NORTHWEST TERRITORIES WATER BOARD

WATER LICENCE APPLICATION QUESTIONNAIRE

FOR

OIL AND GAS EXPLORATION: DRILLING

prepared by

Department of Indian Affairs and Northern Development
Water Resources Division
August 2002

INTRODUCTION

The purpose of this questionnaire is to solicit supplemental information from an applicant to support their application for a Water Licence (or renewal). It is anticipated that the completion of this questionnaire will reduce delays arising from the Northwest Territories Water Board having to solicit additional information after an application has been submitted. This information will be used during the environmental assessment and screening of your application, which must be undertaken prior to the approval of a Water Licence.

The applicant should complete the questionnaire to the best of their ability, recognizing that some questions may not be relevant to the proposed project. For questions that do not relate to the operation, the applicant is requested to indicate "N/A" (not applicable). For information from other sources, please fully reference the material cited, including the title of the document and the page numbers referred to.

If any questions arise while completing the questionnaire, the applicant may wish to contact the Northwest Territories Water Board at (867) 669-2772. If your question is of a technical nature, please contact the Policy and Assessment Section of the Water Resources Division, Department of Indian Affairs and Northern Development (DIAND) at (867) 669-2658.

Chairman
Northwest Territories Water Board

TABLE OF CONTENTS

SECTION 1: APPLICANT INFORMATION

1.1	Applicant:	Alan Wong, Project Manager Alaska/Mackenzie Delta International New Ventures Exploration
	Address:	EnCana Corporation 150 9th Ave. SW Calgary, AB T2P 3S5
1.2	Project Name:	EnCana Corporation Burnt Lake Drilling Program
	Property Name :	
	Exploration Licence Number:	EL 384
	Closest Community (s):	Tuktoyaktuk
	Min/Max Latitude of Project Area:	69° 16.3' to 69° 26.4' N
	Min/Max Longitude of Project Area:	133° 59.2' to 134° 20.2' W
1.3	Primary Company Contact:	Alan Wong
	Title:	Project Manager
	Contact Number:	403-645-5569
	Alternate Contact Numbers:	
	Fax:	403-716-2436
1.4	Field Contact:	To be identified.
	Title:	Environment, Health and Safety Field Supervisor
	Contact Number:	To be determined.
	Alternate Contact	

Numbers:

Fax:

1.5 List the contractors (ie. Major, sewage, water) that will be involved in the project:

Company Name: Akita-Equatak Drilling Ltd.

Primary Contact: David Kennedy

Title: Rig Manager

Contact Number:

Alternate Contact Numbers:

Fax:

Company Name: E. Gruben's Transport Ltd.

Primary Contact: Russell Newmark

Title: General Manager

Contact Number: 867-977-2300

Alternate Contact Numbers: 867-777-1442

Fax:

Company Name:

Primary Contact:

Title:

Contact Number:

Alternate Contact Numbers:

Fax:

1.6 List all other permits or authorizations applied for:

Land Use Permit, Indian and Northern Affairs

Authorization to Drill a Well, National Energy Board (to be submitted prior to spud)

SECTION 2: PRE-SITE ASSESSMENT

2.1 Please complete the following chart for those items that currently exist in the project area - a snapshot of the area before your project commences. Attach a map depicting all of the indicated items in the project area, as well as the surface drainage patterns and elevation contours.

			Description
A. well sites	Yes ☐	latitude:	
	No √	longitude:	
B. waste dumps	Yes ☐	latitude:	
	No √	longitude:	
C. fuel and chemical storage areas	Yes ☐	latitude:	
	No √	longitude:	
D. sump areas	Yes ☐	latitude:	
	No √	longitude:	
E. wastewater discharge	Yes	latitude:	

locations	☐		
	No √	longitude:	
F. camps	Yes ☐	latitude:	
	No √	longitude:	
G. transportation routes	Yes √	latitude:	Winter ice road from Tuktoyaktuk to Inuvik, as shown on the attached map identifying access routes
	No ☐	longitude:	
H. pingos	Yes √	latitude:	Known pingos are shown on the attached topographic map identifying access routes
	No ☐	longitude:	
I. staging areas	Yes ☐	latitude:	
	No √	longitude:	
J. seismic lines	Yes ☐	latitude:	
	No		

	√	longitude:	
K. parks and/or protected areas	Yes √	latitude:	The Kugmallit Bay Beluga Management Zone 1A is shown on Figure 3 (page 18) of the attached project description.
	No ☐	longitude:	
L. wildlife management areas	Yes √	latitude:	Special management areas are shown on Figure 3 (page 18) of the attached project description.
	No ☐	longitude:	
M. bird sanctuaries	Yes ☐	latitude:	
	No √	longitude	
N. trap lines	Yes ☐	latitude:	
	No √	longitude	
O. other	Yes ☐	latitude:	
	No ☐	longitude:	

SECTION 3: WATER USE AND WASTE DISPOSAL

3.1 Water Use

Maximum quantity per day (m^3):	1,800
Total quantity for project (m^3):	Approx. 100,800
Planned uses of water:	For access and lease site construction, drilling operations and to support the rig camp.
Operating capacity of the pump:	To be determined
Size of intake screen:	As prescribed by DFO
Source of potable water:	Lake 1, as identified on the attached map identifying the proposed well sites; or water will be trucked from Inuvik if the potable water maker on the rig camp malfunctions for any reason.

