

August 26, 2002



Shell Canada Limited

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Executive Assistant  
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E.A.	G.W.
BOARD	COPY

**Subject: Shell Farewell Water License N7L1-1762  
Updates to Operations & Management Plan**

In accordance with the subject License, please find attached the amended Operation and Management Plan for the Sewage and Solid Waste Treatment Facilities. The plan includes updates for:

- 1) Those sections affected by Modification 2002-1 including the as-built drawings in Section 3.
- 2) Contingency Plan to reflect changes in occupancy and use from WesternGeco to Shell Canada Limited.

Please destroy your previous version.

Should additional information be required, please contact the undersigned at (403) 691-2521 or [randy.hetman@shell.ca](mailto:randy.hetman@shell.ca).

Yours truly,

R. (Randy) H. Hetman  
DAR/Construction Manager

cc- Inspector – Inuvik District Office, DIAND (w/attachments)  
Site – Camp Farewell (w/attachments)

Attachments

## CAMP FAREWELL

### OPERATIONS & MAINTENANCE PLAN

Sewage & Solid Waste  
Treatment Facilities

November 2001  
Amended May 2002  
Amended August 2002



<b>1</b>	<b>OPERATIONAL PLAN</b>
<b>2</b>	<b>STP – GENERAL DESCRIPTION</b>
<b>3</b>	<b>STP – EQUIPMENT DRAWINGS</b>
<b>4</b>	<b>STP – OPERATIONS &amp; MAINTENANCE GUIDE</b>
<b>5</b>	<b>MODIFICATIONS</b>
<b>6</b>	<b>QA/QC PLAN</b>
<b>7</b>	<b>CONTINGENCY PLAN</b>
<b>8</b>	<b>LICENSE N7L1-1762</b>
<b>9</b>	<b>SOLIDS DISPOSAL PLAN</b>
<b>10</b>	<b>CORRESPONDANCE</b>

## Camp Farewell Operational Plan Summary

### Start Up

- The Water License defines the regulatory requirement for the use of water and discharge of effluents. Maintain a copy of the License at the site at all times.
- Site manager will review Water License N7L1-1762 and "Water License Field Requirement Checklist" and ensure requirements are executed.
- Start up treatment plant as per manufacturer Start Up Procedures.
- The sewage lagoon at Camp Farewell will be used to store the effluent generated by the sewage treatment plant during the conditioning period of the extended aeration activated sludge unit.

### Modifications

- The Board must be notified 45 days prior to beginning modifications. Notification for the upcoming mod was done May 24, 2002.
- Upgrade to Sewage Treatment Plant in July 2002 replaced the RBC unit with an extended aeration activated sludge plant. The plant includes an equalization tank, aeration tanks, aerated sludge digester, final clarifier and ultraviolet light disinfection.
- As-builts must be submitted to Water Board within 90 days of completion of upgrade.

### Operating

- Inspector shall be notified 5 days before the start of any planned discharge.
- Inspector approval is required before discharge to the Mackenzie River. Four samples that average within the water license discharge criteria are required in order to receive approval from the Inspector.
- When discharging continuously from the extended aeration plant, directly to the river, samples and analyses are required every two weeks as per the "QA/QC Plan for Collecting Representative Water Samples".
- Maintain sewage treatment plant as per Sanitherm operation and maintenance manual.
- Monitor sediments in tanks and remove with vacuum truck as required and transport to the municipal sewage lagoon.
- Maintain sign identifying the sampling station of the "Surveillance Network Program.
- In the event of a spill, it is to be handled as per Spill Contingency Plan.
- Spill reporting procedures include GNWT Spill Reporting, within 24 hours of an occurrence.
- Ensure water truck has a screen on the suction hose that is compliant with the water license.



## Camp Farewell Operational Plan Summary

- Maintain a record of water withdrawn from the Mackenzie River. Utilize daily "Water Withdrawal Volumes" form for tracking use.
- Maintain a record of water discharged to the Mackenzie River. Utilize daily "Waste Water Disposal Volumes" form for tracking use.
- Submit Monthly "Water License Field Requirement Checklist", "Water Withdrawal Volumes" and "Waste Water Disposal Volumes" sheets as indicated on form.

### Shut Down

- Shut down sewage treatment plant and facilities as per manufacturer procedures.
- Haul remaining effluent and sludge with vacuum truck to municipal sewage lagoon for disposal.

**Camp Farewell**  
**Water License Field Requirements**

**Check List**

	Circle appropriate answer	<u>Date</u>	<u>Initials</u>
1. Copy on site: License	Yes / No		
Contingency Plan	Yes / No		
QA/QC Plan	Yes / No		
2. Five Day Notice to Inspector Prior to Discharge	Yes / No		
3. Screened Water Intake	Yes / No		
4. Discharge Sample Point Sign in place w/ "1762-1 Treated Effluent Discharge Sample Point"	Yes / No		
5. Volumes of Water withdrawn for the camp are recorded	Yes / No		
6. Treatment Facilities were modified. If yes:  Describe:  45 Day Notice given. As-builts submitted within 90 days of completion	Yes / No    Yes / No Yes / No		

**Biweekly Discharge Samples**

	<i>Date Sampled</i>	<i>Sampler</i>		<i>Date Sampled</i>	<i>Sampler</i>
1			14		
2			15		
3			16		
4			17		
5			18		
6			19		
7			20		
8			21		
9			22		
10			23		
11			24		
12			25		
13			26		

Fax to Shell Canada Limited, DAR/Construction Manager on the first of every month. Fax: (403) 269-7948

Water License Field Requirements

Fill in the Number of Loads for Camp Use Only

Truck Volume: m3 per load.

