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P.O. Box 1500
Yellowknife, NT X1A 2R3

Your file - Votre référence

November 14, 2002

Our file - Notre référence
N7L1-1777

Mr. Gordon Wray
Chairman
NWT Water Board
P.O. Box 1500
YELLOWKNIFE, NT X1A 2R3



Dear Mr. Wray:

**RE: Devon Canada Corporation - Proposed Napartok Winter Drilling Program
(F29 and N03 wells), Mackenzie Delta
Type "B" Water Licence - Level 1 Environmental Screening**

The Department of Indian Affairs and Northern Development (DIAND) has screened the above mentioned water licence amendment application for water use and waste disposal as submitted by Devon Canada Corporation pursuant to Section 5 of the Canadian Environmental Assessment Act (CEAA). The project was previously screened under the original application by Petro-Canada. Both the original project and the current amendment have been screened by the Inuvialuit Environmental Impact Screening Committee (EISC), pursuant to the 1984 Inuvialuit Final Agreement.

DIAND has determined that this project, as proposed, is not likely to cause significant adverse environmental effects and concurs with the EISC's similar determination as concluded in their screening decision, providing that proposed mitigation measures are carried out and licence conditions met. A joint screening report has been prepared by DIAND, the North Mackenzie District Office, and the National Energy Board (NEB). DIAND recommends that the application proceed through the regulatory process. Incorporation of the recommended mitigative measures into the terms and conditions of the licence is required.

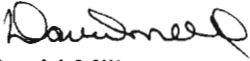
If the Board concurs with our findings, please sign the attached screening forms, advise the applicant of the CEAA recommendations in writing, and return the original forms to Water Resources Division for archiving and registration with CEAA.

.../2

Canada

If you require further information, contact me at (867) 669-2650.

Sincerely,



David Milburn
Manager
Water Resources Division

encl.

cc: D. Livingstone, Director, RR & E
North Mackenzie/Inuvik District
Environment and Conservation Division

CEAA SCREENING FORM - LEVEL I
Department of Indian Affairs and Northern Development (DIAND) /
National Energy Board (NEB)/NWT Water Board

1. Public Registry Required Information

Applicant: Devon Canada Corporation, Calgary
Pete Millman, 403-232-7294
(EA initiated by Petro-Canada in fall 2001)

FEAI I.D. Reference Number: 29632 (NEB RA # 433)

Subject Descriptors: Oil and gas

Alias Project Title: Napartok Winter Drilling

Lead RA and Screening Division: NEB

Lead RA Contact: John Korec 403-292-6614 or Laura Van Ham 403-299-2769

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

Other Screening Trigger Types: Inuvialuit Final Agreement

EA Start Date: July 25, 2001 (Water Board notification to Technical Advisory Committee)
October 16, 2002 (Water Board notification to Technical Advisory Committee re: amendment and re-assignment of licence)

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 operations; 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 Territories

EA Determination: 20-1-a

EA Determination Date: 21 November 2002

Estimated Follow-up program termination date: possibly Summer 2004 (Devon, DIAND Inspectors)

EA Terminated: No

2. General File Information

NWT Water Board File Number: N7L1-1777
DIAND Land Use Permit Number: N2002A0039 (originally N2001A0039)
NEB File Number: WID # to be assigned

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

Present licence/permit/lease number: N/A

Proposed Date of Activity: November 2002 to April 2004

Other RAs or Screening Divisions: DIAND Water Resources for NWT Water Board, Greg Cook,
Tel: 867-669-2656
DIAND North Mackenzie District, Rob Walker,
Tel: 867-777-5968

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

Project File Locations: NEB (Calgary); NWT Water Board - DIAND Water Resources Division (Yellowknife); DIAND N. Mackenzie District (Inuvik)

DIAND District: North Mackenzie, Inuvik

3. Proponent

Type of Proponent: Industry

4. Project Location (Napartok location - Figure 1, Attachment 1)

Topographic Map Sheet Number: 107-B

Latitude / Longitude: F-29 location - 68°28'19"N / 134°36'24"W
N-03 location - 68°32'59"N / 134°31'24"W

Watershed: Mackenzie River

Street Name: N/A

Surrounding Land Status: Crown

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

Conservation Plans)

5. Project Description

The Kurk/Napartok Winter Drilling Program (the project) was originally proposed by Petro-Canada for the winter of 2001/2002. The CEAA EA was initiated in July 2001 and the final screening report was completed and the EA put on hold in November 2001. In October of 2002, Devon indicated to the NEB its intent to complete the Napartok component of the project and requested that the RAs complete the EA process. This screening report was prepared based on Petro-Canada's original project description, subsequent submissions and a project update and subsequent submissions provided by Devon.

Schedule: Devon proposes the following

F-29

Access/lease construction - November 2002 to January 2003

Drilling - February 2003

Well test - February to March 2003

Demobilization and clean-up - March 2003

N-03

Access/lease construction - February to March 2003

Drilling - March 2003

Well Test - March to April 2003

Demobilization and clean-up - April 2003

Note - If N-03 is not drilled over the winter of 2003, it will be drilling during the winter of 2003/2004 and follow a schedule similar to that proposed for F-29. This screening covers both the winter 2002/2003 and 2003/2004 drilling seasons.

Water Use / Waste Disposal: The project would require a maximum of 1,500 m³/d water for: well site and ice-based access construction (up to 1,000 m³/d); drilling fluid (50 to occasionally 200 m³/d); and, camp use (<50 m³/d). Water for ice-based construction, camp and drilling use would be drawn from Mackenzie River channels along the access route and near the well site. Water intake hoses would be equipped with screens in compliance with DFO's 1995 *Freshwater Intake End of Pipe Fish Screen Guideline*. Camp wastewater from a 60-person Arctic-class camp would be treated using an Eco-Tech treatment system before discharging the treated wastewater to a channel of the Mackenzie River near the wellsite. Alternatively, wastewater would be hauled to Inuvik for disposal. Note: Petro-Canada's original proposal entailed discharge of treated wastewater to land and a lower estimated maximum daily water use (1,000 m³/day).

