



ENVIRONMENTAL SCREENING REPORT

SCREENING SUMMARY

EnCana Corporation (EnCana) applied to the National Energy Board (NEB) pursuant to paragraph 5(1)(b) of the *Canadian Oil and Gas Operations Act* (COGOA) for approval to drill one exploratory well (the Project) during the winter of 2004. The proposed project would be located on Richards Island in the Mackenzie Delta, near the Inuvialuit Settlement Region of the Northwest Territories. The environmental components with the potential to be adversely affected include surface water, air quality, soil and permafrost, terrain, vegetation, terrestrial fauna and habitat, aquatic fauna and habitat, heritage resources, and traditional use. The NEB examined EnCana's proposed mitigative measures in relation to these environmental components and determined the measures were adequate.

The NEB, Northwest Territories Water Board (NWT Water Board), and Indian and Northern Affairs Canada (INAC) are Responsible Authorities under the *Canadian Environmental Assessment Act* (CEA Act) and have prepared a joint screening. The NEB, as the Lead Responsible Authority, has examined EnCana's proposed environmental protection and mitigation measures in relation to those environmental issues and determined the measures to be adequate.

The NEB, NWT Water Board and INAC are of the view that, taking into account the implementation of EnCana's proposed environmental procedures and mitigative measures the project is not likely to cause significant adverse environmental effects. This represents a determination pursuant to paragraph 20(1) (a) of the *Canadian Environmental Assessment Act*.

PROJECT IDENTIFICATION

Project Title:	EnCana Corporation Burnt Lake Drilling Program
Physical Work/Activity:	Land Use, Water Use and Waste Disposal, Oil and Gas Activity (Drilling Program)
Project Location:	Richards Island in the Mackenzie Delta, Inuvialuit Settlement Region, Northwest Territories, Approx. 69 25 53N 134 19 06W
Applicant Name:	EnCana Corporation (EnCana)
Application Date:	29/09/03
NEB File No.:	WID to be assigned
NWT Water Board File No.:	N7-1-1797
INAC File No.:	N2003A0035
NEB Reference No.:	553
CEA Act Registration Date:	02/10/03
CEA Act FEAI¹ No.:	39479
CEA Act Law List Trigger:	Paragraph 5(1)(b) of <i>Canadian Oil and Gas Operations Act</i> Paragraph 14(6)(b) of the <i>Northwest Territories Waters Act</i> Paragraph 25(1)(a) <i>Territorial Land Use Regulations</i>
CEA Act Determination Date:	4 December 2003

¹ FEAI (Federal Environmental Assessment Index)

1.0 SCOPE OF THE ENVIRONMENTAL ASSESSMENT

The proposed Burnt Lake Drilling Program is provisionally scheduled to begin in December 2003 and would be completed by April 2004. EnCana originally proposed to drill one exploratory well on Richards Island selected from three potential locations (N16, D16 or K16). The well would be drilled to a depth of approximately 3,300 m. The potential well locations are within EL 384 on Crown Land.

The NEB considers the principal project to be the proposed drilling of a single well related to hydrocarbon exploration west of Inuvik in the vicinity of Richards Island in the Inuvialuit Settlement Region, Northwest Territories. Unless otherwise identified this Environmental Screening Report (ESR) is based on the information provided in the EnCana's Project Description¹ for the proposed Burnt Lake Drilling Program and associated documents (Appendix D).

Scope of the Project

Physical Work and/or Activity	Description
<i>Construction Phase – December 2003 and January 2004</i>	
Access construction	<ul style="list-style-type: none"> * Construct approximately 18.8 km of ice road (20 m wide on land and 60 m wide on frozen water bodies) * Use of the Arctic Star Barge camp with water withdrawal and discharge of treated wastewater (separate water licence to be acquired by Arctic Star for this activity)
Preparation of the drilling site	<ul style="list-style-type: none"> * Construction of a 150 m by 150 m drilling ice pad * Construction of a 80 m by 120 m camp ice pad * Construction of a 85 m by 100 m ice pad for the flare stack * Construction of a 1000 m by 60 m ice airstrip * Construction of a 30 m by 30 m helicopter landing pad * Blasting and excavation of a 5.4 m deep 20 m by 60 m drilling waste disposal sump
Temporary work camp establishment	<ul style="list-style-type: none"> * 21-unit complex and 6 support buildings – house 70 to 80 people * Sleigh camp sleepers will be added with additional accommodation for 30 to 40 people if personnel exceeds 80 people
Water use and waste disposal	<ul style="list-style-type: none"> * Water withdrawal from approved lakes and the East Channel of the Mackenzie River. Maximum daily withdrawal during access construction is expected to be 1800 m³ * Disposal of the KCL based drilling mud will be through the use of an in-ground sump * Wastewater will be treated from the rig camp with a <i>Filterboxx</i> system. The drilling camp's existing EcoTech extended aeration system will act as a contingency for water treatment in the event the <i>Filterboxx</i> is not in place. Disposal of treated wastewater onto land
<i>Operation Phase – January to April 2004</i>	

¹ EnCana September 2003, *Project Description for the Proposed EnCana Corporation Burnt Lake Drilling Program Winter 2004*.

Physical Work and/or Activity	Description
Well drilling and operation	<ul style="list-style-type: none"> • Drill the well to a depth of approximately 3,300 m. • Use of Akita-Equak Rig 62 self contained rig camp with diesel generators; potable water maker, and sewage treatment system • Waste separation and tracking system for metals, plastics, and oily water. On-site incineration of combustibles, hauling of ash and recyclables, and on-site storage of waste materials and hauling • Transport of hazardous material to approved facilities • Weekly transport of various fuel types and onsite storage of fuels • Use of a potassium chloride (KCl) drilling mud system with mud cooler
Flow Testing	<ul style="list-style-type: none"> • Flow testing using a flare stack for a period of approximately 2-3 days • Use of equipment capable of efficiently burning the liquid to generate power for use in the rig and camp
<i>Abandonment Phase – April to August 2004</i>	
Clean-up	<ul style="list-style-type: none"> • Capping of the well • Disposal of all equipment, survey stakes, and construction debris • De-mobilization of the rig and camp • Sump integrity monitoring for at least 5 years

Scope of the Factors that were Considered

The factors considered within the scope of this ESR are those set out in subsection 16(1) of the CEA Act and are examined in this report.

The project area is the area in which the project footprint occurs; the access roads, the ice pads for drilling, the camp, the helicopter landing pad, airstrip, flaring pad and sump area, (see area details in scope table above).

2.0 DESCRIPTION OF THE ENVIRONMENT

2.1 Physical Environment

The proposed well sites for the proposed program are 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. Pingos, some very large, also form unique features in the regional landscape. The region is underlain by continuous permafrost with sediment often containing excess ice in the form of ice veins, lenses, wedges, and massive ice.

Tundra upland soils support tundra vegetation communities providing wildlife habitat and insulative properties that limits the degradation of permafrost. Permafrost, in turn, limits the downward migration of water allowing soils to remain waterlogged even though there is little precipitation. Permafrost in the Tuktoyaktuk Coastal Plains is generally exceeding 500 m in thickness. The active layer (soil layer that thaws every year) develops to about 1 m thick.

Richards Island is characterized by a surficial hydrology that is fundamentally different to Mackenzie Delta Island further west. The area is generally strewn with large number of typically shallow lakes. Lakes in this area remain ice covered for around 250 days per year, with freeze up generally occurring in September or October and break up in late June. The project area lies within the Burnt Creek watershed

which drains westward into Mallik Bay. The project area includes five major lakes ranging in size from 20 to 328 ha, and in depth from 4.4 m to 10.9m.

2.2 Vegetation

Vegetation communities in the project area consist of a continuous cover of shrubby tundra vegetation, including dwarf birch, willows, alder, northern Labrador tea, red and alpine bear berry, crowberry, and bog bilberry. There are low wet sites with a sphagnum moss cover, as well as sedges and cotton-grasses, and in warmer sites dwarf birch, willow, and alder. The flora of the communities is diverse including both southern species and truly arctic or maritime species.

2.3 Terrestrial Fauna

The proposed drilling program overlaps with the range of the Cape Bathurst barren-ground caribou herd, and to a lesser extent the Bluenose West herd. The combined population of the two herds was estimated at 88,000 to 106,000 individuals in 1992, and according to recent community interviews, the herds are perceived to be increasing in numbers.

Grizzly bears exist across coastal areas of the western Arctic in relatively low population densities. The apparent low density may have been the result of poor habitat quality combined with the level of past harvest. Grizzly bears den throughout the Mackenzie Delta where suitable denning habitat exists. The majority of known grizzly bear dens in the delta occur on Richards Island.

The distribution of polar bears in the Southern Beaufort Sea is regulated by constantly changing sea ice, and by the distribution and abundance of seals. Polar bears demonstrate weak fidelity to activity areas in winter and early spring. A net southward movement to near-shore foraging habitat occurs in October, while a net northward movement occurs from May to August. Although polar bears frequent near-shore habitat, radio telemetry indicates that they seldom venture onto land.

Arctic foxes use coastal areas across the western Arctic and are linked to fluctuation in prey densities and availability to suitable denning habitat. During the spring and summer arctic foxes occupy areas near terrestrial denning sites remaining there during the relatively snow-free period from May to August. Important denning sites occur along coastal areas of Richard Island and the Northern Tuktoyaktuk Peninsula.

