TRAILS
RESTORATION**
- 13.11 **PART 1 - In this Permit:**
- "sump" means a man-made pit, trench hollow or cavity in the earth's surface used for the purpose of depositing waste material therein.
- "drill waste" means all materials or chemicals, solid or liquid, associated with the drilling of bore holes and includes bore hole cuttings.
- "dogleg" means clearing a line, trail or right-of-way that is curved sufficiently so that no part of the clearing beyond the curve is visible when approached from either direction.
- 13.12 The Permittee shall submit to the Engineer a contingency plan, for chemical and petroleum spills, for use during the construction and operation of the winter road.
- CONTINGENCY
PLAN**

RECOMMENDED MITIGATIONS SUPPLEMENTARY TO PERMIT CONDITION

Fuel Storage

- Fuel sloops located within 30 m of a water body should be parked within an impermeable dyke. This can be constructed of snow/ice material and will reduce the likelihood of a spill penetrating the ground and migrating into the water. Should equipment need access inside the dyked area for refueling, the opening should be on the uphill side.
Discuss this with the inspector before hand.
- Refueling operations occurring outside an area described above should include a haz-mat/ drip tray under the tank receptacle.

Equipment

- All equipment parked or may be parked for four (4) hours or more, should have a haz-mat/drip tray under it, or

- be sufficiently diapered (leaky equipment should be repaired immediately).
- All areas of significance(ie. bear dens , archaeological sites) should be avoided by a minimum radius of 100 meters.

Operational

- No burning of plastics
- Waste oil should be recycled