By the end of drilling, a 20 m x 50 m, 5 m deep sump for drilling waste would only be filled to about 1/4 of the sump volume.

Land Use/Fuel Storage: The 15 m-wide access route to the land-based drill site on Crown land would be overland for less than 2.5 km from the Mackenzie River channel ice road. The drill site lease would be 150 m x 150 m; camp site 100 m x 80 m; fuel storage site 60 m x 50 m; drilling sump 50 m x 80 m; and a 30 m x 30 m helipad. Total land use would be less than 5.3 ha. Surface preparation of the access and drilling and adjoining sites would begin once adequate snow covers the frozen surface. Vegetation would be cut about 20 cm above the surface using a brush cutter or a hand cutter and spread evenly over the lease surface. The drilling sump would be excavated from the permafrost using small dynamite charges. Devon would place two fuel barges with approximately 2.5 M litres of fuel on Oniak Channel. On the wellsite, Devon would place 4 x 63 m³ tanks for produced liquids, 2 x 63 m³ insulated tanks for brine water, 1 x 15 m³ glycol tank, and 1 x 63 m³ tank for bulk diesel fuel storage. Solid waste would be incinerated daily and non-combustible material would be trucked to Inuvik for landfill disposal. Following the drilling program, all equipment, survey stakes and construction debris would be appropriately disposed.

Drilling Operations: Since water sensitive formations, i.e., containing hydratable shales, are present, potassium chloride (KCl) and other chemicals in the drilling mud system would be used to stabilize the wellbore. The KCl, 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 that exists to about 75 m depth and reduce the possibility of liberating methane gas from gas hydrates (water-methane ice). Along with stabilizing the wellbore, Devon 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 gas would be flared or incinerated and any fluid would be either re-injected into the well or disposed off-site. 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 well blowout preventors;
- spillage of glycol from the mud cooler exchanger;
- fuel or fluid leaks or spills if vehicles break through ice on a lake or channel;
- well kicks or blowouts of drilling fluids, sand, sediment, or hydrocarbon gases or fluid; and
- spillage of wastewater from a waste treatment system malfunction

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

Methods: Inuvialuit Environmental and Geotechnical Inc., on behalf of Petro-Canada (now Devon) provided a description of the environment for the project area based on existing literature, field surveys (summer 2001), a field reconnaissance, and communications with local experts, regulatory agencies, and professional biologists.

Ecozone: Mackenzie Delta Ecoregion of the Taiga Plains Ecozone. Major communities include Aklavik and Inuvik. This ecoregion is composed of the southern two-thirds of the Mackenzie River delta and is classified as having a low arctic ecoclimate. Wetlands extend over 50% of the area, characterized by polygonal peat plateau bogs with ribbed fens. Extensive, discontinuous permafrost low to medium ice content underlies relatively infertile soils. Five successive vegetation communities occur with increasing distance from river channels: water horsetail colonization; leaf willow/common horsetail association; balsam poplar community with an understory of willow; a community composed of a variety of willow species; and a white spruce community with an understory of green alders and various species of willow. Vegetation species of significance in the area include (Project Description, Table 10) pussytoes, mustard, pondweed, goose grass, buttercup and willow (var. *arctolitoralis*). Characteristic wildlife includes muskrat, beaver, mink, and waterfowl. Wildlife of significance in the area including 8 mammals (Table 11), 25 bird species (Table 12), and 14 fish species (Table 13).

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

The proposed project falls within two land management category areas as defined in the Tuktoyaktuk, Inuvik and Aklavik Conservation Planning Areas: Category C; and Category D. The conservation plans suggest that Category C area be managed so as to guarantee conservation of [cultural or renewable] resources, and Category D area be managed so as to

eliminate, to the greatest extent possible, potential damage and disruption.

The area is also used for trapping, hunting, recreation, and tourism. Devon notes that the Spring Goose Harvesting area, 304C, Fall Goose Harvesting area, 312C, and the Central Mackenzie Estuary (beluga concentration), 718D, overlaps the Napartok project area. Nature and adventure tourism is limited. Hunting of belugas is mainly done along the coast up around the Kendall Island area. There is little trapping done in the delta due to low fur prices, high fuel costs and oil and gas industry employment. Devon notes that several cabins are located in the vicinity of the Napartok proposed locations. The Prince of Wales Northern Heritage Centre notes that the area exhibits a high potential for locating new archaeological sites.

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 checked="" 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

Federal Government	Contact Person	Dates Comments Received
DIAND		
Water Resources	✓ G. Cook	Sept. 19, 2001 (TAC request for application review)
	G. Cook	Oct. 17, 2001 (CEAA s.5 response)
		Oct. 24, 2002 (agreement on process to complete EA)
Geology		
Lands		
Minerals		
Ec. Dev.		
Environment		
I&I		
D.M.		
R.M.O.	✓ R. Walker	Oct. 22, 2001 (CEAA s.5 response)

DFO/CCG	✓ B. Hanna B. Hanna K. Simms	Sept. 25, 2001 (Advice to Petro-Canada) Oct 19, 2001 (CEAA s.5 response) Oct. 11, 2002 (Protocols to Devon - to be used with letter of advice provided to Petro-Canada)
DOE	✓ W. Romanko P. Pacholek R. Bujold	Sept. 19, 2001 (provided to EISC and to DIAND Land Admin) Oct. 26, 2001 (CEAA s.5 response) Nov. 2, 2002 (comments and recommendations to DIAND, NWT WB, NEB and Devon)
Health Canada	✓ S. Grewal	Oct. 26, 2001 (CEAA s.5 response)
DOT		
NRCan	✓ I. Lamirande	Oct. 22, 2001 (CEAA s.5 response) Oct. 30, 2002 (confirmed original CEAA s.5 response)
NEB	✓ J. Korec L. Van Ham	Oct. 17, 2001 (CEAA s.5 notification) Oct. 24, 2002 (CEAA notice of EA continuation)
N.W.T. Government	Contact Person	Dates Comments Received
RWED	✓ A. Gibson	
Health	✓ C. Beveridge	Oct. 25, 2002 (provided to NWT Water Board)
Transportation	✓ H. Green	Oct. 5, 2001 (provided to DIAND Land Admin)
Tourism		
MACA		
EM&PR		
PWNHC	✓ B. Cameron	Sept. 13, 2001 (provided to EISC)
Aboriginal Groups	Contact Person	Dates Comments Received
EISC	✓ L. Graf	Oct. 9, 2001 (EISC screening decision)
ILA	✓ C. Pokiak	
Inuvik HTC	✓ R. Binder E. Price	Sept. 24, 2001 (provided to EISC) Oct. 24, 2002 (provided to EISC)
FJMC	✓ R. Bell	Sept. 25, 2001 (provided to EISC) Nov. 4, 2002 (provided to EISC)