3.1.2 Please provide information for each water source as required by the Department of Fisheries and Oceans: "Protocol for Water Withdrawal for Oil & Gas Activities in the Northwest Territories".

Water will be withdrawn from lakes (identified on the attached maps) and the East Channel of the Mackenzie River. The volume of Nesbitt Lake was assessed through a bathymetric survey in the fall of 2002. Volumes for an additional five lakes were estimated based on water depth data collected during the EnCana Burnt Lake 3D program in the winter of 2002. During the Burnt Lake program, at all receiver points on lakes not frozen to bottom, hydrophones were placed 15 cm (6") from the lake bottom. Receiver lines were spaced at 400 m and receiver points were at 60 m intervals on each line. Prior to lowering the hydrophone, crews lowered a rope, with a weight on the end, to the lake bottom. The rope was then lifted to suspend the weight 15 cm from the bottom and the rope was marked. When the rope was pulled to surface the length was measured, and the hydrophone was placed at the appropriate depth. Suspending the hydrophones appropriately was important for seismic data results and the measurements were therefore taken very carefully.

Based on the volume estimates, two of the five lakes assessed were determined to be too shallow for use. The remaining three lakes will be used for water withdrawal. Volume estimates for each lake to be used for water withdrawal are provided in the table below.

Lake	Total Volume (m^3)	Total Volume Remaining with 2 m of Ice (m^3)	Maximum Depth (m)	Surface Area (ha)
1	6 426 900	4 318 500	10.3	116.8
4	3 316 900	1 222 200	9.2	142.3
5	11 451 500	5 723 800	10.9	327.7
Nesbitt	6 627 750	2 017 134	11.4	313.8

To confirm the estimated volumes prior to withdrawal, additional depth measurements will be taken during ice profiling. Transects will be spaced at 400 m and will be perpendicular to the receiver lines from the Burnt Lake 3D. Data will be collected at 100 m intervals. New contour maps will be developed for each lake and the estimated volumes to be withdrawn will be revised as necessary and agreed to with the Department of Fisheries and Oceans (DFO). It is expected that volume to be withdrawn from each lake will not exceed 1-2% of free water volume, assuming 2 m of ice, which is well within DFO's 5% guideline. Given that a bathymetric survey was completed on Nesbitt Lake, no additional depth measurements will be taken.

3.2 Waste Disposal

3.2.1 Will a camp(s) be provided?

Yes √ No ☐

If yes, indicate the maximum number of people that will be accommodated

Capacity:	65
Maximum Accommodated:	50

3.2.2 Will the camp remain in one place for the duration of the project, or move around? Please describe the camp type (e.g. sleigh camp) and attach diagrams of the proposed layout.

For the drilling operation, EnCana will utilize the 65-person camp that is paired with Akita-Equtak Rig 62. The camp is a self-contained unit, with offices, bedrooms, a galley, recreation area and first aid area. The rig camp uses diesel-fired generators, has a potable water-maker and a sewage treatment system. Approximately 50 persons will be required for drilling operations.

3.2.3 What is the proposed method of sewage and greywater treatment/disposal?

Filterboxx system

Please describe the treatment process.

Wastewater from the rig camp will be treated using using a Filterboxx system. The Filterboxx is an extended aeration activated sludge biological wastewater treatment system. A holding tank (approximately 64 m^3) is also being installed, which can store up to five days of wastewater, assuming the camp is running at full capacity. Wastewater can be recirculated from the tank through the wastewater treatment unit. The Filterboxx unit has been ordered by Akita/Equtak Drilling, with expected delivery and installation prior to the program start date.

The influent wastewater is pumped from the collection liftstation to the inlet of the solids separation tank to trap settleable solids as well as oil & grease. The wastewater then flows into the Anoxic/EQ tank that attenuates the peak flows and pre-mixes the influent wastewater with return activated sludge from the aeration tank. From the Anoxic/EQ tank the wastewater is pumped into the aeration tank.