Muskrats occur in particular concentrations in the Mackenzie Delta and coastal Beaufort region. Although Richard Island contains less suitable muskrat habitat compared to the delta, an intermediate number of muskrat pushups on upland lakes of Richard Island and near the Parsons Lake area have been recorded.

Waterfowl known to utilize the project area include, white-fronted and Canada geese, lesser scaup, greater scaup, white winged scoter, surf scoter, long-tailed ducks, tundra swans and colonial nesting gulls and terns.

2.4 Aquatic Fauna

Fish population in lakes within the Burnt Creek watershed included broad whitefish, lake whitefish, burbot, least cisco, northern pike and lake trout.

3.0 CONSULTATION

3.1 Consultation carried out by EnCana

EnCana initiated public consultation with regional organization(s) and government agencies potentially affected by the proposed program in April 2003. EnCana held public meetings from 29 April to 1 May

2003 in the communities of Inuvik, Tuktoyaktuk, and Aklavik to discuss the details of the proposed project and to address any issues of concerns. Updates on the project were also provided to the Hunters and Trappers Committees and Community Corporations in Tuktoyaktuk, Inuvik and Aklavik between 25 August and 11 September 2003. Discussions with regulators and management bodies have been ongoing. A summary of the comments is provided in Appendix A.1.

3.2 Consultation with other Federal Authorities pursuant to the CEA Act

Based on the type and location of the project, and the nature of the environment that could be affected by the project, the NEB contacted Environment Canada (EC), Fisheries and Oceans Canada (DFO), INAC, Natural Resources Canada (NRCan), Health Canada (HC), and Parks Canada (PC). Summaries of the comments are provided in Appendix A.2.

3.3 Consultation carried out by the Inuvialuit Environmental Impact Screening Committee

The Environmental Impact Screening Committee (EISC) reviewed the Application and decided on November 3, 2003 that the development will have no significant negative impact on the environment or Inuvialuit wildlife harvesting in the Inuvialuit Settlement Region [IFA Section 11(13)(a)].

The EISC received correspondence from the Aklavik Hunters and Trappers Committee, the Wildlife Management Advisory Committee (NWT), the Fisheries Joint Management Committee, EC, DFO and PC.

The details of the response to the consultation carried out by the Inuvialuit Impact Screening Committee and the information considered in this ESR is provided in Appendix A.3.

3.3 Consultation carried out by the NWT Water Board

The NWT Water Board requested comment on the application from the NWT Water Board Technical Advisory Committee to be considered in their Type B water licence application review. The NWT Water Board received comments from six technical advisors on the program.

The details of the response to the consultation carried out by the NWT Water Board and the information considered in this ESR is provided in Appendix A.4.

3.4 Consultation carried out by INAC

INAC requested comment from twenty-four various government and local aboriginal groups on the application to be considered in their land use permit application review. INAC received comments from four of the groups consulted on the program.

The details of the response to the consultation carried out by the Inuvik office of INAC and the information considered in this ESR is provided in Appendix A.5.

4.0 ENVIRONMENTAL EFFECTS ANALYSIS

4.1 Baseline Information and Sources

The NEB's analysis is based on the information in the Application and referenced in Appendices A to D.

4.2 Methodology of the Board's Environmental Assessment

In assessing the environmental effects of the project the NEB used an issue-based approach. In its analysis the NEB identified interactions expected to occur between the proposed project activities and the surrounding environmental components. If there were no expected project interactions with an environmental component then no further examination was deemed necessary (Table 4.3.1).

Further analysis was conducted for project-environment interactions that could result in negative effects or where the interactions or effects were uncertain (Table 4.4.1). As well, environmental effects of accidents or malfunctions that may occur in connection to the project were considered. The Applicant's proposed mitigative measures and environmental-protection procedures were examined to assess the potential for any residual adverse environmental effects.

Each predicted residual adverse environmental effect was evaluated and an overall cumulative effects assessment completed taking into consideration any additional mitigation, monitoring or regulatory requirements. Frequency, duration, geographic extent, reversibility and magnitude of the predicted effects were evaluated in determining significance and likelihood. The results of the environmental-effects analysis are summarized in the NEB's, NWT Water Board's and INAC's (Sections 5.0- 7.0) conclusions.

4.3 Project – Environment Interactions

Table 4.3.1 Interaction Matrix

	Environmental Component	Project Interaction (Y/N/E)	Probable Effect (Pos/Neg/S/U)	Description of Interaction (How, When, Where Likely to Occur)
Physical	Groundwater	N		<ul style="list-style-type: none"> No interaction (remote chance of encountering an artesian aquifer)
	Surface Water	Y	Neg	<ul style="list-style-type: none"> Introduction of sediments and/or pollutants in surface water during road construction and site preparation Alteration of surface flow patterns at equipment crossings
	Air Quality	Y	Neg	<ul style="list-style-type: none"> Emissions from the equipment onsite, incineration of camp waste, and flaring of the gas during testing.
	Soils-Permafrost	Y	Neg	<ul style="list-style-type: none"> Sump creation, disturbance of the surface vegetation could result in thawing of the permafrost. Overland road construction could also disturb the soil-permafrost.
	Terrain	Y	Neg	<ul style="list-style-type: none"> Creation of a sump through the use of dynamite.
	Effects of Environ. on Project	Y	Neg	<ul style="list-style-type: none"> Extreme winter conditions could cause work delays
Biological	Vegetation	Y	Neg	<ul style="list-style-type: none"> During access construction and seismic operations, clearing of shrubs, lying down of vegetation and surface disturbance may occur.
	Terrestrial Fauna	Y	Neg	<ul style="list-style-type: none"> Direct human-wildlife interaction during vehicle travel to and from the project area, sensory disturbances from drilling rig operation noise, area avoidance as a result of human activity in the area. Chance of mortality from den disturbances and/or vehicle collisions
	Terrestrial Habitat	Y	Neg	<ul style="list-style-type: none"> Temporary habitat removal and/or alteration during road construction and site preparation.
	Wetlands	N		<ul style="list-style-type: none"> No interaction
	Aquatic Fauna	Y	Neg	<ul style="list-style-type: none"> Impingement or entrainment in water intake hoses. Potential for fish migration blockages at stream crossings.
	Aquatic Habitat	Y	Neg	<ul style="list-style-type: none"> Alteration of aquatic habitat due to water drawdown, stream bank erosion during road construction

	Species at Risk	Y	Neg	<ul style="list-style-type: none"> Possible interaction with polar bears which are a COSEWIC species of "Special Concern" and listed as "sensitive" under the NWT Species 2006 classification.
Social	Land Use	N		<ul style="list-style-type: none"> See Traditional Use
	Heritage Resources	Y	Neg	<ul style="list-style-type: none"> Potential disruption of heritage sites during access or drilling pad construction
	Traditional Use	Y	Neg	<ul style="list-style-type: none"> Potential disturbance of traditional harvesting activities resulting from change in wildlife use of the area.
	Socio-economic	Y	Pos	<ul style="list-style-type: none"> Short-term and seasonal employment opportunities and use of local suppliers.
	Human Health	N		<ul style="list-style-type: none"> No interaction
	Noise/Aesthetics	N		<ul style="list-style-type: none"> No interaction

Legend: Y (yes); N (no); U (uncertain); Pos (positive); Neg (negative); 0 (neutral)

4.4 Project Interactions that May Result in Residual Adverse Environmental Effects

Table 4.4.1: Environmental-Effects Matrix

Environmental Component	Predicted Negative or Uncertain Effects	Applicant Mitigation (Y/N)	Residual Adverse Effect (Y/N/A)	Explanatory Notes
Surface Water	Introduction of sediments and/or pollutants	Y	N	Access will be constructed to intersect stream bank at 90°. No clearing of vegetation including riparian areas. No material to be stored on ice or water bodies. Ice profiling before equipment travel. Store fuel 100m away from water bodies. Wastewater to meet limits set by the NWTWB prior to discharge to the environment.
Air Quality	Decreased in air quality	Y	Y	See table 4.5.1
Soils-Permafrost	Surface and permafrost regime disturbance	Y	N	Access over a minimum of 15 cm of snow. Limit the access to 20 m wide on land. Drill site constructed on a minimum of 40 cm thick ice pad. Activities only on frozen surface. Use of KCl mud system and mud cooler during drilling to prevent down hole permafrost melting. Topsoil stripping prior to sump excavation.
Terrain	Modification of the terrain, slumping	Y	N	Sump site selection based on sound geophysical assessment of the site, and soils. Layering of sump material. Ensure that sump material is frozen before next layer. Backfill material to be track-packed. Sump integrity monitoring.
Vegetation	Damage and/or removal of vegetation	Y	Y	See Table 4.5.2
Terrestrial Fauna	Sensory disturbances and mortality due to vehicle collisions.	Y	N	Speed limits. Fenced sump area. Storage of chemicals, fuels and other harmful materials in areas inaccessible to animals. Daily incineration of camp wastes. No feeding or harassing of wildlife. No forced movement of caribou. 300 to 500 m pullback zone from grizzly and polar bear den site. Avoidance of arctic fox dens.
Terrestrial Habitat	Habitat removal or alteration	Y	Y	See Table 4.5.3
Aquatic Fauna	Mortality due to impingement or entrainment in water intake hoses.	Y	N	Screen all water intake hoses as per DFO guidance.
Aquatic Habitat	Habitat removal or alteration	Y	Y	See Table 4.5.4

	Alteration of fish migration patterns	Y	N	Snowfalls or frozen drainage channels will be removed or v-notched during access road decommissioning
Species at Risk	Disturbance of polar bears and or polar bear habitat	N	N	Polar bears are rarely observed in the project area during the winter season and den offshore. Project area will be monitored by wildlife monitors and in the event a polar bear is seen the area will be avoided.
Heritage Resources	Disruption or destruction of heritage resources	Y	N	Known and newly identified sites were avoided. Cease operations in the area of a discovery and contact the appropriate agencies.
Traditional Use	Disturbance of traditional harvesting activities	Y	N	Local trappers and hunters associations were contacted and will be consulted through the program. Project mitigation will minimize the effect on wildlife.
Accidents and Malfunctions	Spills, leaks, well kicks and blowouts, and malfunction of wastewater treatment system	Y	N	Regular maintenance checks. Proper handling procedures for chemicals. Blowout preventors and procedures. A wastewater technician would be onsite to adjust the wastewater treatment system.