Tuk HTC	✓ F. Pokiak P. Voudrach	Sept. 28, 2001 (provided to EISC) Nov. 1, 2002 (provided to EISC)
Public/Interested Parties/Other	Contact Person	Dates Comments Received

Public Concerns: During the 2001 EISC process, the Inuvik Hunters and Trappers Committee (HTC) noted that a number of vehicles went through the ice last year and it hopes that this does not occur again this year. The HTC is also concerned that any project extension beyond April 15 might have a negative impact on migrating birds or other species.

During the 2001 EISC process, the Fisheries Joint Management Committee (FJMC) expressed concern that the large number of detailed proposals and its lack of resources limits its ability to properly assess the impacts of the projects, including cumulative effects. The FJMC also provided its concerns to the EISC that federal departments were not resourced sufficiently enough to adequately inspect or monitor new proposed technologies, draw-downs of water bodies, access roads, hazardous material management, and spill contingencies, and human wastes management.

During the 2002 EISC process, the Tuktoyaktuk HTC indicated they would like to ensure that an environmental monitor and a wildlife monitor be hired for the duration of the project. The Inuvik HTC indicated that the project would affect the traditional harvesting practices of some beneficiaries and some cabin owners and requested a meeting to discuss the matter further. The FJMC re-iterated its concern regarding the ability to address cumulative effects of this project, and others like it, and the ability of co-management groups and regulatory agencies to ensure that the proponents of projects are delivering on mitigation measures proposed in Project Descriptions.

In its consultation with community members in August 2001, Petro-Canada discussed with the community, environmental issues, employment and training, and program details. Environmental issues addressed included: limited communication between Environmental and Wildlife Monitors and the communities; poor ice roads; spills; poor road markings; and conflicts with skidoo trails. As well, the proponent addressed the communities' concerns about accidents and safety.

In 2002, Devon conducted community and stakeholder consultation meetings in Inuvik on September 25 and 26, in Tuktoyaktuk on September 26 2002 and planned to conduct such meetings in Aklavik on October 8 to provide an update on the project activities and schedule.

Record of these comments and concerns are on the CEAA public registry file # 29632.

8. Detailed Description of Environmental and Cumulative Effects Identified in Tables A and B.

Potential Adverse Environmental Effects: Devon notes that the following environmental components could potentially be adversely affected by the proposed project activities: permafrost; terrain and soils; vegetation; wildlife; aquatic resources; other land uses; and archaeological, historical or palaeontological sites.

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 camp and drilling fluid sumps and the drilling of the well bore. Original surface drainage would be maintained.

Clearing of vegetation for access and well site and camp leases could result in the loss of vegetation communities. Vegetation clearing restricted to the access width and site areas required to complete the project. Cleared vegetation would be windrowed, but not against standing vegetation. Erosion of banks and sedimentation could affect aquatic resources such as fish or fish habitat. Fuel or other pollutant could enter water bodies resulting in contamination and degradation of aquatic habitat.

The primary concerns for wildlife would be injury or mortality of individuals that might fall into a sump, or the fish that might get sucked up by the water truck hoses. The proposed project activities could conflict with wildlife harvesting in the area. Lastly, the project could accidentally damage archaeological, historical or palaeontological resources.

Cumulative Environmental Effects: Past, current and foreseeable future projects and their adverse environmental effects or potential adverse environmental effects have been taken into consideration by Devon in its assessment of cumulative effects. Valued ecosystem components selected for assessment include the Bluenose-West/Cape Bathurst caribou herd, migratory birds, and vegetation. Vegetation species of significance were not selected as VECs for the cumulative effects assessment.

Effects of the Environment on the Project: Devon notes that potential effects of the environment on the project include: delayed ice formation resulting in late project start-up; delay of project implementation in order to cross sensitive terrain; little or no snow requiring artificial snow making to lay down a 25 cm pad of compacted snow; drifting snow that would hide refuse; or early ice break-up that would force premature project stoppage.

9.a) Summary of Proponent's Mitigation Measures

Permafrost: Key mitigation measures proposed by Devon to avoid or minimize disturbance to the underlying permafrost zone include: winter operations during frozen ground conditions; creating an ice layer over the access and leases; keeping the area of operational use to a minimum; and ensuring that sump fluids are deposited below the level of the active layer. Devon has incorporated techniques into the drilling process to reduce the volume of drilling waste deposited in the sump, including: centrifuges to use the mud systems for longer periods of time; and, a mud cooler to help minimize hole size and reduce the volume of the active mud system.

Terrain and Soils: Lease clearing and construction would occur once the active layer of the soil is frozen, mitigating soil compaction from operations and soil disturbance due to uprooting. Natural drainage courses would be avoided or reclaimed. The use of adequately constructed sumps and secondary containment and the implementation of spill response measures as outlined in the contingency plan would reduce the likelihood of spills or mitigate the environmental effects if spills should occur. Devon's measures to reduce drilling waste volume described under permafrost above will also act to minimize impact of the sump on terrain and soils. Devon's sump site selection criteria to minimize impact on terrain, soils and aquatic resources include: locating sump as far as possible from waterbodies; appropriate surface drainage and relief characteristics; and, the presence of perennially frozen fine grained soil. Devon's site reconnaissance and active layer sampling program conducted to assess the site selection criteria included collection of the following information: soil temperature and presence of permafrost; depth of active layer; soil type; soil moisture content; vegetative cover; and surface drainage characteristics and topography. Devon indicates that the sump and well site locations will be inspected by DIAND Water and Land Use licence inspectors to ensure they have been sited appropriately.