Date	January	February	March	April	May	June	July	August	September	October	November	December
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												
13												
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20												
21												
22												
23												
24												
25												
26												
27												
28												
29												
30												
31												
Total Loads												
Total M3												

Fax to: Shell Canada Limited, DAR/Construction Manager on the first of every month @ (430) 269-7948

Waste Water Disposal Volumes

mpirewell

Year: \_\_\_\_\_

**Water License Field Requirements**

*For Reporting Requirements, only Monthly Volume Required.  
Daily Tracking is only for Operational Monitoring*

Date	January	February	March	April	May	June	July	August	September	October	November	December
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
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22												
23												
24												
25												
26												
27												
28												
29												
30												
31												
Total M3												

Fax to: Shell Canada Limited, DAR/Construction Manager on the first of every month @ (430) 269-7948

# **Extended Aeration Activated Sludge Unit**

## **Waste Water Treatment System**

### **General Description**

Wastewater Treatment Facility – 40 to 120 Camp Residents

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**The Extended Aeration Activated Sludge Process**

Aerobic digestion of organic based contaminants is employed as the main treatment process within the treatment plant. Sludge settling, recycling of sludge and final effluent disinfection complete the treatment process operations.

In aerobic digestion, microorganisms use the dissolved and suspended organic matter in sewage as food. They also eat dead microorganisms. In addition to food the microorganisms need oxygen. The oxygen is added in aeration tanks where air is bubbled through the water, organic matter and microorganisms to provide oxygen to the microorganisms and to ensure that the microorganisms contact the organic material. In the extended aeration activated sludge process, the microorganisms eat each other as well as sewage. This cannibalism results in a biologically inert sludge with very few microorganisms in it. This is achieved by a retention time in the aeration tanks of 24 hours and having more microorganisms than necessary to eat the sewage. The products of the aeration tanks are water, carbon dioxide, more microorganisms and a biologically inert residue.

The mixture of treated water and microorganisms is settled out in settling tanks (called clarifiers). The settled out alive and active microorganisms (called activated sludge) are returned to the aeration tanks. As there are more microorganisms in the activated sludge than needed to eat the incoming sewage, some of the microorganisms along with the inert sludge are wasted.

With the microorganisms settled out, clean and clear water flows out over the top of the settling tanks. Passing it through banks of ultraviolet lights disinfects this water. After disinfection, the water is discharged to the Mackenzie River

The treatment plant is contained within two 39' 5" long by 7' 8 1/2" wide by 8- 9 1/2" high containers. The two containers are located parallel to one another and are connected by pipes and electrical cables. One container contains a flow equalization chamber, four settling tanks, a sludge holding tank, a chlorine contact chamber, two banks of ultraviolet disinfection lights, pumps, air blowers electrical panels and instrumentation controls. The second container has aeration tanks. Power to operate the plants pumps, heating and control system is supplied by the camp generating facility

The flow of sewage through the treatment facility is as follows:

The camp wastewater outfall line discharges to a lift station placed below grade to accept this flow under gravity. The lift station is equipped with a level activated submersible lifting and grinding pump, which pumps the sewage to the sewage treatment plant.

The pumped sewage flows into a flow equalization chamber. This chamber smooths out the peaks and valleys of sewage flow to the aeration tanks. It has a minimal amount of air bubbling through it to prevent it from becoming septic and very smelly. Overflow from the sludge holding tank and some wasted activated sludge are also pumped into this chamber. Grinder pumps pump sewage from the bottom of this tank to the aeration tanks.

In the aeration tanks the sewage from the flow equalization chamber has activated sludge (live microorganisms) added. Air is blown through this to add oxygen and mix the sewage and microorganisms into a uniform mixture. Retention time in this unit is around 24 hours. As sewage is pumped in at one end of an aeration tank, a mixture of water, inert sludge and microorganisms flows out the other end to the settling tanks.