Legend: Y (yes); N (no); U (uncertain)

4.5 Predicted Residual Adverse Environmental Effects

Table 4.5: Criteria for Evaluation of Significance of Adverse Environmental Effects

Criteria	Definitions
ALL CRITERIA	
Uncertain	When no other criteria descriptor is applicable due to either lack of information or inability to predict.
FREQUENCY	
Single	A one-time event over assessment period (i.e., life of the project)
Multiple	Occurs intermittently but repeatedly over assessment period
Continuous	Occurs continually over assessment period
DURATION	
Short-term	Effect duration is limited to less than two days
Medium-term	Effect duration is longer than two days but less than one year
Long-term	Effect duration extends one year or longer
GEOGRAPHIC EXTENT	
Local	Project footprint, or the immediate area of the project operations that is estimated to affect less than 1 % of the regional area
Sub-regional	Extending beyond the limits of the project operations, but limited to an area of no more than 5 % of the regional area
Regional	Effect reaches beyond the 5 % of the regional area (Mackenzie Delta within the Inuvialuit Settlement Region)
REVERSIBILITY	
Reversible	Effect would return to baseline conditions within the life of the project
Irreversible	Effect would be permanent, or only reversible beyond the life of the project
MAGNITUDE	
Low	<ul style="list-style-type: none"> • Effects anticipated to be restricted to a few individuals, but would not affect the resource or parties involved • Factors that influence species at the population level would not be affected and in no way endangers their long-term survival • The component is not rare, nor unique

Criteria	Definitions
Medium	<ul style="list-style-type: none"> • Effects would affect many individuals or could noticeably affect the resource or parties involved • Factors that influence species at the population level would be affected to a degree that a change within natural limits of variability will occur without endangering their long-term survival • The component is not rare, nor unique
High	<ul style="list-style-type: none"> • Effects would affect numerous individuals or affect the resources or parties involved in a substantial manner • Factors that influence species at the population level would be altered to such a degree that a change beyond natural limits of variability will occur and endangers the long-term survival of a population or species • The component is unique; requires a particular protection status
EVALUATION OF SIGNIFICANCE	
Significant	Any adverse effect that would be of high frequency, long-term duration, regional extent, irreversible, and of high magnitude
Not significant	Any adverse effect that would be of low to medium frequency, short to medium term duration, immediate to local extent, reversible, and of low to medium magnitude

Table 4.5.1: Summary of Analysis

Residual Effect: Decreased Air Quality					
<i>Physical Work/Activity:</i>	<ul style="list-style-type: none"> • Emissions from equipment during construction, operation, and abandonment • Flow testing and flaring of the gas 				
<i>Mitigation:</i>	<ul style="list-style-type: none"> • Flare stack designed to burn the gas encountered efficiently • Hydrocarbon liquids will be removed prior to flaring and transported for disposal • Flare stack located 150 m downwind of the camp • Flow testing will be done for a limited time period (max. expected time frame ~ 72 hours) 				
<i>Monitoring/Follow-up:</i>	<ul style="list-style-type: none"> • There will be ongoing monitoring of any flow testing 				
<i>References:</i>	<ul style="list-style-type: none"> • 1, 2 				
Frequency	Duration	Geographic Extent	Reversibility	Magnitude	Significance
Continuous	Medium-term	Sub-regional	Yes	Low	Not significant

Table 4.5.2: Summary of Analysis

Residual Effect: Damage and/or removal of vegetation					
<i>Physical Work/Activity:</i>	<ul style="list-style-type: none"> • Construction and operation of access road • Construction of well site and drilling of a well 				
<i>Mitigation:</i>	<ul style="list-style-type: none"> • A minimum of 15 cm of snow cover would be required to enable access • Limit the access to 20 m wide on land. • Drill site constructed on a minimum of 40 cm thick ice pad. • Activities on frozen surface only 				
<i>Monitoring/Follow-up:</i>	<ul style="list-style-type: none"> • Post operation clean-up monitoring to occur in July or August 				
<i>References:</i>	<ul style="list-style-type: none"> • 1, 2 				
Frequency	Duration	Geographic Extent	Reversibility	Magnitude	Significance
Multiple	Long-term	Local	Reversible	Medium	Not significant

Table 4.5.3: Summary of Analysis

Residual Effect: Terrestrial Habitat Removal or Alteration					
<i>Physical Work/Activity:</i>	<ul style="list-style-type: none"> • Construction and operation of access road • Construction of well site and drilling of a well 				
<i>Mitigation:</i>	<ul style="list-style-type: none"> • Winter construction would minimize removal/alteration of habitat features • 300 to 500 m pullback zone from grizzly and polar bear den site. • Avoidance of arctic fox dens. • Environmental monitors to watch for bear den sites and notify personnel in charge 				
<i>Monitoring/Follow-up:</i>	<ul style="list-style-type: none"> • None 				
<i>References:</i>	<ul style="list-style-type: none"> • 1, 2 				
Frequency	Duration	Geographic Extent	Reversibility	Magnitude	Significance
Multiple	Medium-term	Local	Reversible	Low	Not significant

Table 4.5.4: Summary of Analysis

Residual Effect: Aquatic Habitat Removal or Alteration					
<i>Physical Work/Activity:</i>	<ul style="list-style-type: none"> • Road Construction • Water Withdrawal 				
<i>Mitigation:</i>	<ul style="list-style-type: none"> • Pre-approved water withdrawal volumes • Prior to water withdrawal from lakes additional depth measurements will be taken during ice profiling to confirm depths of the lakes • Refine contour map of lakes to withdraw in the deepest part of the lake • Stream banks to be protected by using snow and ice fills 				
<i>Monitoring/Follow-up:</i>	<ul style="list-style-type: none"> • None 				
<i>References:</i>	<ul style="list-style-type: none"> • 1, 2 				
Frequency	Duration	Geographic Extent	Reversibility	Magnitude	Significance
Multiple	Medium-term	Local	Reversible	Low	Not significant

4.6 Cumulative Effects Assessment

Table 4.6.1: Summary of Analysis

Potential Cumulative Effect (CE):	<ul style="list-style-type: none"> • Decreased Air Quality • Damage and/or removal of vegetation • Terrestrial Habitat Removal or Alteration • Aquatic Habitat Removal or Alteration 				
<i>Project Residual Effect:</i>	<ul style="list-style-type: none"> • Emission from equipment and vehicles causing reduced air quality • Emission from gas flaring causing reduced air quality • Compression, compaction of soil and root system, and uprooting of vegetation • Removal or alteration of terrestrial habitat along the access road and at the well site • Removal or alteration of aquatic habitat caused by water withdrawal 				
<i>Effects of Other Projects or Activities that Act in Combination with the Project Residual Effect:</i>	<ul style="list-style-type: none"> • None, since there no other projects identified in the project area, there is no potential combination of effects, therefore no cumulative effects 				
<i>CE Mitigation:</i>	<ul style="list-style-type: none"> • None 				
<i>CE Monitor/Follow-up:</i>	<ul style="list-style-type: none"> • None 				
<i>References:</i>	<ul style="list-style-type: none"> • 1 				
Frequency	Duration	Geographic Extent	Reversibility	Magnitude	Likelihood of Significance
N/A	N/A	N/A	N/A	N/A	N/A

5.0 NEB CONCLUSION

The NEB examined all of the environmental information as described or referenced in this ESR in making its conclusion. The NEB is of the view that EnCana should implement all of the policies, practices, mitigative measures, recommendations, and procedures for the protection of the environment referred to in its application and that a condition to that effect be required.

The NEB is of the view that if EnCana's environmental protection procedures and mitigative measures are implemented, as well as any conditions imposed by the NEB in any approval that may be granted, the proposed Project is not likely to cause significant adverse environmental effects.

5.1 Proposed NEB Conditions

- A) EnCana shall implement or cause to be implemented all of the policies, practices, mitigative measures, recommendations and procedures for the protection of the environment referred to in its application.
- B) Within 30 days of the completion the well EnCana shall file with the Chief Conservation Officer a confirmation, by an officer of the company, that the approved Project was completed in compliance with all applicable conditions in the Approval to Drill a Well. If compliance with any of these conditions cannot be confirmed, the officer of the company shall file with the Chief Conservation Officer details as to why compliance cannot be confirmed.
- C) EnCana shall meet the Guideline for Ambient Air Quality Standards in the Northwest Territories when conducting any flaring associated with the Burnt Lake Program.

6.0 NWT WATER BOARD CONCLUSION

The NWT Water Board examined all of the environmental information as described or referenced in this ESR in making its conclusion. The NWT Water Board is of the view that EnCana should implement all of the policies, practices, mitigative measures, recommendations, and procedures for the protection of the environment referred to in its application.