Vegetation: The majority of the access would be developed along the Mackenzie River channels. Clearing of vegetation along land access and at the leases, using a brush mower where possible, would be done after the ground is frozen and snow covered. Cleared vegetation and snow would not be windrowed against standing vegetation.

Wildlife: Fencing around the sump would prevent wildlife from accidentally falling into the sump and coming to harm.

Aquatic Resources: Potential for destabilization or erosion of stream banks would be minimized by the use of snow ramps, use of mushroom shoes on bladed equipment and the establishment of a 100 m buffer of undisturbed ground between the well site and water bodies. Fish would be protected from being sucked up into the water truck by the use of a fish screen on the intake hose. Damage to fish and habitat would be mitigated by ensuring that fill material and debris not enter or be disposed into water bodies. No materials would be stored on the ice surface of water bodies. Water required for construction, drilling and camp use would only be drawn from licensed sites. To mitigate contamination of water bodies, sumps and hazardous materials would be sited more than 100 m from water bodies and fuels and oils would be stored in contained containers with secondary containment. A spill response procedures would be implemented in the event of a spill of hazardous substances. Devon's measures to reduce drilling waste volume described under permafrost above and measures to select an appropriate sump location described under terrain and soils above will also act to minimize impact of the sump on aquatic resources.

Other Land Uses: Public consultation has been undertaken and communities would be notified of the drilling operations and timing. As well, post-construction warning signs would be placed on access roads to minimize conflict with wildlife harvesting in the area.

Effects of the Environment on the Project: The development schedule is conservative and allows for a certain amount of delay that could be caused by weather conditions such as late ice formation, insufficient snow cover, or an early break-up. Water can be pumped from the Mackenzie River to aid accelerate ice thickening, or snow can be artificially produced to increase snow cover. Should drifting snow obscure refuse, a post-snow cover aerial inspection and ground clean-up would be undertaken. Sensitive terrain such as steep banks would be accessed by building up snow/ice ramps to prevent disturbance or erosion.

Accidents and Malfunctions: Devon would reduce the likelihood of hydraulic oil leaks through regular procedural checks of the blow out preventors' hydraulic system and preventative maintenance. Potential spills of glycol should be captured and contained in the built-in 'false floor' below the glycol reservoir. Regular equipment maintenance should reduce the likelihood of spills of glycol or other equipment fluids or wastewater from the treatment system.

To prevent break throughs on ice and resulting fluid spills into water, mechanical and electronic profiling would be undertaken to verify safe ice thicknesses. Secondary containment of storage tanks and spill-proof fueling mechanisms would be used, thus reducing the chance of spills reaching a water body.

Well kicks and blowouts that could result in an uncontrolled release of drilling fluid, sediment and hydrocarbons are rare. Preventative measures would include the use of premium technology, equipment and experienced personnel. A quadruple redundant blowout preventor and an automatic well choking technology would be used to control kicks or blowouts.

Cumulative Adverse Environmental Effects: Devon notes that the Bluenose-West/Cape Bathurst caribou herd is rarely found in this project area. However, would minimize new access for development to avoid the potential for altering hunting success. Disturbance of the migratory bird habitat and population during spring arrivals is noted as a greater concern. Devon would reduce these impacts by restricting flights to established lines and minimizing air traffic effects. It is expected that migratory birds would habituate to drilling noise within a few days. Clearing of vegetation and the resulting habitat loss would be minimized to the minimum required to carry out the project. Consultation with local elders suggest that vegetation recovery for willows cut back or walked down is in the order of about two years if the root systems are not damaged. Winter operations would be the main mitigation measure to ensure that roots and surface soil is undisturbed.

9.b) Reviewers' Recommended Mitigation Measures

The following is a summary of some of the recommended mitigation measures provided by reviewers with respect to Petro-Canada's original submission in the fall of 2001. For the complete and unabridged recommendations, refer to the information on the public registry.

Prince of Wales Northern Heritage Centre:

- proponent to remain at least 30 m from the boundaries of all known archaeological sites;
- proponent should proceed with caution in all operations as the area exhibits a high potential for locating new archaeological sites; and
- proponent to conduct a summer follow-up study to assess potential impacts to heritage resources as a result of winter activities.

Environment Canada:

- winter lake or stream crossings to be located to minimize approach grades;
- crossings to be constructed entirely of ice and snow;
- bank disturbance to be avoided;
- mechanized clearing should not be done immediately adjacent to any water course;
- stream crossings to be removed or notched prior to spring break-up;
- no fuel or wastes to enter waters frequented by fish;
- drilling fluid sump to be located on the high side of the lease with sufficient space for expansion for the original sump;
- sump should be excavated deeper, with adequate freeboard, rather than wider in order to minimize surface area disturbance within a discontinuous permafrost zone;
- drilling fluids and additives to be disposed in a manner that prevents entry into a water body by surface or ground water flows;
- disposal of treated wastewater, demonstrated as non-toxic, should be discharged to land in a distributed surface application;
- monitoring program should be implemented to assess long-term and cumulative effects of the normal mix, bury and cover restoration method for drilling sumps; and
- Environment Canada, Environmental Protection Branch should be notified of changes in the proposed or permitted project activities.

Inuvik Hunters and Trappers Committee:

- avoid blockage of flow when constructing access roads across streams;
- efforts should be made to avoid negative impacts to cabins in the area; and
- HTC-provided wildlife monitors should be onsite to ensure avoidance of potential negative impacts to wildlife and habitat.