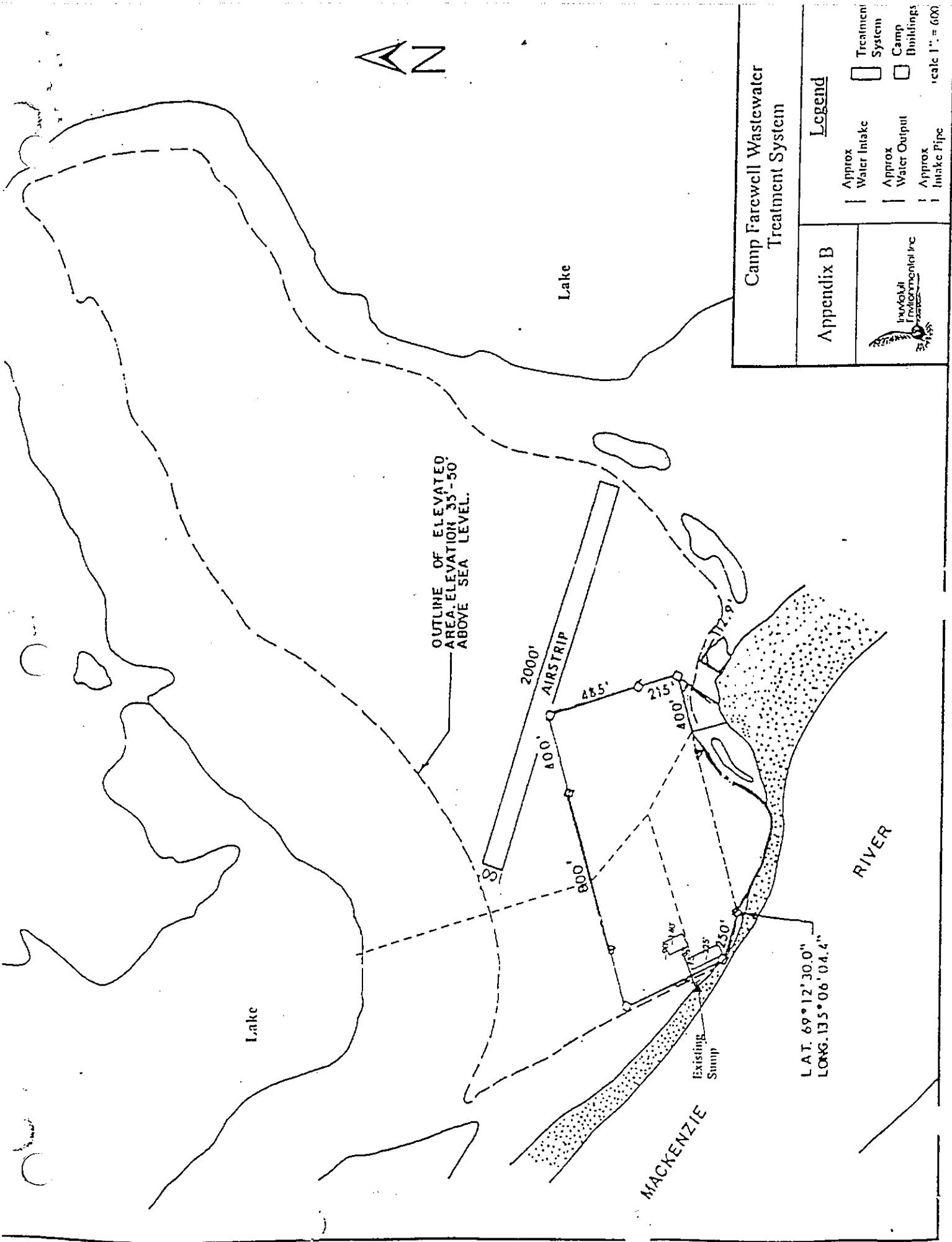
After about four hours of settling the clear, treated discharge water runs over a weir to a holding tank. The settled sludge containing microorganisms is then pumped using airlifts to the aeration tanks. This is the 2" PVC RAS (Returning Activated Sludge) line shown on the Saniterm P&ID drawing. Two valves allow some of this sludge to be wasted to either the sludge holding tank or the flow equalization chamber. These are the WAS (Waste Activated Sludge) lines shown on the Sanitherm P&ID drawing. Any inert material will be recycled through the system until it eventually ends up in the sludge holding tank where it stays.

Whilst the holding tank could be used as a chlorine contact chamber, it is not planned that chlorine be added to the water for disinfection. After flowing through the holding tank, the water enters into two banks of Ultraviolet lights for disinfection. Then the water leaves the building through a 2" male cam lock connection. If the discharged water does not meet quality specifications it can be diverted to the lagoon located immediately beside the plant for processing at a later time.

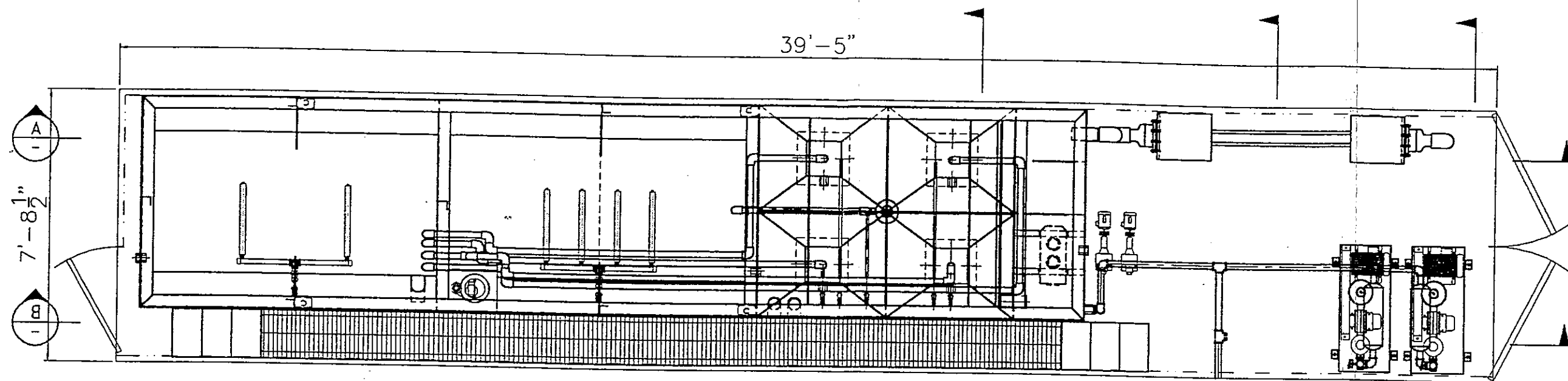
The discharge line is heated to prevent freezing. Sufficient discharge hose, dependent on yearly water levels will transport the treated water to a discharge point in the Mackenzie River channel directly adjacent to Camp Farewell. The discharged water flows from the pipe directly into the moving water, through a hole in the ice.

Float switches control the pumps that pump from the flow equalization tank to the aeration tanks. A timer in the control panel controls the aeration blowers. There are two flow equalization pumps and two aeration pumps so that there is 100% stand-by. These blowers provide air for the aeration, flow equalization and holding tanks and for the airlift pumps installed in the settling tanks. The airlift pumps have no other controls on them. They are on when the blowers are on and off when the blowers are off.