The NWT Water Board is of the view that if EnCana's environmental protection procedures and mitigative measures are implemented, as well as any conditions imposed by the NWT Water Board Type B water licence that may be granted, the proposed Project is not likely to cause significant adverse environmental effects.

6.1 Proposed NWT Water Board Conditions

Proposed water license conditions are provided in Appendix F.

7.0 INAC CONCLUSION

INAC examined all of the environmental information as described or referenced in this ESR in making its conclusion. INAC is of the view that EnCana should implement all of the policies, practices, mitigative measures, recommendations, and procedures for the protection of the environment referred to in its application.

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INAC is of the view that if EnCana's environmental protection procedures and mitigative measures are implemented, as well as any conditions imposed by the INAC Land Use Permit, the proposed Project is not likely to cause significant adverse environmental effects.

7.1 Proposed INAC Conditions

Proposed land use permit conditions are provided in Appendix E.

8.0 CEA ACT DETERMINATION


This ESR and the CEA Act determination were approved by the NEB on the date specified on page one of this report. This ESR and the CEA Act determination were approved by the NWT Water Board and INAC on the date specified by the signatures below.

Table 8.0 CEA Act Determination

Responsible Authority Decision indicated by an "X"			CEA Act Decision on the Proposed Burnt Lake Drilling Program located on Richards Island in the Mackenzie Delta of the NWT
INAC	NWT Water Board	NEB	
		X	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.


NEB Authorization (Lead RA):


 Approved by: T. M. Baker
 Chief Conservation Officer


 Date

NWT Water Board Authorization:


 Approved by: Gordon Wray
 Chair, NWT Water Board


 Date

INAC Authorization:

Approved by: Rudy Cockney
 District Manager

Date

9.0 AGENCY CONTACTS

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National Energy Board
444 Seventh Avenue S.W.
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Inuvik, Northwest Territories X0E 0T0
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Mr. Gordon Wray, Chairman
Northwest Territories Water Board
C/O Ms. Shannon Pagotto, Head Water Policy and Assessment
4914 - 50th Street
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Facsimile (867) 669-2716
E-mail: pagottos@inac-ainc.gc.ca

APPENDIX A: CONSULTATION

A.1 Consultation carried out by EnCana

Public	Method	Summary of Comments
Inuvik Community	Meeting	Questions concerning the number of wells to be drilled, any additional seismic, and the route to be used for access have been answered.
Aklavik Community	Meeting	Questions concerning the long-term plan for tying into a pipeline if gas is found, advantages of going overland from Swimming Point, monitors on the program, wastewater handling, and incorporation of recommendations from the drilling waste workshop have been answered. Request that the Community Corporation could be kept informed of the contracts and hiring have been noted
Tuktoyaktuk Community	Meeting	Questions concerning the staging of the rig, plans for more seismic, training component in bid packages, and changes in depth of active layer have been answered. Concerns regarding use of a southern company to move the rig, screening of water intake, monitoring of subcontractors, and sump melting have been addressed. Request that locals should be used as monitors has been noted. Comment on the late spring and summer noted.

A.2 Consultation with other Federal Authorities

Department / Agency	Involvement			Summary of Comments
	RA ³	FA ⁴ Specialist	Name	
Indian and Northern Affairs Canada (Sect 5 response 15/10/03)	X			- provided comments on the joint screening which were incorporated in the screening. - Project specific mitigation identified in the Class A land Use permit for the proposed project (Appendix F)
NWT Water Board Division (Sect 5 response 24/10/03)	X			- provided comments on the joint screening which were incorporated in the screening. - Project specific mitigation identified in the Type B Water Licence for the proposed project (Appendix E)

³ RA refers to a Responsible Authority as defined by the CEA Act

⁴ FA refers to a Federal Authority as defined by the CEA Act

<p>Fisheries and Oceans Canada (DFO) (Letter dated 08/10/03)</p>		<p>X</p>	<p>DFO is of the opinion that if the work is carried out as described in the plans provided to DFO and mitigation measures are implemented as required the proposed work will not be considered as contravening subsection 35(1) of the Fisheries Act. Therefore an authorization under subsection 35 (2) will not be necessary.</p> <p>Mitigation measures suggested to prevent the harmful alteration, disruption, or destruction of fish habitat include: avoiding zone 1A areas under the <i>Beluga Management Plan</i>, access routes following existing lines (trails, winter roads, or cut lines), use of fine mesh screens on water intakes, use of boots on bladed vehicles, number of winter crossings should be minimized and locations should be selected that require the least amount of snowfall and water to construct, cutting of approaches is not permitted, v-notching or removal of crossings prior to spring breakup, and bank stabilization and re-vegetation prior to spring thaw.</p> <p>Mitigation measures suggested to prevent the deposit of deleterious material into fish-bearing water include: control of refueling and maintenance, locating wastes at least 100 metres from any water body, secondary containment of fuel, the removal of material from ice when there is potential for it to enter the water, an accessible spill contingency plan, and immediate reporting of spills to the NWT 24-Hour Spill Line.</p> <p>Prosecution under subsections 35(1) and/or 36(3) of the <i>Fisheries Act</i> may be initiated if an unapproved change in plans occurs or there is a failure to implement the suggested mitigation measures.</p>
<p>Environment Canada (EC) (Letter dated 08/10/03)</p>		<p>X</p>	<p>Environment Canada indicated that information provided in support of the proposed Burnt Lake Drilling Program is insufficient to provide a complete review of the program. EC asked a series of questions;</p> <p>What criterion was used to determine a good sump location? What practices referred to are being adhere to with respect to drilling waste disposal? What are the proponents long term expectations for the waste, will the waste remain frozen, for how long? What is the waste containment mechanism? What is the restoration and reclamation plan if the integrity of the sump is compromised? What drilling waste disposal alternatives have been considered?</p> <p>EC also indicated that the EnCana's ERP lacked specific information and that their contingency plan did not include appropriate clean/up and disposal procedures for oil and gas releases into the environment. EC also highlighted that the NWT spill line is presently used for reporting all spills.</p>

Environment Canada (EC) (Email dated 20/11/03)		X	Based upon the information provide Environment Canada believes that the impacts of the proposed project can be mitigated after taking into account the mitigation measures recommended by the proponent detailed in the Information Response No. 1. This conclusion is based on the premise that all of the recommended mitigation measures which are pertinent to our departmental areas of responsibility are substantially adopted, installed, monitored, and effectively maintained by the proponent for the full duration of construction, operation and decommissioning of this project.
Natural Resources Canada (NRCan) (Letter dated 04/11/03)			Posed question on the possible use of explosives on the project.
Natural Resources Canada (NRCan) (Letter dated 26/11/03)		X	Determined that they are an FA with specialist advice available upon request.
Health Canada (Sect 5 response 28/10/03)		X	No comments provided.
Parks Canada (PC) (Letter dated 24/10/03)		X	- Have no specific concerns with the project, however general concerns were expressed about drilling waste disposal and the use of in-ground sumps and long-term cumulative impacts of accelerating hydrocarbon development on natural and cultural resources within the region. Parks welcomes the work of the Technical Advisory Committee on identifying best practices for drilling waste disposal and encourages companies like EnCana to explore and adopt alternatives to traditional in-ground "permafrost" sumps to dispose of drilling wastes.

A.3 Consultation carried out by Inuvialuit Environmental Impact Screening Committee

Department / Agency	Summary of Comments
Inuvialuit Environmental Impact Screening Committee (Letter dated 03/11/03)	<ul style="list-style-type: none"> - The EISC determined the project would have no significant negative impact on the environment. - The issuance of appropriate permits and approvals may proceed. - The EISC thanked EnCana for clarifying that they will only drill one target (N16), that they will not discharge treated waste water into a sump and that EnCana will continue to work with RWED to determine the location of grizzly bear denning sites. -The EISC would appreciate receiving any follow-up reports that may be produced as a result of this development.

<p>Environment Canada (Letter dated 28/10/03)</p>	<p>- Environment Canada indicated that information provided in support of the proposed Burnt Lake Drilling Program is insufficient to provide a complete review of the program. EC asked a series of questions;</p> <p>-What criterion was used to determine a good sump location? What practices referred to are being adhere to with respect to drilling waste disposal? What are the proponents long term expectations for the waste, will the waste remain frozen, for how long? What is the waste containment mechanism? What is the restoration and reclamation plan if the integrity of the sump is compromised? What drilling waste disposal alternatives have been considered?</p> <p>-EC also indicated that the EnCana's ERP lacked specific information and that their contingency plan did not include appropriate clean/up and disposal procedures for oil and gas releases into the environment. EC also highlighted that the NWT spill line is presently used for reporting all spills.</p>
<p>Wildlife Management Advisory Council (Letter dated 24/10/03)</p>	<p>- Comment were provided by the council;</p> <ul style="list-style-type: none"> • council believed DIAND lists 20 cm as minimum cover for travel by tracked vehicle as compared to 10 cm as identified in the PD, • questioned how long the sump will be fenced, • there was a lack of discussion in PD cumulative effects on air quality • proponent was encouraged to speak to CWS about ongoing migratory bird studies in the area, • they were pleased to see a barge camp being used • the proponent appears to have done a thorough study on potential sump site locations.
<p>Parks Canada (Letter dated 24/10/03)</p>	<p>Have no specific concerns with the project, however general concerns were expressed about drilling waste disposal and the use of in-ground sumps and long-term cumulative impacts of accelerating hydrocarbon development on natural and cultural resources within the region. Parks welcomes the work of the Technical Advisory Committee on identifying best practices for drilling waste disposal and encourages companies like EnCana to explore and adopt alternatives to traditional in-ground "permafrost" sumps to dispose of drilling wastes.</p>
<p>Fisheries Joint Management Committee (Letter dated 27/10/03)</p>	<p>- Provided the project is carried out as described in the application they have no concerns</p> <p>- Committee commented on the preference of industry and regulatory agencies continuing to explore alternatives to sump use.</p>
<p>Aklavik Hunters and Trappers Committee (Lener dated 16/10/03)</p>	<p>Concerns were expressed with regard the burnt gas (flare) and its possible effects on humans and wildlife. They posed a question wondering how clean is the gas?</p>