The main treatment is performed by the activated sludge process within the aeration tank. The extended aeration activated sludge process is a suspended growth biological treatment. The process utilizes aerobic (oxygen using) bacteria to remove organic contaminants through a process of biological oxidation. The air required to meet the oxygen demands of the system and to provide the mixing of the mixed liquor suspended solids is supplied via a central blower system and fine pore bubble diffusers. The wastewater flows from the aeration tank to a secondary clarifier that settles out the biological solids and skims off any residual oil & grease. The solids are recycled to the activated sludge system to maintain the mixed liquor suspended solids concentration in the aeration tank or pumped to the solids holding tank.

In the unlikely event the system cannot be delivered and installed prior to the program start-up, the camp's existing wastewater treatment system would be used. The existing system is an EcoTech extended aeration system and is capable of processing approximately 15 000 litres per day.

A certified technician/engineer will be hired to manage the potable water system, as well as the wastewater treatment system. The technician will have access to an on-site laboratory to test samples frequently and regularly to ensure compliance. Testing on-site will allow the technician to manage the system more closely and make adjustments, as and when required. Routine third-party testing will also be conducted, as per the conditions established by the water license.

What is the maximum capacity per day (in m^3 and people) of the treatment system?

Flow design 35 m3/day or maximum 150 people

Please attach a diagram(s) of the treatment system labeling all of the major components.

Please see attached.

3.2.4 Describe the manner in which the treated effluent will be disposed/discharged to the environment:

Upon meeting licensed criteria, treated wastewater will be discharged to the land surface at the rig camp or, if approved by the Inspector, will be spread on overland sections of roads as part of the routine access maintenance. Any discharge to land will be kept a minimum of 30 m from any waterbody. Discharge is estimated at less than 150 litres/capita/day for a total estimated discharge 9 m^3/day.

3.2.5 What other back-up methods are available for sewage and greywater treatment/disposal (i.e. contingency)?

As a contingency, if treated wastewater does not meet criteria required to discharge to land, EnCana may discharge to the East Channel of the Mackenzie River, provided the treated effluent met the necessary criteria. An estimate of the minimum average flow rate on the East Channel at Lousy Point is approximately 17 884 800 m^3/day in winter (flow rate information is provided in Appendix A of the attached project description). Assuming an estimated discharge rate of 150 litres/capita/day, dilution would be greater than 10 000:1. A second alternative, if wastewater could not be discharged to the river, would be to chlorinate and subsequently dechlorinate the wastewater to bring it into compliance with discharge criteria. As a final option, EnCana may discharge treated wastewater to a sump. The sump would be constructed separately from the drilling sump. This is not a preferred option, and would only be undertaken if the other processes failed.

While EnCana may haul wastewater to a municipal facility early in the program, as initial tests of the wastewater stream are being conducted, this is not a preferred option given the cost and safety issues associated with hauling waste over long distances in winter.

3.2.6 What is the proposed method of solid waste disposal?

Metal, plastic and oily and other hazardous wastes will be separated on-site. Separated recyclable materials and plastics will be hauled to an appropriate handling facility for recycling or disposal upon program completion. The rig camp is also equipped with an incinerator. Combustibles and

food waste will be incinerated on-site, with the resulting ash being disposed of in the Inuvik landfill. Contaminated snow will be transported to Swimming Point for processing in an oil-water separator and the oil will be incinerated.

3.2.7 List all hazardous materials that will be used during the project as defined under the *Transportation of Dangerous Goods Regulations*.

To be determined.

3.2.8 Fuel storage

Arctic Star Barge (1 container)	75 710 litres (diesel)
2 fuel sloops x 6 tanks/sloop (mobile)	1 900 litres (diesel)
Drilling Rig (1 container)	35 000 litres (diesel)
Rig camp (1 container x 2 power units)	20 000 litres (diesel)
Lease site (4 fuel tanks)	60 000 litres (diesel)
6 drums (contingent supply to be stored a lease site)	170 litres (aviation fuel)

3.2.9 What is the proposed method of hazardous waste disposal?

Hazardous wastes will be transported, by an approved carrier, to an appropriate southern facility for disposal.

SECTION 4: DRILLING PROGRAM INFORMATION

4.1 What is the time frame of this project? Will this project be carried out and completed during frozen ground conditions?

The project will be carried out under frozen ground conditions from approximately 1 December 2003 to 15 April 2004.

An approximate schedule is provided in the table below (schedule is subject to weather and other unforeseen conditions).

Access and Lease Site Construction	December - January 2003
Well Drilling	January - March 2004
Testing and Completion	March - April 2004
De-mobilization	April 2004
Clean-up	Winter operations complete by 15 April 2004
	Follow-up July or August 2004
Sump Monitoring	Annually, August 2004-2007

4.2 Please describe the methods in which equipment will be brought to the project area and provide a list of heavy equipment that will be transported to the site.

Most equipment will be brought to the site via truck. Mobile equipment will be driven on designated access routes.