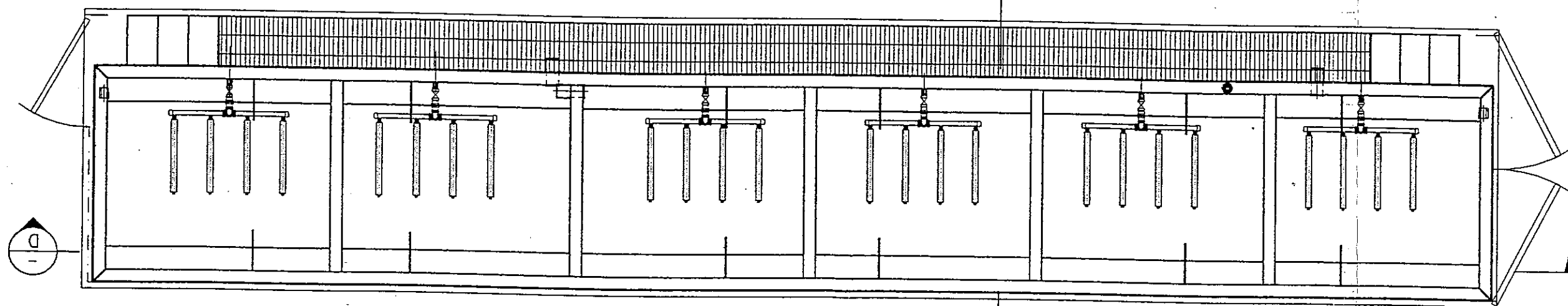
Samples of discharged water are taken after the disinfection point. This sample point is easily accessible for collection in a safe and hygienic manner. A small PVC bucket is used to collect approximately 2 liters of sample. The sample is then decanted into three separate sample bottles provided by a third party lab. Samples are shipped directly to the lab for analysis of pH, BOD, TSS, fecal coliform counts, oil and grease and free chlorine concentration. Samples are collected every two weeks during periods of discharge. An insulated cooler with ice packs is used to transport the samples to the lab, preventing them from warming and maintaining a constant sample temperature. Some of the analysis must be conducted within 24hrs of sampling, therefore sampling and expediting planning is of utmost importance. For full details on sampling and analysis, refer to License N7L1-1762 and the approved QA/QC Program.




Camp Farewell Wastewater Treatment System		Appendix B	
<p><b>Legend</b></p> <p>  Approx Water Intake   Approx Water Output   Approx Intake Pipe   Treatment System   Camp Buildings </p>		<p>Scale 1" = 600'</p>	