A.4 Consultation carried out by NWT Water Board

Individual / Agency	Summary of Comments
<p>Kevin Glowa INAC North Mackenzie District (Email dated 04/11/03)</p>	<p>- Concerns were raised over discharging waste water to land indicating that if EnCana discharges to land then it is his recommendation that different less stringent Wastewater Effluent Quality Guidelines be used for TSS , BOD and FC. He would rather see responsible discharge to land than use of alternatives (sumps, trucking it back to Inuvik or Tuk).</p>

<p>Don Thompson Petro-Canada (Email dated 28/10/03)</p>	<ul style="list-style-type: none"> - Recommends limiting overland travel to one pass and that the minimum 10 cm of snowcover for travel overland should be increased to 20 cm. -Indicated that EnCana should determine thermal properties of the sump site. -When constructing berms around re-fuelling site EnCana should ice in both the bottom of the storage area as well as the snow berms to ensure containment. Temporary metal diking should be used for longer-term storage and a winter spill kit should be onsite. EnCana should also check and limit the salinity of water they use in building ice roads.
<p>Juanetta Sanderson INAC Water Resources (Email dated 11/7/03)</p>	<ul style="list-style-type: none"> - Questions posed with regard to; the disposal of greywater and sewage overland, approval from the Town of Inuvik to use their sewage and dump facilities, baseline water quality values.
<p>Robert Jenkins INAC Water Resources (Email dated 11/7/03)</p>	<ul style="list-style-type: none"> -All water withdrawal should be done in accordance with DFO water withdrawal protocols. -All fuel sloops should have secondary containment capable of holding 110% of the volume of the fuel sloop itself. -All water crossings should be v-notched upon abandonment of the site. -Will the wastewater sump be constructed at the start of operations and only used if required? Or will this sump only be constructed if all other options fail and the sump will definitely be utilized (i.e. on an as needed basis)? -EnCana performed field assessments in areas where potential sump sites may exist. This data should be made available to the NWT Water Board. As well, prior to constructing the sump, the results of the field assessments will be confirmed by taking core samples at the potential site. The results of these investigations should be discussed with the INAC Inspector prior to constructing the sump. -Using the RECLAIM Model for Oil and Gas developments, I have estimated that the total cost for the abandonment and restoration of the project site and associated facilities to be approximately \$325,000.00. I have attached the estimate for your review and consideration.

<p>Alan Gibson GNWT RWED (Email dated 11/7/03)</p>	<ul style="list-style-type: none"> - EnCana should conduct long term monitoring to determine if the sump integrity has been compromised. EnCana should also provide for approval by the Board, a mitigation plan should the sump fail. Because of the drilling waste and the possibility of future contamination of the surrounding soils, no letter of clearance should be issued for the sump site. - Permission is required from any community for the disposal of sewage at their sewage disposal facility. - To accommodate wildlife movement, windrows created by snow removal should have a 10 metre opening every 60 metres for wildlife movement. - The Government of the Northwest Territories has produced a Draft Air Quality Code of Practice (Code) to provide the oil and gas industry with clear, predictable and consistent guidance in respect to best management practices in such areas as emissions quality, monitoring and reporting, and pollution control technology. By using this Code and by following the practice of "Keeping Clean Areas Clean", EnCana can meet NWT Air Quality Standards. EnCana should conduct air dispersion modelling to determine if the emissions from flaring and other sources will meet NWT Air Quality Standards. -EnCana should start acquiring meteorological data to support future well evaluation and production facilities. RWED will be requiring a minimum of 1 year worth of onsite (local) meteorological data for new areas with 5 years as a minimum for production facilities. This data will be used for any future air modelling that will be required as part of any application for well evaluation or production facilities. - EnCana should provide a site specific Spill Contingency Plan. The Emergency Response Plan Duties/Quick Reference Guide does not have any Northwest Territories contact numbers. If EnCana is proposing to use this document, then these numbers should be added.
<p>Christopher Beveridge Inuvik Regional Health and Social Services (Email dated 11/7/03)</p>	<ul style="list-style-type: none"> - Indicated that they have no concerns regarding the project however they identified the lists of regulations that are applicable to a camp with a capacity of 80 people. - Indicated that an Environmental Health Inspection of the camp facilities may occur sometime during the operating season.

A.5 Consultation carried out by INAC

Individual / Agency	Summary of Comments
GNWT – Transportation Letter Oct. 29, 2003	Request to obtain temporary access permit for access off the Winter road

ILA – Calvin Pokiak Email – Oct. 20, 2003	<p>Access construction should use previous routes and pre-scouting done beforehand</p> <p>Concern that DFO be consulted to ensure that proper procedures followed to protect fish and habitat.</p> <p>Sump location should be confirmed.</p> <p>EnCana should consult RWED for bear den sites in area.</p> <p>Expressed concern over the disposal of camp effluent, exact location.</p> <p>Question on how the crew and supervisor would know what mitigation measures were to be in place if they did not read the PD.</p> <p>Question on who determined the significance and magnitude of cumulative effects?</p> <p>Comment on whether the double walled fuel tanks would have further secondary containment.</p>
Environment Canada	Same letter sent to EISC and NEB
DFO – K. Simms	Same letter sent to EISC and NEB

APPENDIX B: INFORMATION SOURCES

Reference No.	Title/Type of Document/Date
1	EnCana Corporations Burnt Lake Drilling Application, 1 October 2003
2	EnCana's Response to NEB Information Request #1 (response date 17 November 2003)
3	Inuvialuit Environmental Impact Screening Committee decision letter (3 November 2003)
4	Letter of Advice from the Department of Fisheries and Oceans (8 October 2003)
5	Letter of Comment from Environment Canada (28 October 2003).
6	Comments from the NWT Water Board compiled email – (November 2003)

APPENDIX C: APPLICANT'S REGULATORY COMMITMENTS

Reference No.	Legislation/Permits
1	Canada Oil and Gas Operations Act – Approval to Drill a Well (ADW)
2	NWT Water Board Type B Water Licence
3	INAC Type A Land Use Permit

APPENDIX D: PROJECT-SPECIFIC MONITORING AND FOLLOW-UP

Environmental Component	Mitigation, Monitoring and/or Follow-up
Terrain	Sump Monitoring 5 years

APPENDIX E: INAC PROPOSED LAND USE PERMIT CONDITIONS

RECOMMENDED CONDITIONS ANNEXED TO AND FORMING PART OF LAND USE PERMIT NUMBER N2003A0035

31 (1) (a) - LOCATION AND AREA

- | | | |
|----|--|---------------------------------------|
| 1. | The Permittee shall not conduct land use operations on any lands not designated in the accepted application, unless otherwise authorized, in writing, by the Engineer. | PLANS |
| 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 |
| 3. | The Permittee shall not construct parallel lines or roads, unless authorized by the Engineer | PARALLEL
ROADS |
| 4. | The Permittee shall remove from Territorial Lands, all scrap metal, discarded machinery and parts, barrels and kegs, buildings and building material. | REMOVE
WASTE
MATERIAL |
| 5. | The Permittee shall not construct a drillsite within 100 metres of the normal high water mark of a stream unless approval, in writing, is obtained from the Engineer. | LOCATION
OF ADITS AND
DRILLSITE |
| 6. | The Permittee shall locate all camps on gravel, sand or other durable land. | CAMP
LOCATION |
| 7. | The Permittee shall locate all lines, trails and rights-of-way to be constructed parallel to streams a minimum of thirty (30) metres from any stream except at crossings, unless otherwise authorized in writing, by a Land Use Inspector. | PARALLELLING
STREAMS |
| 8. | The Permittee shall at all times conform to all applicable Federal Territorial or local regulations, ordinances or bylaws. | CONFORM TO
APPLICABLE
LAWS |

31 (1) (b) - TIME

- | | | |
|-----|---|------------------------------|
| 9. | 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 the land use operation. | CONTACT
INSPECTOR |
| 10. | 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 |
| 11. | The Permittee shall submit a progress report to the Engineer every seven (7) days during each land use operation. | PROGRESS |