Department of Fisheries and Oceans:

- fuel barges must be sufficiently protected from ice scour damage during the winter;
- details of water withdrawal such as volume required, size of water body, etc. to be submitted to DFO for review;
- water removal to not result in a significant drawdown that could be detrimental to fish and fish habitat;
- access routes should follow existing trails, winter roads or cut lines where possible;
- cutting of crossing approaches is not permitted unless approved in writing by DFO;
- winter crossings should not impede water flow;
- winter crossings should be v-notched or otherwise removed prior to spring break-up;

- exiting drainages should not be altered;
- reclamation activities should include bank stabilization and re-vegetation as required and should be completed prior to spring thaw when surface runoff may be greatest; and
- no material should be left on the ice when there is potential for that material to enter the water (i.e., spring break-up).

Tuktoyaktuk Hunters and Trappers Committee:

- avoid any migratory bird harvesters that may be in the project area.

GNWT Department of Transportation:

- no landings, storage of material or equipment, and no loading operations should take place in the highway right-of-way;
- Maintenance Supervisor, Department of Transportation, Inuvik to be notified when winter roads would be used;
- all work, including clean-up should be completed by the second or third week in April; and
- signs to be placed on all intersections with the Inuvik-Tuktoyaktuk Winter Road to guide motorists to their destinations.

The following is a summary of some of the recommended mitigation measures provided by reviewers with respect to Devon's update submission in the fall of 2002. For the complete and unabridged recommendations, refer to the information on the public registry.

Environment Canada:

- the company must meet all requirements of the *Fisheries Act*;
- no fuels or wastes associated with the project are to be allowed to enter any waters frequented by fish;
- winter lake/stream crossings shall be located in such a manner as to minimize approach grades, and shall be constructed entirely of ice and snow;
- bank disturbance is to be avoided, and mechanized clearing should not be done immediately adjacent to any water course;
- stream crossings shall be removed or notched prior to spring break up;
- on site operational practices for handling fuels and hazardous fluids should be available to personnel and include,
 - an approved spill contingency plan with response path,
 - location of all spill equipment on and off site,
 - report all spills to the 24 hour spill report line, and
 - keep an appropriate spill kit with absorbent material at all re- fueling stations;
- regarding planned deposition of drill wastes to a sump: EP recommends that a long term monitoring plan be implemented to assess the long term and cumulative effects of the normal mix, bury and cover restoration methods commonly used for drill sumps (and noted in the EUB Guide 50).

In its 13 November 2002 Information Request response to the NEB, Devon indicated that it is able to comply with all the mitigation measures provided in Environment Canada's 1 November 2002 correspondence to regulatory agencies and Devon.

Department of Fisheries and Oceans:

In a Letter of Advice to Devon, DFO recommends that the following mitigation measures, if implemented, should prevent any potentially harmful impacts to fish and fish habitat. This list includes measures outlined in the proposal.

- access routes should follow existing trails, winter roads or cut lines where possible to minimize unnecessary clearing of vegetation and soil compaction;

- every effort should be made to retain riparian vegetation as it is critical for the protection of littoral and riparian fish habitats as well as for providing cover and enhancing bank stability;
- reclamation activities should include bank stabilization and re-vegetation as required. This work should be completed before spring;
- water intakes should be properly screened with fine mesh of 2.54 mm to prevent the entrainment of fish. Please refer to the Freshwater Intake End-of-Pipe Fish Screen Guideline (DFO, 1995) which is available upon request; and
- "mushroom shoes" or "boots" on the blades of vehicles, such as loaders, are recommended as a protective measure to minimize ground disturbance and erosion.

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 containment facilities, should be located a minimum of 100 metres from any water body if possible, and be sufficiently bermed or otherwise contained to ensure that these substances do not enter any water body;
- due to concerns with the potential for sump failures (e.g., resulting from permafrost degradation) DFO encourages alternate waste disposal methodologies;
- fuel storage should have secondary containment (such as double walled tanks, berms, etc.) that is sufficient to ensure that fuel will not be able to enter any water body;
- 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.

In its 13 November 2002 Information Request response to the NEB, Devon indicated that it is able to comply with all the mitigation measures provided in DFO's 30 October 2002 Letter of Advice to Devon except:

- maintaining a 100 m buffer of undisturbed ground between the wellsite boundary and watercourses/waterbodies;
- maintaining, where feasible, 100 m between the ordinary high water mark of permanent watercourse/waterbody and drilling sump, campsite and associated facilities; and
- all wastes, drill cuttings, sewage and wastewater containment facilities, should be located a minimum of 100 metres from any water body if possible, and be sufficiently bermed or otherwise contained to ensure that these substances do not enter any water body; due to concerns with the potential for sump failures (e.g., resulting from permafrost degradation) DFO encourages alternate waste disposal methodologies.

Also in its Information Request response, Devon proposed the following mitigation to minimize potential impacts associated activities mentioned above:

- all hazardous fluids will be equipped with appropriately sized secondary containment systems;
- the program will be conducted during frozen ground and water conditions;
- appropriate spill response and fire fighting equipment will be located on-site;
- a Spill Contingency Plan will be available on-site; and
- issues of spill awareness and spill response will be a regular topic at on-site safety meetings.

10. 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

Potential adverse effects to permafrost, would be local in extent, low in magnitude, and reversible in the short-term (within one year) through mitigation measures. Disturbance to soils and terrain, if they occur, would be low in magnitude, local in extent and short-term. Loss of vegetation communities would be low in magnitude, limited to the access routes and well site and camp leases, and reversible in the medium- to long-term. Disturbance of wildlife, if it occurs, would be isolated, low magnitude, limited to one or two days, and reversible in the short-term. Potential damage to aquatic resources could be local to regional in extent, short- to medium-term and reversible in the medium-term. Damage to archaeological, historical or palaeontological resources, if it occurs, would be localized, immediate and low magnitude.

Through diligent safety procedures and systems (e.g., berms, false floors, blowout preventors), preventative regular maintenance, and implementation of emergency and spill response procedures, adverse environmental effects would be unlikely to occur or would be quickly mitigated.