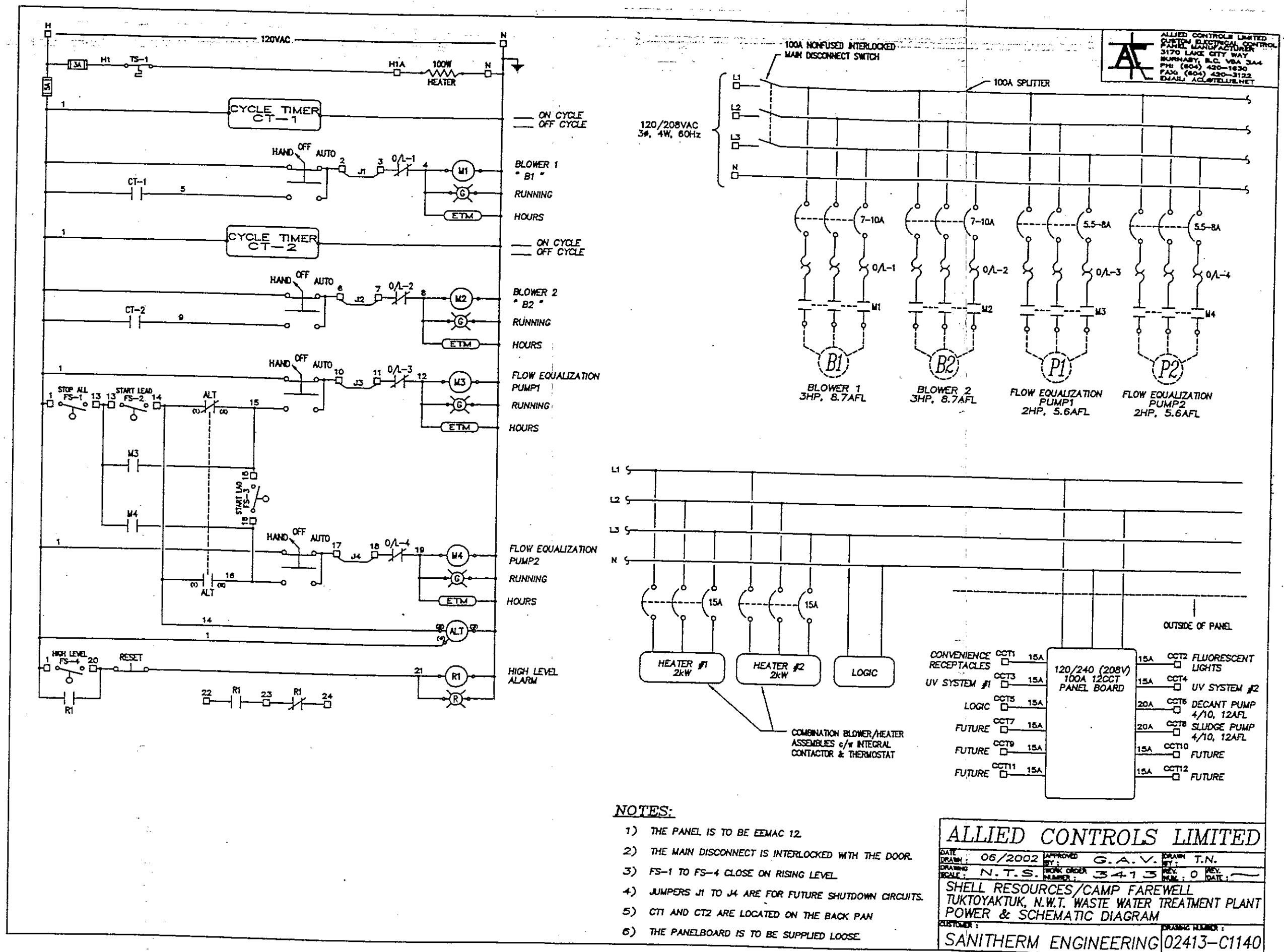


TANK1 PLAN



TANK2 PLAN

 <b>SANTHERM ENGINEERING LIMITED</b> <small>437 MOUNTAIN HWY., SUITE 4, ROCKY MOUNTAIN, B.C. V0A 2L1  TEL: (250) 886-5100 FAX: (250) 886-5377 E-MAIL: <a href="mailto:info@santherm.com">info@santherm.com</a></small>					
<b>TITLE</b> PACKAGE SEWAGE TREATMENT PLANT GA					
<b>CLIENT</b> SHELL CANADA LTD.					
<b>PROJECT</b> CAMP FAREWELL 120 MAN STP					
<b>DRAWN BY</b> SC	<b>FOR REF NO</b> A2585	<b>SCALE</b> N.T.S.	<b>PAPER SIZE</b> 17" X 11"	<b>APPROVED</b>	
<b>CHECKED BY</b> DMB	<b>DATE</b> 10-JUN-2002	<b>SHEET</b> 1 OF 3	<b>DWG NO</b> SA-34-002		



# **Extended Aeration Activated Sludge Unit**

## **Waste Water Treatment System**

### **Operations and Maintenance Guide**

*Extended Aeration Activated Sludge Waste Water Treatment System – Operations and Maintenance Guide*

#### Section 1.0: Quick Start Procedure

- This procedure is used when the plant is being restarted after being shut down
1. Check that electrical is still connected. Energize all breakers within the plant panel. Turn on heaters to warm building up.

2. Check that all drains have been closed. Check that pipes are not cracked or broken. Check that all pipes are connected.

3. Ensure weight loaded relief valve on air blower is operational.

4. Check out the air blower as outlined in section 2 item 7 (System Start-up Procedure)
5. Energize breakers within electrical panel after equipment has been checked for operability and required maintenance has been done.

6. If UV bulbs and quartz sleeves were removed reinstall them per section 2 item 8. Clean quartz sleeves as outlined in section 6 item 1.

7. Check that heat tracing on pipe to river is working.

8. Check oil level in Barnes submersible pumps. Check oil levels in air blowers. Grease air blowers.

9. Start up lift station and fill flow equalization chamber. Start up blower and start filling up aeration tanks and then settling tanks.

10. Check submersible pumps for operability. Do not run until they are submerged.

11. It is not recommended that the UV bulbs be energized unless they are at room temperature. Pre warming of the bulbs may be required. Check that UV works electrically. Do not run full time until there is water covering the UV lights in the UV troughs.

12. Divert discharge from plant to lagoon until such time as four samples have an average within the license discharge criteria.

13. Inform Inspector that samples are within criteria and obtain his approval to discharge to the MacKenzie River.

**NOTE:** Sanitherm have technicians that can come to the camp to provide start-up assistance. If unsure of any part of the start up phone Sanitherm. Telephone number is 1 604 986-9168 (Dave Botwright).

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## Section 2.0: System Start-Up Procedure

1. Ensure the packaged treatment plant is set on level secure ground.
2. Connect the piping and electrical from the aeration container to the container containing the settling, flow equalization and holding tanks.
3. Follow the quick start-up procedure outlined above plus the following:
4. Energize the Control Panel.
5. Check rotation of all three phase powered equipment within the plant. Energize all circuits within the breaker panel.
6. As the building is warming, all control circuitry within the plant should be tested. Turn the selector switch to the blower and pumps quickly on then off to ensure their operation.
7. Checkout the air blowers. Steps in checking out them are as follows.
  - a) Check the unit and all piping for foreign material and clean if required.
  - b) Check the flatness of the feet and the alignment of the drive. Feet that are bolted down in a bind can cause case distortion and internal rubbing. Misaligned V-drives can cause the impellers to rub against the headplates and cause a reduction in the volumetric efficiency of the unit. Misaligned couplings can ruin bearings.
  - c) If blower is V-belt driven, check the belt tension and alignment. Overtensioned belts create heavy bearing loads which leads to premature failure.
  - d) Be sure adequate drive guards are in place to protect the operator from severe personal injury from incidental contact.
  - e) Check the unit for proper lubrication. Proper oil level cannot be overemphasized. Too little oil will ruin bearings and gears. Too much oil will cause overheating and can ruin gears and cause other damage. Insure drive end bearings are greased.
  - f) With motor locked out, turn the drive shaft by hand to be certain the impellers do not bind.
  - g) "Jog" the unit with the motor a few times to check rotation and to be certain it turns freely and smoothly.
  - h) The internal surfaces of all Sutorbilt units are mist sprayed with rust preventive to protect the machine during the shipping and installation period. This film should be removed upon initial start-up.
  - i) Start the unit and operate 15 minutes at no load. During this time, check for hot spots and other indications of interference.
  - j) Apply the load and observe the operation of the unit for one hour. Check frequently during the first day of operation.
8. Insert the UV bulb(s). Procedure for UV installation is as follows:

- a) Slide lamp into the domed quartz sleeve by inserting the non-connector end of the lamp into the open end of the quartz sleeve. If quartz dome touched or if it is dirty clean with alcohol.
- b) Slide a compression nut over the end of the quartz sleeve.
- c) Place an O-ring over the end of the quartz sleeve.
- d) Insert the domed end of quartz sleeve into the receiver of the lamp rack. An O-ring should be in the receiver end of the lamp rack assembly.
- e) Bring the connector end of the lamp up to the connector in the nipple of the lamp rack and connect them together.
- f) Move the open end of the quartz sleeve forward from the receiver and insert into the nipple on the lamp rack.
- g) Move the o-ring and compression nut up to the nipple. Engage the threads of compression nut and nipple.
- h) Tighten the compression nut by hand until it cannot be turned any further. Then tighten nut by a 1/4 turn with a wrench. **DO NOT OVERTIGHTEN.** This will create a waterproof seal.
- i) After all lamps have been connected, install the lamp racks on the UV bank supports in the channel.
- j) Connect multipin connectors with their receptacles mounted on sides of the wireway.
- k) Install UV sensor on lamp number 1 of the lamp rack assembly and position between lamp 1 and 2. Direct sensor eye towards the number 2 lamp.
- l) The 3-pin connector for the sensor is connected to the outside of the wireway.
- m) It is not recommended that the UV bulbs be energized unless they are at room temperature. Pre warming of the bulbs maybe required. Spare bulbs should be stored in a warm environment.
- n) The ICH UV horizontal disinfection system is designed to operate with the effluent flowing parallel and between the horizontal lamp racks. A dry channel condition may cause the system's lamps to overheat, resulting in a decrease in lamp life and damage to other system components.

**ALWAYS MAINTAIN PROPER EFFLUENT LEVELS WHEN OPERATING THIS SYSTEM. ALL LAMPS SHOULD BE SUBMERSED IN THE EFFLUENT AT ALL TIMES.**

**WATER LEVEL SHOULD BE 1 in. MAX. ABOVE THE TOP OF THE PROTECTIVE QUARTZ SLEEVE OF THE TOP NO.1 LAMP.**

8. Start-up UV system. Procedure is as follows.

- a) Turn ON the GFIs located in Ballast Power Enclosure.
- b) Turn ON the MAIN POWER FEED.
- c) Turn the OFF switch to the ON position on the side of the Ballast Power Enclosure.
- d) Verify that the UV lamps are ON in the first lamp rack assembly by viewing the LED array located behind the display window of the Ballast Power Enclosure.

9. Calibrate UV meter

The ultraviolet meter for each bank of lamps can only be calibrated when the power is “on” and the ultraviolet lamps are operational. Allow the lamps to warm up for 2 minutes prior to any calibrations. This should only be done with new lamps that have been in operation for approximately 100 hrs.

Note: The UV Sensor is located between lamp no.1 and lamp no.2 the sensor eye should be pointed directly at lamp no.2.

- a) To set the low ultraviolet intensity alarms, find the test switches located near the intensity meter on the front inside display panel of the **ballast power enclosure**. Flip the **run/set** switch to the **set** position. The meter will go to approximately 60%.
- b) Adjust the set point by turning the potentiometer marked **set**, located near the test switches.
- c) Turn right (clockwise) for up scale.
- d) Turn left (counter clockwise) for down scale.
- e) Return **run/set** switch to **run** position.
- f) To test for low ultraviolet intensity, turn scale potentiometer, adjusting 0-100% meter scale, down below 60% level. The low UV intensity light will come on. When turning the meter back up, the light/alarm will stay on for 30 seconds.
- g) Set meter at 100%.

### Section 3.0: Equipment Shut Down Procedure

1. Flush all discharge lines within the camp with water. The lift station will fill sending the flush water into the sewage treatment plant.
2. Once the camp lines have been flushed disconnect the camp discharge line from the lift station(s). Loosen the lift station(s) lid bolts and slide to on side so the pump and level switch are visible.
3. Disconnect the 2" discharge line at the lift station and plant inlet. Roll line up and store within the plant building.
4. Pump out the sludge holding tank and haul the sludge to the local municipality or alternate site approved by Inspector.
5. Drain the remaining tanks and ship the contents to local sewage treatment plant for further treatment. Wash tanks and piping to remove all solids. A vacuum truck is required to remove all remaining fluid from the tank system.
6. Put tray under valving at grinder pump discharges. Disconnect piping before check valve and drain pipe into tray.
7. Put tray under valving at grinder pump inlets. Disconnect inlet line to grinder pumps and drain piping. Disconnect the submersible sewage pumps and drain their bowls.
8. Leave all drain valves open to prevent them from cracking due to freezing.
9. The fluid within the UV system must be removed. Open the small drains on the UV transition boxes. Drain fluid into bucket.
10. Disconnect piping from blower. Spray rust inhibiting aerosol into pump. Place few packets of silica gel desiccant. Cap of motor. If possible rotate shaft by hand every month.
11. Turn all breakers off.

## Section 4.0: Trouble Shooting Guide

Problem	Cause	Possible Remedy
Lift station filling, pump not running	Level switch caught in down position.	Shake lift station tank to free switch Remove tank cover and re-position switch.
	Impeller requires service.	Replace impeller and seal.
	No power to pump.	Check breaker and electric connection.
Blower not turning	No power to blower.	Check breaker and selector.
	Motor starter tripped off	Reset motor contactor and ensure heater pack set points are properly set to full load amperage of the motor
Blower knocking	Unit out of time.	Retime impellers.
	Distortion due to improper	Check mounting alignment and relieve pipe strains.
	Excessive pressure	Reduce to manufacturer's recommended pressure. Examine relief valve, re-set if necessary.
	Worn gears.	Replace timing gears.
	Worn bearings	Replace bearings.
Excessive blower Temperature	Too much oil in gear case.	Reduce oil level.
	Too low operating speed.	Increase blower speed.
	Clogged filter or muffler.	Remove cause of obstruction.
	Excessive pressure differential.	Reduce pressure differential across the blower.
	Worn impeller clearances.	Replace impeller.
	Internal contact.	Correct clearances
Impeller end or tip drag.	Insufficient assembled clearances	Correct clearances.
	Case or frame distortion.	Check mounting and pipe strain.
	Excessive operating pressure.	Remove cause.
	Excessive operating temperature.	Remove cause.
Lack of volume	Slipping belts	Tighten belts
	Worn clearances	Re-establish proper clearances
Excessive bearing Or gear wear.	Improper lubrication	Correct lubrication level. Replace dirty oil.
Loss of oil.	Headplate, gear case or drive cover vents plugged.	Clean vents.
Low discharge pressure from	Blockage at intake line.	Remove and clean breather.