- | | |
|---|---|
| 12. The Permittee shall notify a Land Use Inspector at least ten (10) days prior to backfilling any sump. | BACKFILL
NOTIFICATION |
| 13. 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 |
| 14. The Permittee shall not conduct any overland movement of equipment and vehicles after 0800 hours local time on April 15, unless otherwise authorized, in writing, by a Land Use Inspector. | SHUT-DOWN
DATE |
| 15. The Permittee shall not conduct any overland movement of equipment and vehicles between April 15 and Nov 15, unless otherwise authorized, in writing, by a Land Use Inspector. | SHUT-DOWN
PERIOD |
| 16. The Engineer, for the purpose of this operation, designates April 15, as spring break-up. | SPRING
BREAK-UP |
| 17. 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 |
| 18. The Permittee shall V-notch or 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. | SNOW FILLS
REMOVE |
| 19. 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 |
| 20. The Permittee shall commence and foster revegetation on all parts of the land used, as may be directed by a Land Use Inspection, within one (1) year of the completion of the land use operation. | RE-ESTABLISH
VEGETATION |
| 21. The Permittee shall complete all clean-up and restoration of the lands used prior to the expiry date of this Permit. | CLEAN-UP |
| 22. 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 | |
| 23. 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 a Land Use Inspector. | ONLY
APPROVED
EQUIPMENT |
| 4. The Permittee shall equip bulldozer blades (including snowcats) used in this operation with "mushroom" type shoes or a similar type of device which shall be extended twenty (20) centimetres below the cutting edge of the blade. | BULLDOZER
BLADES
AND SHOES |
| 25. The Permittee shall use a forced-air, fuel-fired incinerator to incinerate all combustible garbage and debris. | INCINERATORS |

31 (1) (d) - METHODS AND TECHNIQUES

26. The Permittee shall construct and maintain winter roads with a minimum of fifteen (15) centimetres packed clean snow at all times during the land use operations. If this cannot be done, then the Permittee shall construct Ice Roads in a manner approved by a Land Use Inspector. **SNOW ROADS/
ICE ROAD**
27. The Permittee shall not erect camps or store material on the surface ice of streams, channels, lakes or any other waterbodies unless authorized in writing by an Inspector. **STORAGE
ON ICE**
- 31 (1) (e) - TYPE, LOCATION, CAPACITY AND OPERATION OF FACILITIES**
28. 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/protocol **SUMPS
FROM WATER**
29. 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**
30. The Permittee shall backfill and restore all sumps prior to the expiry date of this Permit. **BACKFILL
SUMPS**
31. The Permittee shall backfill all sumps in such a manner that drill waste is maintained below the 1.2 metre freeboard. **BACKFILL
SUMPS-HOW**
32. The Permittee shall: **BACKFILL SUMP**
- (a) Place all excavated material over the sump area to ensure ponding does not occur. **OVERLAP**
- (b) Overlap the material a minimum of two (2) metres beyond the edges of the existing sump .
33. 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**
34. (a) The permittee shall, where flowing water from bore holes is encountered, plug the borehole 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.
35. The Permittee shall remove any obstruction to natural drainage caused by any part of this land use operation. **NATURAL
DRAINAGE**
36. The Permittee shall not cut any stream bank unless authorized, in writing, by a Land Use Inspector, **STREAM
BANKS**
37. The Permittee shall not use any material other than water in the construction of ice bridges **ICE BRIDGE
MATERIAL**
38. The Permittee shall not allow any ice bridge to hinder the flow of water in any stream. **ICE BRIDGE**

- | | |
|---|---|
| <p>39. The Permittee shall insulate the ground surface beneath all structures and facilities associated with the land use operation with a minimum fifteen (15) cm ice pad</p> | <p>INSULATE
GROUND
SURFACE</p> |
| <p>40. The Permittee shall prepare the site in such a manner as to prevent rutting of the ground surface.</p> | <p>PREVENTION
OF RUTTING</p> |
| <p>41. 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.</p> | <p>VEHICLES
MOVEMENT
FREEZE-UP</p> |
| <p>42. The Permittee shall suspend overland travel of equipment or vehicles if rutting occurs.</p> | <p>SUSPEND
OVER- LAND TRAVEL</p> |
| <p>43. 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.</p> | <p>REVEGETATE
STRIPPED
AREA</p> |
| <p>44. The Permittee shall save the organic soil stripped from the excavation areas.</p> | <p>SAVE
ORGANIC SOIL</p> |
| <p>45. The Permittee shall place the organic soil over the disturbed areas prior to the expiry date of this Permit.</p> | <p>PLACE
ORGANIC SOIL</p> |
| <p>31 (1) (g) - USE, STORAGE, HANDLING AND DISPOSAL OF CHEMICAL OR TOXIC MATERIAL</p> | |
| <p>46. The Permittee shall not use chemicals in connection with the land use operation without the prior approval of the Engineer.</p> | <p>APPROVAL
OF CHEMICALS</p> |
| <p>47. 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</p> | <p>PROHIBITED
CHEMICALS</p> |
| <p>48. The Permittee shall deposit all drill waste into a sump.</p> | <p>DRILL WASTE</p> |
| <p>49. The Permittee shall not allow any drilling waste to spread to the surrounding lands.</p> | <p>DRILL WASTE
CONTAINMENT</p> |
| <p>50. The Permittee shall burn all garbage and debris at least daily.</p> | <p>GARBAGE
DISPOSAL</p> |
| <p>51. 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.</p> | <p>REMOVE
GARBAGE</p> |
| <p>52. The Permittee shall dispose of all waste petroleum products by removal.</p> | <p>WASTE
PETROLEUM
DISPOSAL</p> |
| <p>53. The Permittee shall dispose of all toxic or persistent substances in a manner as approved, in writing, by the Engineer.</p> | <p>WASTE
CHEMICAL
DISPOSAL</p> |

54. 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**

55. 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 SPILLS**

56. 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

57. The Permittee shall not unnecessarily damage wildlife habitat in conducting this land use operation. **HABITAT DAMAGE**

58. The Permittee shall not obstruct the movement of fish while conducting this land use operation. **FREE FISH MOVEMENT**

59. The Permittee shall not destroy or damage beaver dams. **BEAVER DAMS**

60. The Permittee shall not destroy or damage muskrat lodges. **MUSKRAT LODGES**

61. 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 (867) 777-7230. **BEAR/MAN CONFLICT**

62. The Permittee shall not in any circumstances deposit or allow the deposit of any deleterious substances (including but not limited to fuels, lubricants, hydraulics, and coolants) of any type into any waters, or in any place under any conditions where the deleterious substances may enter any waters. **DEPOSITING DELETERIOUS SUBSTANCES**

63. The Permittee shall screen all water intakes from fish bearing waters to exclude fish in accordance with DFO requirements. **SCREENS**

31 (1) (i) - OBJECTS AND PLACES OF RECREATIONAL, SCENIC AND ECOLOGICAL VALUE

64. The Permittee shall not operate any machinery or equipment within one hundred (100) metres of the base of a pingo. **PINGOS**

65. The Permittee shall not feed wildlife. **NO FEEDING WILDLIFE**

66. The Permittee shall immediately suspend the Land Use operation on the site and notify the Land Use Inspector of the location of the site and nature of any unearthed materials, structures or artefacts. **ARCHAEOLOGICAL SITES AND /OR BURIAL GROUND**

31 (1) (k) - PETROLEUM FUEL STORAGE

67. The Permittee shall not place any petroleum fuel storage containers within thirty (30) metres of the normal high water mark of any stream where possible. **FUEL BY STREAM**

68. The Permittee shall locate mobile fuel facilities on land when stationary for any period of time exceeding twelve (12) hours. **FUEL ON LAND**

<p>69. The Permittee shall not allow petroleum products to spread to surrounding lands or into water bodies.</p>	<p>CONTAINMENT</p>
<p>70. 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.</p>	<p>DYKE/FUEL CONTAINERS</p>
<p>71. The Permittee shall line the dyke and area enclosed by the dyke with a type of plastic film liner approved by the Engineer.</p>	<p>LINE DYKE</p>
<p>72. The volume of the dyked area shall be ten percent 10% greater than the capacity of the largest fuel container placed therein.</p>	<p>CAPACITY</p>
<p>73. The Permittee shall ensure that the dyke and the area enclosed by the dyke shall be impermeable to petroleum products at all times.</p>	<p>IMPERMEABLE DYKE</p>
<p>74. The Permittee shall:</p> <p>(a) Examine all fuel storage containers for leaks a minimum of once every day.</p> <p>(b) Repair all leaks immediately.</p>	<p>CHECK FOR LEAKS</p>
<p>75. The Permittee shall not use bladders for storing and/or transporting petroleum products.</p>	<p>BLADDERS PROHIBITED</p>
<p>76. The Permittee shall mark all stationary petroleum products storage facilities with flags, posts or similar devices so that they are at all times plainly visible to local vehicle travel.</p>	<p>MARK FUEL LOCATION</p>
<p>77. The Permittee shall seal all container outlets except the outlet currently in use.</p>	<p>SEAL OUTLET</p>
<p>78. The Permittee shall mark all fuel containers with the Permittee's name. This includes forty-five (45) gallon drums.</p>	<p>MARK CONTAINERS</p>
<p>31 (1) (l) - DEBRIS AND BRUSH DISPOSAL</p>	
<p>79. 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.</p>	<p>SPREAD BRUSH</p>
<p>31 (1) (m) - MATTERS NOT INCONSISTENT WITH THE REGULATIONS</p>	
<p>80. The Permittee shall not construct approaches abutted to any public highway or road, (including ice roads) without prior approval of the Department of Public Works and Highways, Government of the Northwest Territories.</p>	<p>HIGHWAY APPROACHES</p>
<p>81. The Permittee shall display a copy of this Permit in a conspicuous place in each campsite established to carry out this land use operation.</p>	<p>DISPLAY PERMIT</p>
<p>82. The Permittee shall provide in writing to the Engineer, at least Forty-eight (48) hours prior to commencement of the land use operation, the following information:</p>	<p>IDENTIFY AGENT</p>

(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).

83. The Permittee shall, while preparing the access roads, make every effort to avoid covering or destroying traps or snares that may be found in the area.