Construction				**Drilling**	
Cat 950G Loader	1	Grader	1	Drilling rig	1
250 Komatsu	1	Hitatchi 300 Excavator	1	Oilfield service rentals, as required	
5 Ton Plow Truck	2	Tandem Dump Trucks	3	Satellite dish/communication system	1
Flood Trucks	4	¾ Ton Diesel Supercabs	5	Light towers	
Gator with Vacuum tank etc)	1	1 Ton Diesel Crew Cabs	5	Support equipment (water tanks,	
Delta II	1	Pumphouses	2	Picker or crane	1
Delta III	2	Fuel Sloop on Sleigh	2	Rig camp	1
Water Trucks	3	Warm-up Shacks	2	Well testing unit	1
Fuel Truck	1	150 kilowatt Light Plant.	3	Telehoist	1
BR-180 Snowcat	1	Crew Bus – 30 man	1	Man-rider	1
D3 Cat	1	Spacer Barge	1	Rathole Rig	1
D6 Cat w/ Water Sleigh	1	Snowmobiles For Scouts	4		
Shothole Rig	1	Service Truck	1		
Dynamite Magazine	1	Profiler	1		

4.3 Describe any access routes and their method of construction. How many streams will be crossed? Will any stream crossings greater than 5m be required?

Access will be across a combination of lakes, channels and overland sections from the Tuktoyaktuk-Inuvik ice road to the lease site. The proposed access routes are shown on the attached map. The access routes has been selected to:

- Utilize existing seismic trails and accesses used during the winter seasons 2001-2003 wherever feasible, to minimize surface disturbance;
- Follow a direct overland route from the river to the well site, maximizing the use of waterbodies;
- Maximize safety considerations;
- Avoid known archaeological sites; and,
- Minimize cost.

Construction crews will be based at the Arctic Star barge camp. To facilitate an early season start, equipment will be staged with the barge in the fall. Equipment will be staged both on the Arctic Star, as well as on two

barges to be staged adjacent to the Arctic Star.

From the Tuktoyaktuk-Inuvik ice road to the well site, overland sections of the access will be approximately 20 m wide, while on waterbodies, for safety purposes, the width will be increased to 60 m. Where slopes are unavoidable and high banks (>1 m) hinder access, snow and/or ice ramps made of clean snow and water will be constructed to minimize erosion and disturbance by equipment. No clearing of vegetation is expected on the access or the well site.

If the ice on the East Channel is slow to form in the early winter because of warm weather and/or a heavy snow pack, construction equipment may be walked overland from the barge camp to Nesbitt Lake, where construction could begin on overland portions of the main access. Only tracked construction equipment would be used, and the access would follow a route used by EnCana during the Kugmallit 2D seismic program in the winter of 2003. No tracked equipment would be allowed on the tundra without a minimum 10 cm snow cover. This alternate access is identified on the attached map.

Both the access and drilling lease will be prepared using the same equipment and procedures. All overland sections of the access will be built up with snow and ice to a minimum thickness of 15 cm. EnCana's construction supervisor will clearly mark the access.

On all waterbodies, EnCana will use electronic and manual ice profiling to ensure ice thickness is adequate to deploy equipment. Once the ground surface is frozen and has adequate snow cover, snowmachines will be used to pack the snow initially. Snow-cats will follow and be used to blade the access, pack snow and build snow ramps on lake and channel banks. A Delta III or Gator, both with low ground pressure tires, will spray water on all snow ramps, do an initial watering on the overland sections of the access and improve sections of the access as necessary to support the other road building equipment. The access will be dragged using a rubber-tired drag with a Delta. A D6 may be required, but is not likely to be used extensively during road construction. The Delta III or Gator will continue to flood the road sufficiently to allow water trucks to travel safely and efficiently. Fuel sloops will be staged using a D6 or Delta to supply all of the lead equipment.

4.4 Please provide the name, latitude and longitude, and UTM coordinates for all proposed well sites.

WELL REFERENCE	LOCATION
Potential Wellsite Locations	
N-16	Lat/Long: 69 25 53.1/-134 19 06.0 UTM: 526727 / 7702617
K-16	Lat/Long: 69 25 33.6/-134 18 48.9 UTM: 526920 / 7702017
D-16	Lat/Long: 69 25 06.1/-134 19 06.0 UTM: 526555 / 7701176

4.5 Indicate the total estimated volume of drilling wastes in cubic metres.

EnCana estimates approximately 1 200 m^3 of drilled solids and liquid effluent will be generated, and is planning for a contingency of up to 1 800 m^3.

4.6 Indicate methods for the disposal of drilling wastes and attach a management plan.

- [√] Sump
- [ ] Remote Sump
- [ ] Down Hole
- [ ] On-site Treatment
- [ ] Off-site
- [ ] Other_____

4.7 What is the capacity in cubic metres of the sump? Attach a drawing to scale of the layout of the proposed sump.

A 20 m x 60 m x 5.4 m deep sump will be blasted and excavated. The sump will contain drilling waste to a depth of approximately 1-1.5 m. Please refer to Drawing 2 (page 12 of the attached project description) for a sump schematic.