Problem	Cause	Possible Remedy
blower.		
High discharge pressure from blower	Blockage at discharge line.	Ensure valve(s) open.
Blower turning in wrong direction.	Incorrect three phase wiring.	Interchange two of the wiring phases. To be done only by licensed electrician.
Blower has intermittent operation.	Motor starter overload	Reset heater packs to proper full load settings. Faulty contactor or heater pack. Replace items.
Supernatant Pump not activating	Control timer in "OFF" mode	Wait for timer to time out.
	Level switch stuck in down position.	Reposition level switch for free movement.
	No power to pump	Check breaker and selector.
Sludge light brown instead of dark brown	Insufficient sludge return	Reduce amount of sludge being wasted
	Plant being started up	Reduce amount of sludge being wasted
Sludge not settling in settling tanks	Too low level of solids in system	Decrease amount of sludge being wasted (sludge too young)
	Too much grease	Cut down kitchen wasting of oils and grease
	Alkaline waste from laundry	Stagger laundry usage
		Use low phosphate detergent
Sludge building up in settling tank	Insufficient activated sludge being wasted	Increase amount of sludge being wasted.
High Coliform reading on discharge sample.	Limited UV radiation	Ensure UV bulbs are on Bulbs may need replacing. UV quartz sleeves require cleaning
	Cross contamination when obtaining sample	Follow proper sampling protocols for collection and handling sample.
High BOD reading on discharge sample	Limited aeration	Increase aeration time
	Contamination of influent.	Ensure cleaning products used are biodegradeable. Reduce volume of chlorine and ammonia based cleaning agents.
	Plant is "hydraulically overloaded	Ensure that water inlet rate is less than 70 gpd per person being serviced by plant.
	Cross contamination when	Follow proper sampling

Problem	Cause	Possible Remedy
	obtaining sample	protocols for collection and handling sample.
High TSS reading on discharge sample	Contamination of influent	Ensure cleaning products used are biodegradable. Reduce volume of chlorine and ammonia based cleaning agents.
	Cross contamination when obtaining sample	Follow proper sampling protocols for collection and handling sample
	Plant is "hydraulically overloaded"	Ensure that water inlet rate is less than 70 gpd per person being serviced by plant.
Offensive odour from plant	Septic conditions in plant.	Increase aeration or ensure there are not blockages in aeration line. Ensure cleaning products used are biodegradable. Reduce volume of chlorine and ammonia based cleaning agents.
Gray or black biomass	Septic conditions in plant	Increase aeration or ensure there are not blockages in aeration line. Ensure cleaning products used are biodegradable. Reduce volume of chlorine and ammonia based cleaning agents
Clumps of black smelly solids on top of settling tanks	Solids too long in settling tanks	Increase sludge return rate
	Sludge lines plugged	Check and unplug lines
Reddish biomass	Over aeration	Reduce air to tanks
UV system not working	Quartz sleeve is cracked	Remove and replace quartz sleeve (see installation instructions).
	Compression nut seal is leaking	Reseat O-ring and tighten compression nut.
	O-ring is damaged	Replace O-ring and tighten compression nut.
	Liquid tight cable connection is loose or damaged	Contact Ideal Horizons Waste Water Sales Dept. and return the lamp rack assembly to the factory for repair. Attempts to repair the unit by unauthorized person(s) may void the warranty.
	Lamp out indicator is on	Check and verify the location of

Problem	Cause	Possible Remedy
		the lamp out condition. Turn <b>OFF</b> the lamp rack assembly that has the lamp out. Replace the defective lamp and turn the module <b>ON</b> .
	Defective ballast	Verify that the ballast is defective. NOTE: Each ballast controls two (2) lamps in sequence. Verify that two (2) lamps in sequence are out. Lamp numbers are on female 6-pin connector.
	Lamp wiring failure	Use multimeter to test system. Set the meter to the Ohm scale. Turn <b>OFF</b> power to the module. Check point to point from the lamp to its corresponding ballast, looking for an <b>OPEN</b> circuit. If the circuit is open, reseal the connection and retest the circuit. Turn <b>ON</b> module power.
	Lamp Status Board Failure	Locate the suspect lamp status board Turn <b>OFF</b> the corresponding module. Disconnect the <b>LED</b> array connector from the board and remove the board. Replace the suspect lamp status board with a known operational board and turn <b>ON</b> the module. If the problem persists ( <b>LED's</b> will not light), follow the procedure outlined in <b>LAMP WIRING</b> .

Problem	Cause	Possible Remedy
	Defective Wiring	Obtain a mutimeter and set to the Ohm scale. Turn the <b>GFI</b> to <b>OFF</b> . Check point to point from the <b>GFI</b> to the power <b>ON</b> relay socket pin in the <b>Ballast Power Enclosure</b> . If a circuit is <b>OPEN</b> , reconnect the wire. If the problem persists, check the <b>ON/OFF/AUTO</b> switch.
	On/off/auto switch	Turn <b>OFF</b> the power to the suspect module at the <b>GFI</b> 's in the control box. Module switch needs to be in the <b>ON</b> position. Obtain a multimeter and set to the Ohm scale. Read the resistance between the two contacts on the switch that corresponds to the module in question. If the meter reads <b>OPEN</b> , replace the switch.
	Ultraviolet meter circuit board failure	Turn <b>OFF</b> the power to the bank. Remove the suspect board, and replace it with a known operational board. Turn <b>ON</b> the power and read the ultraviolet intensity on the meter. If the meter reads above 60%, replace the defective board. If the meter continues to read low UV, contact the factory representative.