**TRAPS
PROTECTION**

84. 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**

85. **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.

86. The Permittee shall submit to the Engineer a contingency plan, for chemical and petroleum spills, for use during the construction and operation of the land use operations.

**CONTINGENCY
PLAN**

87. The Permittee shall ensure that a copy of this Permit, operating conditions and definitions is provided to and understood by all contractors and sub-contractors prior to the start-up of Land Use Operation.

**PERMIT
CONTRACTORS &
SUB-CONTRACTORS**

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

- If 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

APPENDIX F: NWT WATER BOARD PROPOSED WATER LICENCE

PART A: SCOPE AND DEFINITIONS

1. Scope

- This Licence entitles EnCana Corporation to use water and dispose of waste for municipal and industrial undertakings in the Mackenzie Delta for the Burnt Lake Drilling Program located within a two kilometre radius of the following point: N16: 69°25'53.1" E / 134°19'06" N, Northwest Territories, which entails the drilling of one well.
- This Licence is issued subject to the conditions contained herein with respect to the taking of water and the depositing of waste of any type in any waters or in any place under any conditions where such waste or any other waste that results from the deposits of such waste may enter any waters. Whenever new Regulations are made or existing Regulations are amended by the Governor in Council under the *Northwest Territories Waters Act*, or other statutes imposing more stringent conditions relating to the quantity or type of waste that may be so deposited or under which any such waste may be so deposited this Licence shall be deemed, upon promulgation of such Regulations, to be automatically amended to conform with such Regulations; and
- Compliance with the terms and conditions of this Licence does not absolve the Licensee from responsibility for compliance with the requirements of all applicable Federal, Territorial and Municipal legislation.

2. Definitions

In this Licence: N7L1-1797

"Act" means the *Northwest Territories Waters Act*;

"Active Layer" the top layer of ground subject to annual thawing and freezing in areas underlain by permafrost;

"Analyst" means an Analyst designated by the Minister under Section 35(1) of the *Northwest Territories Waters Act*;

"Artesian Aquifer" means a water-bearing rock stratum, which when encountered during drilling operations, produces a pressurized flow of groundwater that reaches an elevation above the water table or above the ground surface;

"**Board**" means the Northwest Territories Water Board established under Section 10 of the *Northwest Territories Waters Act*;

"**Drilling Fluids**" means any liquid mixture of clay, water or chemical additives pumped downhole;

"**Inspector**" means an Inspector designated by the Minister under Section 35(1) of the *Northwest Territories Waters Act*;

"**Licensee**" means the holder of this Licence;

"**Minister**" means the Minister of Indian Affairs and Northern Development;

"**Maximum Average Concentration**" means the running average of any four consecutive analytical results, or if less than four analytical results collected, and submitted to the Inspector in accordance with the sampling and analysis requirements specified in the "Surveillance Network Program";

"**Modification**" means an alteration to a physical work that introduces a new structure or eliminates an existing structure and does not alter the purpose or function of the work, but does not include an expansion;

"**Permeability**" means the ability of a material to transmit fluids through its pores when subjected to pressure or a difference in head;

"**Permafrost**" means ground (soil or rock) that remains at or below 0°C for at least two years;

"**Permafrost Table**" means the upper boundary of permafrost as defined by the depth of the active layer;

"**Project Description**" refers to the report titled "Project Description for the Proposed EnCana Corporation Burnt Lake Drilling Program", dated Winter 2004, prepared by EnCana Corporation;

"**Regulations**" means Regulations proclaimed pursuant to Section 33 of the *Northwest Territories Waters Act*;

"**Sewage Treatment Facility**" comprises the engineered structures that are designed to contain and treat sewage;

"**Sewage**" means all toilet waste and greywater;

"**Sump**" means an excavation for the purpose of catching or storing fluids.

"**Waste**" means waste as defined by Section 2 of the *Northwest Territories Waters Act*;

"Waters" means waters as defined by Section 2 of the *Northwest Territories Waters Act*;

PART B: GENERAL CONDITIONS

1. The Licensee shall file an Annual Report with the Board and an Inspector not later than March 31st of the year following the calendar year reported which shall contain the following information:
 - a) the total quantity in cubic metres of fresh Water obtained from all sources;
 - b) the total quantities in cubic metres of each and all Waste discharged;
 - c) an itemized list indicating the names and quantities of all drilling mud additives used;
 - d) details of work completed;
 - e) details on the restoration of any Sumps;
 - f) a list of spills and unauthorized discharges;
 - g) results from all monitoring programs; and
 - h) any other details on Water use or Waste disposal requested by the Board within forty-five (45) days before the final report is due.
2. Meters, devices or other such methods used for measuring the volumes of Water used and Waste discharged shall be installed, operated and maintained by the Licensee to the satisfaction of an Inspector.
3. The Licensee shall comply with the "Surveillance Network Program" annexed to this Licence, and any amendment to the said "Surveillance Network Program" as may be made from time to time, pursuant to the conditions of this Licence.
4. The "Surveillance Network Program" and compliance dates specified in the Licence may be modified at the discretion of the Board.
5. All monitoring data shall be submitted in printed form and electronically in spreadsheet format on a diskette or other electronic forms acceptable to the Board.

6. All reports shall be submitted to the Board in printed format accompanied by an electronic copy in a common word processing format on diskette or other electronic forms acceptable to the Board.
7. Thirty (30) days prior to the commencement of drilling, the Licensee shall notify the Board and an Inspector of the exact wellsite location(s) that have been selected for drilling.
8. Prior to the use of Water for industrial undertakings or the disposal of Waste and pursuant to Section 17(1) of the *Act* and Section 12 of the Regulations, the Licensee shall have posted and shall maintain a security deposit of XXX in a form suitable to the Minister.
9. The security deposit shall be maintained until such time as it is fully or in part refunded by the Minister pursuant to Section 17 of the *Act*. This clause shall survive the expiry of this Licence or renewals thereof and until full and final restoration has been completed to the satisfaction of the Minister.
10. By April 15, 2004, pursuant to Section 17(1) of the *Act* and Section 12 of the Regulations, the Licensee shall have posted and shall maintain a security deposit of XXX in a form suitable to the Minister. This security deposit shall be maintained until the completion of the requirements of Part H, Item 2 have been met.
11. The Licensee shall ensure a copy of this Licence is maintained at the site of operation at all times.

PART C: CONDITIONS APPLYING TO WATER USE

1. The Licensee shall obtain Water from lakes and channels of the Mackenzie River as described in the Project Description or as otherwise approved by an Inspector.
2. The daily quantity of Water used for all purposes shall not exceed 1800 cubic metres.
3. The water intake hose used on the water pumps shall be equipped with a screen with a mesh size sufficient to ensure no entrainment of fish (2.54 mm).

PART D: CONDITIONS APPLYING TO WASTE DISPOSAL

1. All sewage shall be directed to the Sewage Treatment Facility as indicated in the Project Description or as otherwise approved by an Inspector.

2. All Waste discharged from the Sewage Treatment Facility shall be directed to the land surface or to a channel of the Mackenzie River at a location approved by an Inspector.
3. There shall be no discharge of floating solids, garbage, grease, free oil or foam.
4. All Waste discharged from the Sewage Disposal Facility shall meet the following effluent quality requirements:

Sample Parameter	Maximum Average Concentration
Biological Oxygen Demand (BOD ₅)	80.0 mg/L
Total Suspended Solids (TSS)	100.0 mg/L
Faecal Coliforms	10E4 CFU/dL
Oil and Grease	5.0 mg/L
Total Residual Chlorine (TRC)	0.1 mg/L

The Waste discharged shall have a pH between 6 and 9.

5. The Licensee shall direct all Wastes that do not meet the requirements in Part D, Item 5 to an approved Sewage Treatment Facility.
6. Introduction of Water to Waste for the purpose of achieving effluent quality requirements in Part D, Item 5 is prohibited.
7. The Licensee shall, to the satisfaction of an Inspector, contain all drilling Waste in a drilling Sump near the drill site, or at an alternate Sump location as approved by an Inspector.
8. Sumps shall be constructed, to the satisfaction of an Inspector, in materials that normally exhibit low Permeability and in a manner that prevents intrusion of runoff Water.
9. All drilling Waste shall be contained in the drill Waste Sump a minimum of one (1) metre below the permafrost table.
10. In the event the initial drill Waste Sump site does not contain materials that exhibit low Permeability, the Licensee shall select an alternate Sump location to the satisfaction of an Inspector.

11. The Licensee shall construct and maintain the Sumps to the satisfaction of an Inspector.
12. There shall be no disposal of Drilling Fluids from the Sumps into any Waters or onto any land surface where Drilling Fluids may enter any Waters.
13. The Licensee shall ensure that Chloride concentrations at SNP Station 1797-2 do not exceed 100,000 mg/L.
14. The Licensee shall, prior to abandonment of a Sump, obtain a representative sample from the Sump using the information requirements outlined in the "Sampling and Analytical Requirements for Characterization of Sump Supernatant Fluids" (Appendix A).
15. If during the drilling, an Artesian Aquifer is encountered producing water flowing at the surface, the Licensee shall notify an Inspector immediately. A sample of not less than ten (10) litres shall be collected from the flowing source at the point of discharge from the well. Five (5) litres shall be made available to an Inspector for analysis, and the Licensee shall have the remaining five (5) litres analysed.
16. Any fluids generated to surface, including those produced from an Artesian Aquifer, shall be contained and shall not be disposed of without approval of an Inspector.
17. All analyses shall be conducted in accordance with methods prescribed in the current edition of "Standard Methods for the Examination of Water and Wastewater" or by such other methods as may be approved by an Analyst.
18. No oil-based Waste products are to be disposed of on-site. Oil-based additives and drill cuttings associated with these additives are to be disposed of at an approved offsite location to the satisfaction of an Inspector.
19. Any on-site treatment of oil-based Waste products must be done with the approval of an Inspector.
20. Lost circulation that may contaminate groundwater must be immediately reported to an Inspector.
21. The Licensee shall dispose of all solid Waste in a manner acceptable to an Inspector.