Cumulative adverse environmental effects to the Bluenose-West/Cape Bathurst caribou herd would be expected to be sub-regional in extent and low in magnitude and insignificant. Cumulative adverse environmental effects to migratory bird populations and habitat would be expected to be sub-regional in extent, of low magnitude, short-term and insignificant. For vegetation and habitat loss, the cumulative adverse environmental effects are anticipated to be localized, reversible in the medium term and not significant.

11. Likelihood of Occurrence

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

n/a Yes

☒ No If yes, which one(s)?

12. CEAA Determination /Recommendation

- ☒ 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.

13. Consultation on Screening Report

Public consultation on screening report deemed necessary?
Deadline for comments on screening report

☐ Yes ☒ No
☐ n/a

Public Comments Received on Screening Report?
(Attach Comments to screening file.)

☐ Yes ☒ No

14. Follow-up Program

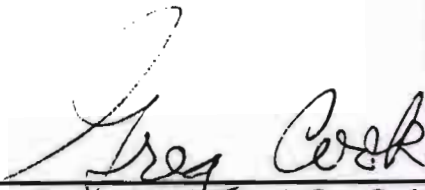
Regular licence, land use and operations inspections, conducted by regulating agencies and Devon, should identify any problems needing attention. Devon's post-program inspection would focus on: removal of debris from access and sites; ensuring no vegetation had inadvertently been left in water courses; documentation, reporting and reclamation of site disturbances, including off-site vehicle travel; removal of signage from access; and monitoring of the sump, including visual inspection and measures to determine whether the contents of the sump remain frozen and have not migrated from the location.

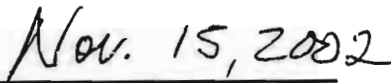
15.a) CEEA Determination and Authorization - NWT Water Board

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 (scrubber): Greg Cook
Environmental Assessment Coordinator


Date


Approved By: Gordon Wray
Chair

Date

15.b) CEEA 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

15.c) CEAA 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

Date

Approved By: T. M. Baker
Chief Conservation Officer

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

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 October 17, 2001 to review Petro-Canada's proposed project and, pursuant to subsection 6(1) of the CEAA Federal Coordination Regulations, inform the lead RA by October 27, 2001 whether they are a responsible authority or could provide specialist advice. The identified RAs and FAs were again contacted on October 24, 2002 and requested to review Devon's updated information and provide any further comments on the environmental assessment or new information pursuant to subsection 6(1) of the CEAA Federal Coordination Regulations to the lead RA by November 1, 2002.

The responses pursuant to subsection 6(1) of the CEAA Federal Coordination Regulations are provided in the following table:

Role of Federal Departments/Agencies

Department/Agency (District)	Responsible Authority	Specialist Department	No Involvement
Canadian Coast Guard (Sarnia)			X
Environment Canada (Yellowknife)		X	
Fisheries and Oceans (Yellowknife)		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 [delete any that do not apply]

DIAND: *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* Class B Water Licence - amendment

Section 8 Requirements of the CEAA Federal Coordination Regulations

With respect to section 8 of the FAR, 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

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

The RAs consider the principal project to be the proposed [geophysical operations or well drilling operations, etc.] related to hydrocarbon exploration in the Mackenzie Delta area, Northwest Territories.

2. 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.

3. 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 Description¹ for the project, are suggested.

1. Spatial Boundaries

- | | |
|--------------|--|
| Local: | Impacts would be limited to the seismic rights-of-way and camps; |
| Subregional: | Impacts might extend beyond the limits of the rights-of-way and camps, but would be limited to within 1 to 50 km of the rights-of-way and camps; and |
| Regional: | Impacts might extend beyond 50 km from the rights-of-way and camps to the entire region. |

2. Temporal Boundaries

- | | |
|--------------|--|
| Immediate: | Impact duration would be limited to less than two days; |
| Short-term: | Impact duration would be longer than two days but less than one year; |
| Medium-term: | Impact duration would be more than one year but less than ten years; and |
| Long-term: | Impact duration would extend ten years or longer. |

Section 9 Requirements of the CEAA Coordination Regulations

The RAs agreed to a CEAA determination date of 21 November 2002 for taking a course of action under subsection 20(1). Each RA for this joint screening made its own independent CEAA determination.

¹ Inuvialuit Environmental & Geotechnical Inc., August 2001, "Project Description for the Proposed Petro-Canada Kurk/Napartok Winter 2001/2002 Drilling Program".

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 (including well testing, suspension and abandonment activities)
 - 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)
 - tunnelling/underground
 - other, explain _____
- ✓ accidents or malfunctions (Check if there is a possibility for malfunctions and accidents with this project). Describe. ✓ risk of spills: minimal - training, safety and preventative procedures and measures in place.
- ✓ effects of environment on project (e.g., beaver dams). Describe: weather disruptions affecting schedule; sensitive terrain affecting routing; deep snow affecting site drainage and recovery of garbage; lack of snow affecting schedule and vegetation and terrain;

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 (aquatics study)
 - ☒ hunting/subsistence (Cape Bathurst Caribou Herd Tagging/Tracking)
 - ☒ other: biophysical studies, grizzly bear denning study
 - ☐ 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)

48. ☒ impact to local aesthetics
49. ☒ impact to archaeological or historical site
50. ☐ other, explain _____

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 (caribou herd)
25. ☐ impact to small mammals
26. ☐ impact to fish
27. ☒ impact to birds (population & habitat)
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 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

Cumulative Environmental Effects - Comparison of effects identified in Table A and Table B

Matching Numbers	Description of cumulative adverse environmental effects
7	Change in air quality caused by the running of diesel and gas engines for the duration of the projects and by flaring during well testing. Emissions from flaring, generators, trucks, Nodwells and other heavy equipment may cause air quality problems in small areas of the region. Effects are expected to be temporary and reversible at the end of the project.
11	Change in ambient noise levels - Noise levels will increase due to the number of vehicles and equipment being used in the wilderness area. Due to the winter operations, wildlife populations may be sparse (e.g., migratory birds) or would avoid the sources of noise and move back into the area after the completion of the program.
14 & 15 & 16	Alteration of permafrost regime and destabilization / erosion and compaction could occur if permit conditions and proposed operating procedures were not followed. This may be multiplied by the numerous seismic and well drilling programs. Efforts would be made during all the programs to prevent or minimize alteration to the permafrost layer.
24 & 27 & 31 & 32	Impact to the caribou herd and impacts to migratory bird habitat could occur - as this is new development in a wilderness area. This effect will probably displace mammals and birds for a temporary period of time. Although once the wildlife becomes familiar with the presence of people they will start returning to the area after the project is completed. Change in wildlife habitat / ecosystem - this will occur on each program area due to the minimal disturbance of the vegetation. This will cause new and perhaps different vegetation growth in the future thus changing the habitat. Habitat alteration would be limited to the well site and overland access and would be allowed to regenerate over a period of years.