How will the sump berms be protected from erosion?

N/A

Provide information on the soil type, permeability and depth of the active layer at the proposed sump location.

Based on the initial field assessment two locations were identified as good potential locations for a sump. At the N16 location, a potential sump location was identified adjacent to the well site. At D16, the potential sump location was identified approximately 200 m from the well site. No suitable location for a sump was identified at the K16 well site. If K16 is selected as the drilling location, a remote sump will be constructed at the site identified adjacent to the N16 site.

At the proposed N16 location, the area is gently rolling (ridge <5% grade), with tussocks throughout and wet polygons in low-lying areas, south of the ridge. There is no standing water or apparent drainage courses on the ridge. Test pit logs at the proposed sump site show that soil is primarily silt (beginning at 0.1 m below grade) with traces of clay, and organics at the surface. Permafrost was encountered 0.2 m below the surface.

The field reconnaissance at the proposed D16 location showed the topography surrounding the well

site was not appropriate for the placement of a sump near the well site. A more appropriate location for a remote sump was identified approximately 200 m to the south. The proposed sump location is relatively flat with <2% gradient. Similar to N16, there are tussocks throughout and well-developed wet polygons in a low-lying area to the north. No standing water or apparent drainage courses were encountered in the vicinity of the proposed sump. Soil is primarily clayey-silt, with frozen soil at 0.35 m below grade, and peat to 0.1 m.

To confirm the suitability of the soil and ice conditions at the potential sump locations, Kiggiak-EBA used ground-penetrating radar (GPR). GPR profiles can be used to identify soil characteristics up to 10 m below surface. At the proposed sump location adjacent to N16, four profiles over an area approximately 100 m x 170 m were assessed using the GPR. The GPR showed potentially ice-rich soils or coarse sands and gravels on the western edge of the profile area. These soils are isolated on the western side of the study area and will be avoided by sump construction. The remainder of the survey identified finer-grained soils throughout, which will be appropriate for sump construction. At the proposed D16 location, three profiles over an area approximately 125 m x 110 m were assessed with the GPR. At the southern and northern edge of the profile area, potentially ice-rich soils or coarse sands and gravels were identified. These areas will be avoided by constructing the sump in the middle of the study area. Similar to N16, the remainder of the study area showed finer-grained soils.

Prior to sump construction, these findings will be confirmed by taking core samples at the proposed sump location.

How will water used for drilling be recycled/reclaimed?

The solids control system uses a special auger tank, together with two centrifuges, to separate water from the used drilling mud.

What measures are contemplated for surface drainage controls?

N/A

What are the planned abandonment procedures for sumps?

When the drilling operation is complete, the sump will be backfilled and capped. Sump wastes will be buried approximately 3.5-4 m below the level of the surrounding active layer and an additional 1-1.5 m of backfill cap will be compacted above the level of the surrounding ground surface. First, the soil from the "subsurface soil" stockpile will be removed from the ice pad surrounding the sump and be used to backfill the sump. The backfill will be replaced in layers. Each layer, up to the level of the surrounding active layer, will be thoroughly watered, track-packed, and allowed to freeze, before the next layer of fill is replaced. This process will help ensure the backfill is solidly

---

compacted, which will minimize potential settling. Above the active layer level, the soil backfill will be placed without watering and compacted by track packing. Material from the "surface soil" stockpile will be placed and compacted on the top of the sump cap. Placing this material at the surface is expected to better facilitate revegetation of the sump site. The backfill cover over the sump will provide a minimum of 2 m of overlap on all sides, be 1 m above the surrounding ground level and have a minimum 2% grade, to reduce settling, and prevent runoff or rain entering the sump area.

The sump will be revegetated with a seed mix agreed to by the Inspector. Revegetation of the site will help to minimize surface erosion and permafrost melt. Five thermistor strings will be placed in and around the sump site to monitor thermal characteristics within the sump, and at undisturbed areas around the sump. The area around the sump will also be monitored for salinity migration using an electromagnetic survey. The survey will measure conductivity of the soil around the sump site to determine if salts in the drilling waste are migrating through the soil from the sump. The sump will be monitored annually for three years after program completion. Should monitoring indicate drilling fluids may be migrating out of the sump, or if the sump integrity appears compromised, a restoration and reclamation plan will be developed in conjunction with the Inspector.

4.8 Mud SystemType(s): Check all that apply:

- ☐ Gelchem
- ☐ Invert
- √ KCL
- ☐ Other_____

Please provide a complete list of all planned drilling mud additives.