PART E: CONDITIONS APPLYING TO MODIFICATIONS

1. The Licensee may, without written approval from the Board, carry out Modifications to the planned undertakings provided that such Modifications are consistent with the terms of this Licence and the following requirements are met:
 - a) the Licensee has notified an Inspector in writing of such proposed Modifications at least five (5) days prior to beginning the Modifications;
 - b) such Modifications do not place the Licensee in contravention of either this Licence or the *Act*;
 - c) an Inspector has not, during the five (5) days following notification of the proposed Modifications, informed the Licensee that review of the proposal will require more than five (5) days; and
 - d) an Inspector has not rejected the proposed Modifications.
2. Modifications for which all of the conditions referred to in Part E, Item 1 have not been met may be carried out only with written approval from an Inspector.
3. The Licensee shall provide to the Board as-built plans and drawings of the modifications referred to in this Licence within ninety (90) days of completion of the modifications.

PART F: CONDITIONS APPLYING TO STREAM AND WATER BODY CROSSINGS

1. The Licensee shall ensure that only clean snow and ice is used on all stream or water body crossings, and that no debris is left on the surface of the crossings.
2. Stream or water body crossings shall be notched or removed before spring break-up to facilitate natural flow.
3. The removal of naturally occurring material from the bed or banks of any stream or water body below the ordinary high water mark is not permitted.

PART G: CONDITIONS APPLYING TO CONTINGENCY PLANNING

1. The Licensee will maintain a copy of the approved Emergency Response Plan onsite in a readily available location, to the satisfaction of an Inspector.
2. The Licensee shall ensure that petroleum products, hazardous material and other Wastes

associated with the project do not enter any Waters.

3. The Licensee shall ensure that all containment berms are constructed of an impermeable material, to the satisfaction of an Inspector.
4. If, during the period of this Licence, an unauthorized discharge of Waste occurs, or if such a discharge is foreseeable, the Licensee shall:
 - a) report the incident immediately via the 24 Hour Spill Reporting Line (867) 920-8130; and
 - b) submit to an Inspector a detailed report on each occurrence not later than thirty (30) days after initially reporting the event.

PART H: CONDITIONS APPLYING TO ABANDONMENT AND RESTORATION

1. Upon completion of all activities, the Licensee shall ensure that all equipment and materials are removed from the site. Other final restoration activities as outlined in the Project Description should be implemented to the satisfaction of an Inspector.
2. The Licensee shall monitor the drilling Waste Sump after closure for a period of at least five (5) years during the thaw season consisting of the following measures:
 - a) install subsurface monitoring systems designed to detect thawing of the drilling Waste in the following manner:
 - i) placement of at least five (4) thermistor strings (Appendix B):
 - one (1) in the center of the Sump cap;
 - one (1) on the lee side of the Sump with respect to the winter wind direction at the interface between undisturbed ground and the Sump cap;
 - one (1) at the interface between undisturbed ground and the Sump cap where most of the drilling muds have been placed; and
 - one (1) in undisturbed terrain next to the Sump to monitor background conditions.
 - ii) mean daily temperature readings must be recorded at a minimum of 0.25, 0.5, 0.75, 1.5, 3, 6, 9, and 12 metre depths.

- iii) installed thermistors must be designed to allow for manual field measurements to be taken.

- b) monitor for salinity migration using electromagnetic induction; and

- c) conduct an annual inspection of the site during the thaw season, and submit a written report of the inspection, including photographs of the site, to the Board by December 1st of the year the inspection is conducted.

NORTHWEST TERRITORIES WATER BOARD

Witness

Chairman

**APPENDIX A - SAMPLING AND ANALYTICAL REQUIREMENTS
FOR CHARACTERIZATION OF SUMP SUPERNATANT FLUIDS**

Prior to abandoning a drilling Waste Sump, the Licensee shall sample the Sump using the following method:

Divide the Sump into a grid of six equal areas, take three samples in the vertical profile (surface, mid-depth, just above the mud/supernatant interface) at the centre of each area. Mix these eighteen samples together to form a single Composite Sample, from which as many sub-samples may be obtained as necessary for analysis. An additional sample must be taken from the surface of the Sump.

The Licensee shall have the Composite Sample analyzed for the following parameters:

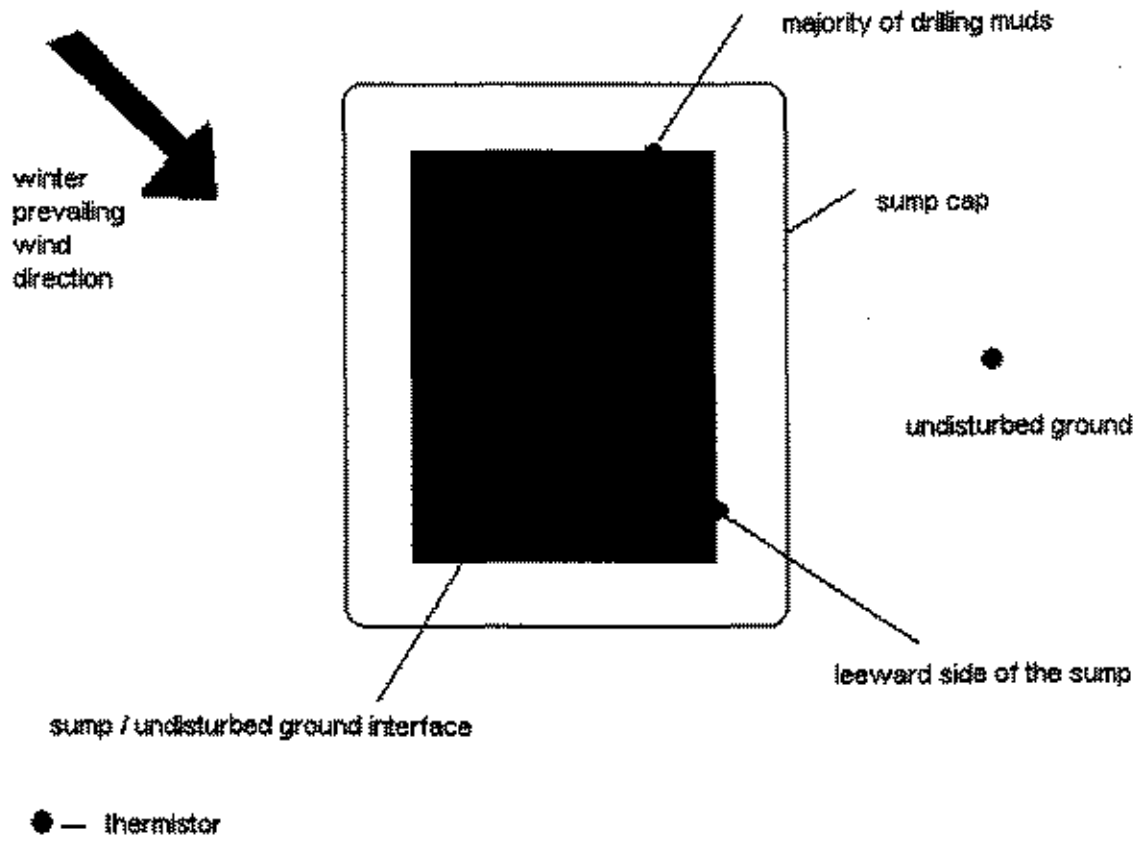
- Total and Dissolved Metals:
 - Copper
 - Cadmium
 - Iron
 - Nickel
 - Lead
 - Chromium
 - Zinc Sulphate
- Conductivity
- pH
- Total Suspended Solids
- Total Reactive Chlorine
- Chloride
- Sodium
- Potassium
- Calcium
- Magnesium
- Oil and Grease
- Toxicity (Microtox Bioassay)

The Licensee shall have the Surface Sample analyzed for the following parameters:

- Oil and Grease

APPENDIX B - EXAMPLE PLACEMENT OF THERMISTOR STRINGS

DRAFT - November 20, 2003



NORTHWEST TERRITORIES WATER BOARD

LICENSEE: EnCana Corporation

LICENCE NUMBER: N7L1-1797

EFFECTIVE DATE OF LICENCE:

**EFFECTIVE DATE OF
SURVEILLANCE NETWORK PROGRAM:**

SURVEILLANCE NETWORK PROGRAM

A. Location of Sampling Stations

<u>Station Number</u>	<u>Description</u>
1797 - 1	Discharge from the Sewage Treatment Facilities
1797 - 2	Drilling Waste Prior to Entering the Drilling Sump

B. Sampling and Analysis Requirements

1. Water at Station Number 1797 -1, shall be sampled every week during decant, and analyzed for the following parameters:

BOD ₅	Total Suspended Solids
Oil and Grease	Faecal Coliforms
Ammonia pH	
Total Residual Chlorine	

2. Waste Water at Station 1797-2, shall be sampled monthly, and analysed for the following