Attachment 1

(Insert Figure 1)

Attachment 2 - Proponent's Mitigation Measures

Concern/Impact	Mitigation Measures
1. Permafrost	
1.1 Disturbance of permafrost	Surface area utilized will be minimized to avoid disturbance of permafrost outside the wellsite and camp leases and/or off the 15 m wide access road.
	Except during sump construction, permafrost areas will not be disturbed.
	Machinery will be strictly confined to the surveyed area to minimize terrain disturbance.
	Access roads and the lease site will be flooded with water to create an ice layer of sufficient thickness to insulate the permafrost and protect it from degradation.
	Equipment mobilization / demobilization and drilling operations will occur during winter to mitigate soil disturbance and permafrost degradation.
	Access roads will not be constructed until the active layer of the soil is frozen.
	Casing of the well will be installed in accordance with the Canada Oil and Gas Regulations including: <ul style="list-style-type: none"> Permafrost casing will be cemented from the shoe of the casing to the surface.
2. Terrain and Soils	
2.1 Disturbance to the soil profile (i.e. soil loss, compaction, admixing)	Clearing of the site will be completed under frozen ground conditions limiting soil disturbance caused by uprooting.
	Construction of an rig pad, access roads and lease site will mitigate soil compaction from the drilling rig and associated equipment
	Access roads will not be constructed until the active layer of the soil is frozen.
2.2 Disturbance to drainage	The well sites will not be located within a drainage feature.
	The well sites will not be located downhill from perennial snow accumulation areas or snow banks.
	Snow bridges or ice roads will be constructed across drainage or water bodies. Only clean snow and/or ice will be used for drainage crossings.
	Drainages will be left free of debris.
	Any clearings will be re-contoured to restore natural cross drainages
	Surface drainage ditches will be reclaimed to original condition. V-notching of snow bridges will be performed upon completion.
3. Vegetation	
3.1 Loss of vegetation communities	Mobilization and demobilization will take place in winter and utilize an ice access, therefore minimizing effects to existing vegetation.
	Cleared vegetation and snow will be windrowed within the surveyed area and not pushed into standing vegetation or undisturbed areas.
	The access road will be developed along the Mackenzie River and on ice access routes.

Concern/Impact	Mitigation Measures
	Where new access road is required, it will entail compacting snow and building an ice layer. Roads will be restricted to a 15 m width.
4. Wildlife	
4.1 Disturbance to wildlife	Intake hoses will be equipped with screens to prevent impingement or entrainment of fish.
	The sump will be fenced to prevent wildlife from accessing the sump.
5. Aquatic Resources	
5.1 Erosion of stream banks and destabilization of slopes	Snow ramps will be designed to minimize erosion and/or destabilization of slopes.
	Tracked units and dozers equipped with mushroom shoes will be used to reduce the possibility of surface disturbance.
	A 100 m buffer of undisturbed ground between the well site boundary and watercourses or water bodies will be maintained.
5.2 Possible damage to fish habitat and spawning sites	Excavated fill, waste material, or debris will not be disposed of in waterways
	No materials will be stored on any ice surface of a water body or within 30 m of such a water body.
	Water intake from water bodies will utilize screens on intake hoses to prevent damage to stream or lake bottoms and to prevent the entrainment of fish.
	Water for construction, drilling, and camp use will be collected at permitted sites.
	Drawdown of water sources will be minimized through the selection of lakes of appropriate size, and by drawing from the Mackenzie River.
5.3 Introduction of oil, fuel or other pollutant to water body	The campsite and associated facilities (i.e. kitchen, sanitary waste sumps, solid waste site) will be located a minimum of 100 m from the ordinary high water mark of any permanent water body or watercourse, where feasible.
	Liquid fuels and oils will be stored in a closed system during transportation.
	Liquid fuel will be contained in a closed and properly vented container and will be located at least 25 m from the well.
	All fuel storage will have secondary containment with the volume of containment being 15% greater than the capacity of the largest fuel container.
	Fuels or hazardous materials will not be stored within 100 m of a water body, where feasible.
	Devon will minimize fuel storage volumes on site by transporting fuel to the work site on an as needed basis from fuel barge locations and Swimming Point base camp.
	Hydraulic hoses and couplings, fuel tanks, and other potential sources of contamination will be inspected prior to working on-site.
	Any mobile equipment will be refueled and serviced a minimum of 100 m away from water bodies, where feasible.
	Drilling units will be equipped with a system capable of collecting any waste oil from the oil sumps on the unit.