Acid soluble plug
Alcomer RD60
Alpex
Ammonium Bisulphite
API Bentonite
API Wyoming Bentonite
Asphaltic resin
Attapulgite
Barite
Biocide
Blend of Granular Flake and Fibrous Materials
Calcium Hydroxide
Caustic Soda
Cellophane/Pol-E-flak)
Chrome Free Lignsulfonate
Chrome Lignite
Chrome Lignsulfonate
Citric Acid
Defoamer
Drilling detergent
Encapsulating Polymer
Ethoxlyated Alcohol
Extreme Pressure Lubricant
Fatty Easter Lubricant
Filming corrosion inhibitor
Filtration Control Agent (Invert System)
Glass Spheres
Ground Walnut Shells

H2S Scavenger
High Molecular weight Xanthan Gum Biopolymer
High Quality Low Viscosity Grade Polyanionic Cellulose (PAC - LV)
Hydroxyethyl Cellulose
Hydtrated calcium sulphate
Large protein chain
Ligco
Lignite
Liquid low MW polyacrylate
Liquid Shale Swelling Suppressant
Liquid Viscosifier and Gelling Agent for Oil Mud
LSRV Rheology Modifier
Lubricant
Magnesium Oxide
Mica
Modified Starch
Oil Soluble resign
Oil-Wetting Agent
Olefin based ROP enhancer
Organic Surfactant Emulsifier
Organophilic Clay
Oxygen Scavenger
PHPA polymer
Polyphenolic Tannin Base Thinner
Potassium Chloride
Potassium Hydroxide
Potassium Nitrate
Premium Quality Regular Grade Polyanionic Cellulose (PAC - R)
Premium-grade, clarified xanthan gum
Resinated Lignite
ROP Lubricant
Salt (NACL)
Sawdust
Scale inhibitor organic phosphorus compound
Seepage Loss Circ, Agent
Sized Calcium Carbonate Coarse/Medium/Fine/Ground marble
Sized Salt Briding Agent
Sized salt material
Sodium Acid Pyrophosphate (SAPP)
Sodium Bicarbonate
Sodium Carbonate
Sodium Chloride
Sodium Nitrate
Sodium Silicate Dry/Liquid
Sodium Sulphite
Soya Lecithin
Starch
Sulfonated asphalt
Surfactant Cleaner
T-307 - Bleach
Technical Grade High Viscosity Carboxy Methyl Cellulose (CMC-HVT)
Technical Grade High Viscosity Carboxy Methyl Cellulose (CMC-LVT)
Technical Grade High Viscosity Sodium Carboxy Methyl Cellulose (Starch)
Variable Density Oil Base Spotting Fluid Concentrate
Viscosifier
Viscosifier Basic Emulsifier package
Wetting Agent for Oil Mud

4.9 Indicate any potential for encountering artesian aquifers or lost circulation within the surface hole (to casing depth):

N/A

4.10 Describe the surficial geologic and hydrogeologic conditions in the immediate vicinity of the well site.

Richards Island is characterized by a surficial hydrology that is fundamentally different to Mackenzie Delta islands further west. The area is generally strewn with a large number of typically shallow lakes. A large proportion of these lakes were formed during a postglacial warm period when active

layer depths resulted in thawing of the upper, ice-rich, permafrost layers (Mackay 1992).

Lakes on the Tuktoyaktuk Coastal Plain tend to remain ice covered for around 250 days/year, with freeze up generally occurring in September or October and break up occurring in late June (Bond and Erickson 1985). Break up on the peninsula is caused by melting as opposed to flooding of the ice by a warmer water body, as in the Mackenzie Delta. In tundra areas of the Tuktoyaktuk Peninsula, subsurface flow, as opposed to overland flow, is the dominant mode of water transport (Quinton and Marsh 1999). During the summer, evaporation from lake surfaces is generally greater than precipitation (Pienitz et al. 1997). Seasonal variations in surface water chemistry are therefore related mainly to dilution by snowmelt and runoff and to concentration by evaporation and exclusion from ice and/or permafrost (Pienitz et al. 1997). The slower process of melting and the lack of a flood regime on the Tuktoyaktuk coastal and tundra lakes contribute to greater year to year variability in measured physical properties, such as temperature, pH, and conductivity, compared to lakes of the Mackenzie Delta (Fee et al. 1988).

The project area lies within the Burnt Creek watershed which drains westward into Mallik Bay. The project area includes five principal lakes, all of which are linked to Burnt Creek via small connecting lakes and streams. Most of these connecting streams are probably intermittent although some may flow throughout the open water season in wet years. The lakes range in size from 20 to 328 ha, and in depth from 4.4 to 10.9 m

SECTION 5: CONTINGENCY, ABANDONMENT AND RESTORATION PLANNING

5.1 Attach the proposed or existing contingency plan which describes course of action, mitigative measures and equipment available for use in the event of system failures and spills of hazardous materials (in compliance with NWT Water Board Guidelines for Contingency Planning, 1987).

5.2 Outline the planned abandonment and restoration procedures.

Upon completion of the drilling program, the wells will be capped and suspended or permanently abandoned. All equipment, survey stakes and construction debris associated with the operations will be disposed of upon completion of drilling. The rig and camp will be de-mobilized to Tuktoyaktuk, Inuvik, Swimming Point or Lucas Point. However, if weather conditions should deteriorate ice conditions on the East Channel earlier than expected, the rig may be de-mobilized to Taglu. The only permanent facility planned is the wellhead, which will be above ground level, and appropriately marked, staked, and signed as per NEB regulations.

Upon completion of program operations, any equipment will be removed from the site and debris will be disposed of in an appropriate off site facility. In the summer, a follow-up inspection will also be conducted to ensure no debris was inadvertently left on-site and to better assess if, and where, any surface disturbance may have occurred. An assessment of the sump area will be conducted for three years after program completion as outlined above.

Any surface disturbance will be reported to regulators and reclamation efforts will be initiated if warranted. Effects related to surface disturbance requiring remediation would be discussed with INAC to determine the appropriate action to be taken and a reclamation plan would be established. If post program monitoring identifies any issues related to sump integrity, a remediation plan would also be established with the agreement and input of the Inspector.

SECTION 6: ENVIRONMENTAL ASSESSMENT AND SCREENING

6.1 Has this project ever undergone an initial environmental assessment, including previous owners? If yes, by whom/when:

No other environmental assessments have been conducted or submitted directly in relation to this program. EGT will be submitting a project description to the Environmental Impact Screening Committee and NWT Water Board to support its application for a water license to operate the Arctic Star barge camp.

6.2 What baseline data been collected for the water bodies you intend to cross, or draw water from in the area? Please attach data.

Please refer to Section 11.0 (pages 22-38) of the attached project description. Volumes estimates for lakes to be used for water withdrawal are provided above.

6.3 What baseline data has been collected and evaluated with respect to the biophysical components of the environment potentially affected by the project (wildlife, soils, air quality, etc.)? Please attach data.

Please refer to Section 11.0 (pages 22-38) of the attached project description.

6.4 What community consultation has been done in regards to this project? Provide details of the program.

Please refer to Section 10 (pages 19-22) of the attached project description .

6.5 Please provide the following information:

b) description of the environment (including known historic sites, results of any archeological assessments, wildlife, waterbodies, etc.)

b) potential environmental impacts (including cumulative and socio-economic effects)

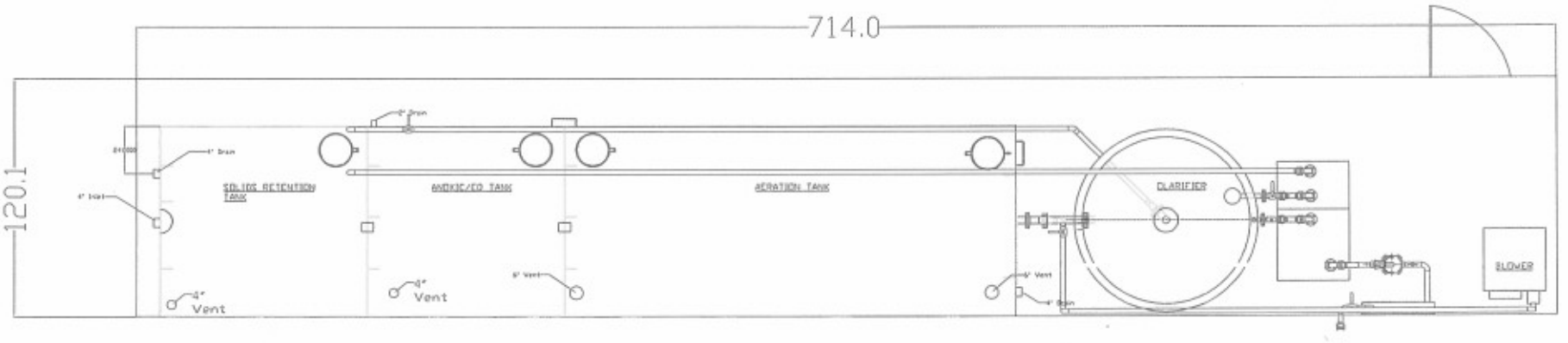
c) proposed mitigation to potential environmental impacts.

d) any follow-up or monitoring programs to be implemented to verify effectiveness of mitigation measures.

Please refer to Sections 11 and 12 (pages 22-48) of the attached project description.