Concern/Impact	Mitigation Measures
	The well-head will be equipped with a blow-out preventor system and be installed in accordance with the Canada Oil and Gas Drilling Regulations.
	Spills will be recovered immediately and the location, type of pollutant and volume unrecovered recorded.
	Spills will immediately be reported to Devon's Environmental Coordinator and the 24 Hour Report Line (867-920-8130). Spills > 100 L during drilling program operations will also be reported directly to the NEB. Devon's Emergency Response Plan will be implemented in the event of a spill.
	Spill areas will be treated in-situ where appropriate.
	Personnel will be trained in spill response procedures and equipment use.
5.4 Disposal of drilling waste in sumps	Drilling fluid sumps will be located a minimum of 100 m from the ordinary high water mark of any permanent water body or stream, where feasible.
	The sump will be located on the high side of the lease and sufficient space will be left for expansion of the original sump if required.
	Drilling fluid levels will be maintained a minimum of 1.5 m below the level of the immediately adjacent original ground.
	The sump will be constructed to contain 0.5 m ³ per metre of hole drilled.
	If there is no alternative but to construct the sump in a pervious material, sump will be lined with either an artificial liner.
	Well site personnel will be familiar with the properties of the mud types available and only use drilling additives of chemically known composition.
	Records will be kept of the quantities and types of mud additives used, in case post-abandonment leakage problems occur.
	Sumps will be monitored regularly so that any required corrective measures can be immediately implemented.
	Snow fences will be used to prevent snow from accumulating in the sump and to prevent wildlife or personnel from falling in.
	Sump will be properly abandoned at the end of the operating season.
5.5 Disposal of other associated waste	In the event there are sump problems leading to potential release of untreated toxic material into the environment the following three options will be considered: <ul style="list-style-type: none"> • Drilling will be suspended; • The existing sump will be enlarged or a supplementary sump will be constructed; and • Fluids from the sump will be dewatered. Applications to dewater sump fluids will only be considered in special circumstances and only for treated fluids
	Supplementary sumps will be constructed immediately adjacent to the existing sump with a wall separating the two. A ditch will be dug to connect the two sumps.
	Combustibles and non-combustibles will be segregated.
	Camp wastes will be incinerated with a force-fired incinerator daily.
	Incinerator residue will be disposed of at an approved facility.

Concern/Impact	Mitigation Measures
	Non-combustible materials will be hauled to Inuvik for proper disposal at the landfill.
	Solid wastes will not be disposed of in the drilling fluid sump.
	All waste fuel, oil or lubricant will be collected in a closed system separately and will be transported and properly disposed of off site.
6. Interference with Other Land Uses	
6.1 Possible conflict with wildlife harvesting in the area	Public consultation with all local communities has been undertaken and is ongoing to notify communities of drilling operations and timing.
	Post construction warning signs will be placed on access routes.
7. Archaeological, Historical or Palaeontological Sites	
	A 30 m buffer between camp facilities, including roads, and culturally important sites will be maintained.
	Should any archaeological or palaeontological sites be discovered during construction or operations, work will be suspended at that location until permission is granted by the appropriate Inuvialuit organizations. Notification shall be provided in writing within 2 days.
8. Abandonment and Restoration	
	Non-combustible solid wastes will be removed from the site.
	Drilling sump fluids will be disposed of using the total containment method.
	The sump will be capped with a layer of freshwater to dilute the salt content of the sump fluids and ensure that the sump remains frozen.
	Before backfilling the sump, the frozen fluids will be tested to ensure they are sufficiently frozen to support the weight of the backfill material without rupturing.
	A compacted cap of a minimum 1.5 m of soil material will be placed over the sump. The cap will overlap the sump edges.
	Material excavated during sump construction will be used as the cap material and contoured to promote vegetation growth and allow natural migration of permafrost on to the site.

**RECOMMENDED CONDITIONS ANNEXED TO AND FORMING PART
OF LAND USE PERMIT NUMBER N2002B0039**

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 Apr 15, 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. | CLOSURE |

31 (1) (C) - EQUIPMENT

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| 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 cutting edge of the blade. | BULLDOZER
BLADES
AND SHOES |
| 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

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| 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 <u>Ice Roads</u> 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

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| 5.1 | The Permittee shall not locate any sump within one hundred (100) 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:

(a) Place all excavated material over the sump area to ensure ponding does not occur. | BACKFILL
SUMP
OVERLAP |

- (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**

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| 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 |
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**31 (1) (G) - USE, STORAGE, HANDLING AND DISPOSAL
OF CHEMICAL OR TOXIC MATERIAL**

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| 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 |
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| 7.2 | The Permittee shall not use the following materials during the drilling operation without the prior written approval of the Engineer: | PROHIBITED
CHEMICALS |
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Chlorinated phenols (Dowicide B, etc.)
Compounds composed primarily of heavy metals
Asbestos

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| 7.5 | The Permittee shall deposit all drill waste containing poisonous or persistent chemical additives into a sump. | DRILL WASTE
DISPOSAL |
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| 7.6 | The Permittee shall deposit all drill waste into a sump. | DRILL WASTE |
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| 7.7 | The Permittee shall not allow any drilling waste to spread to the surrounding lands. | DRILL WASTE
CONTAINMENT |
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| 7.8 | The Permittee shall burn all garbage and debris at least daily. | GARBAGE
DISPOSAL |
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| 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 |
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| 7.12 | The Permittee shall dispose of all combustible waste petroleum products removal. | WASTE
PETROLEUM
DISPOSAL |
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| 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 |
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| 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

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| 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

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| 9.3 | The Permittee shall not operate any machinery or equipment within one hundred and fifty (150) metres of the base of a pingo. | PINGOS |
| 9.4 | The Permittee shall not feed wildlife. | NO FEEDING
WILDLIFE |

31 (1) (K) - PETROLEUM FUEL STORAGE

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| 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 | FUEL ON LAND |

stationary for any period of time exceeding twelve (12) hours.

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| 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:

(a) examine all fuel storage containers for leaks a minimum of once every day.

(b) repair all leaks immediately. | CHECK
FOR LEAKS |
| 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

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| 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 |
| 12.12 | The Permittee shall salvage all portions of trees cleared that are larger than thirteen (13) centimetres in diameter. | SALVAGE TIMBER |

**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, **CONTINGENCY PLAN**
for chemical and petroleum spills, for use during the
construction and operation of the winter road.

RECOMMENDED MITIGATIONS SUPPLEMENTARY TO PERMIT CONDITIONS

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.

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).

Low impact wheeled vehicles should be limited to properly constructed snow/ice roads. There should be no use of these vehicles on seismic lines.

Operational

- No burning of plastics
- Waste oil should be recycled