SECTION 7: LIST OF ATTACHMENTS

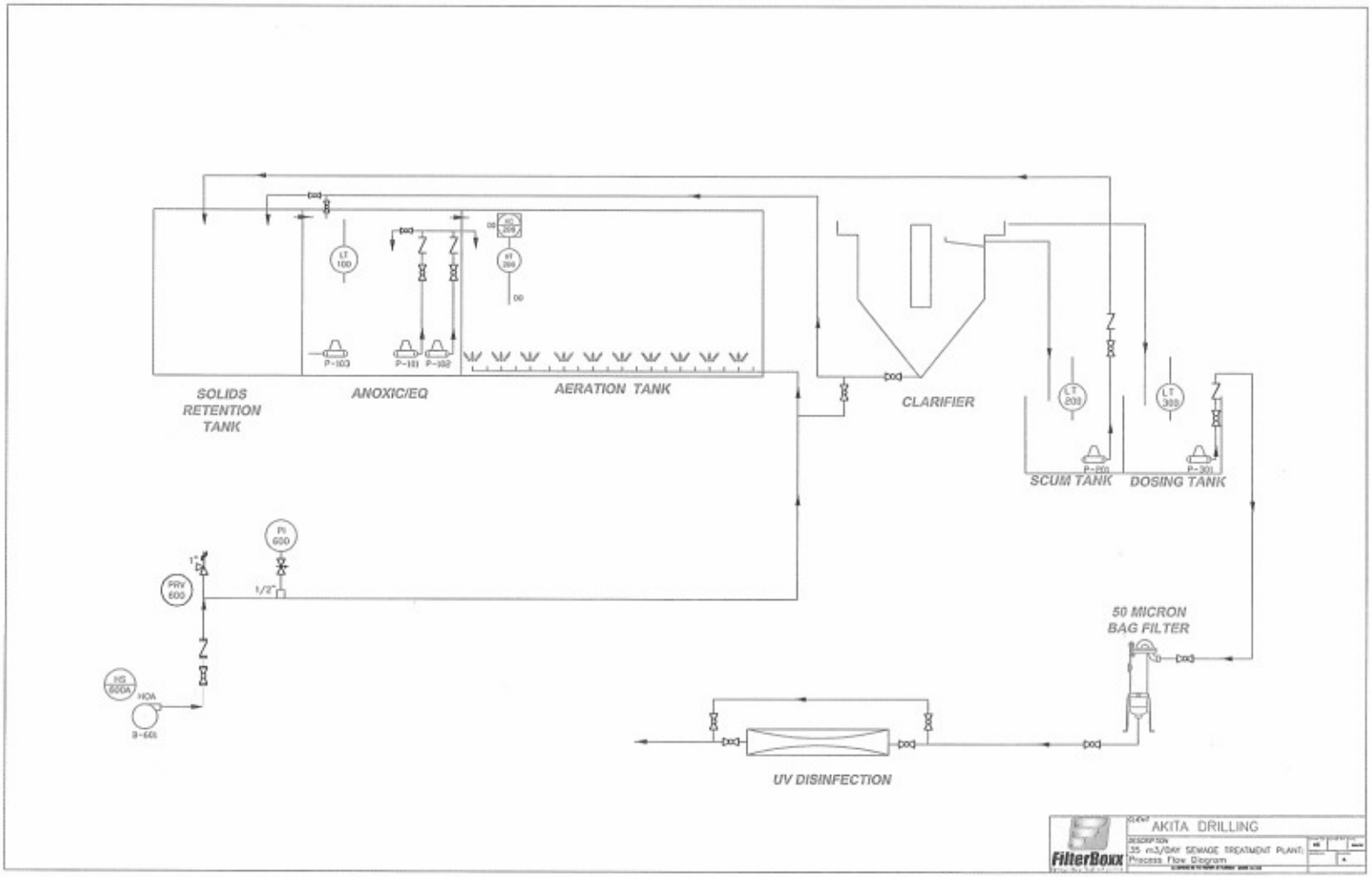
Reference to Question #	Title	Page / Section Number
3.2.3	Filterboxx Process Flow Diagram Filterboxx General Arrangement Diagram	
3.2.2	Rig 62 Camp Plan	



FilterBoxx

CLIENT AKITA DRILLING

DESCRIPTION 35 m3/DAY SEWAGE TREATMENT PLANT: General Arrangement Diagram


LT 100
SD 200
FT 300
P-103
P-101
P-102
SOLIDS RETENTION TANK
ANOXIC/EQ
AERATION TANK
CLARIFIER
LT 200
LT 300
P-201
P-301
SCUM TANK
DOSING TANK
PI 600
PRV 600
1"
1/2"
HS 600A
HOA
B-601
50 MICRON BAG FILTER
UV DISINFECTION
FilterBoxx
AKITA DRILLING
35 m3/DAY SEWAGE TREATMENT PLANT
Process Flow Diagram