Problem	Cause	Possible Remedy
	Lamp bank failure	<p>If there is a lamp bank failure, or partial bank fail check the following five (4) areas:</p> <ol style="list-style-type: none"> <li>1. GFI breaker- SIB ON.</li> <li>2. Multi- pin connectors should be plugged in</li> <li>3. Wiring (see previous defective wiring)</li> <li>4. ON OFF/AUTO switch- select proper setting</li> </ol>
		<p>NOTE:                      If the GFI breaker has tripped reset the breaker and check the bank. If the breaker continues to trip, inspect the quartz sleeve for cracks or water intrusion. Check ballast assemblies or ground faults.</p>

### Section 5.0: Equipment and Flow Description

All the equipment is contained within two containers, which have connecting piping, and electrical cabling installed to tie them together. The electrical supply to these containers is three-phase 210 volt at 60 amps.

Camp sewage flows into a lift station. The lift station periodically pumps the sewage to a flow equalization tank in the first container. A float switch controls the pump. The purpose of the flow equalization tank is to smooth out flow to the aeration tanks. The flow equalization tank is aerated to prevent the sewage from going septic. Microorganisms from the settling tanks are also pumped into this tank. Because there is only a small amount of air being bubbled through the tank, there is not a lot of sewage treatment done in this tank.

Pumps remove sewage from the bottom of the flow equalization tank and grind and pump it to the aeration tanks. These tanks are located in the second container.

Here the sewage is mixed with active (living) microorganisms being returned from the bottom of the settling tanks. This mixture has air bubbled through it. The air mixes the contents and provides air for the microorganisms. A mixture of water and microorganisms overflow the aeration tanks and flows to settling tanks located in the first container.

In the settling tanks the microorganisms settle to the bottom of the holding tank. The water overflows the settling tanks to a holding tank. It then flows from the holding tank through Ultraviolet lights where the light kills any microorganisms left in the water.

Airlift pumps pump the settled sludge out of the bottom of the settling tanks. Some of the sludge is returned to the aeration tanks. The remainder is wasted to either the Solids Holding Tank or Flow Equalization Tank.

The Sludge Holding Tank is also aerated to prevent it from going septic. The air bubbling through the tank ensures that all organic material is consumed. Thus the sludge that settles out is biologically inert. This sludge is pumped out and hauled to the local municipal sewage treatment plant. A pump is located in the middle of this tank to pump the watery liquid left after settlement into the Flow Equalization tank for further treatment.

## Section 6.0: Routine and Periodic Maintenance

1. The protective quartz sleeve that encompasses each **UV lamp** needs to be removed from the channel for cleaning on a routine basis. Any buildup of dirt or scaling on the sleeve must be removed. The cleanliness of the lamp and its protective quartz sleeve is instrumental in the UV systems performance. Cleaning of the lamp rack assemblies should occur every time the intensity drops below 65. Detailed cleaning procedure is as follows:
  - a) Mix one (1) part citric acid to nine (9) parts water in a two-gallon bucket. Rubber gloves, face mask and apron must be worn while cleaning the ultraviolet (UV) lamp rack.
  - b) Disconnect the UV light multi-pin connectors from the wireway to avoid high voltage electrical shock. Remove each rack from the channel for cleaning, one at a time. Make sure the multi-pin connector does not fall into the channel. If you have spare UV lamp racks, replace each rack to be cleaned with a spare to ensure that the bank of lamps are in operation during the cleaning process.
  - c) Wipe down each lamp rack with the citric acid solution
  - d) Rinse down the UV lamp rack and wipe each quartz sleeve with a soft, clean cloth to remove the cleaning solution residue.
  - e) Return the UV lamp rack to its position in the channel and attach the multi-pin connectors to their appropriate connection points. After cleaning of the lamp rack assemblies be certain that the multi -pin connectors have been thoroughly dried before making the connection.
  - f) Repeat the above process for each UV lamp rack.
  - g) If the proper ultraviolet intensity levels cannot be obtained through repeated cleaning of the quartz sleeves of the lamp and the sensor, one of the following may be causing it.
    - i. UV sensor location. - reposition or change the sensor unit located on the lamp rack assembly
    - ii. Plant effluent transmissivity – check effluent for clearness. If not clear fix process problem.
    - iii. Lamps produce less light as they age. The lamp may need to be replaced.
    - iv. The protective quartz sleeve can also degrade due to long exposure to the UV. This exposure causes quartz tube to turn light brown and effect UV output. The quartz sleeve should be replaced.
- 2 Lift/Sludge/Discharge Pumps –the pumps should be checked daily to ensure they are functioning and that the level switches are able to freely float within their respective tanks. Amperage draw should be checked every month. Increasing amperage indicates water in motor housing and impeller seal should be replaced. Check impeller every 6 months for wear or breakage. Replace as required.
- 3 Air Blowers – clean inlet filters monthly. Replace as required.
  - Check oil level daily. Add fresh oil as required
  - Drain oil from gearbox and replace every 1500 hours (about 2 months)

*Extended Aeration Activated Sludge Waste Water Treatment System – Operations and Maintenance Guide*

- Grease bearings in drive end every 500 hours (about 3 weeks)
- Ensure vents on drive end are always open to prevent overpressure damaging seals

**Precautionary Note:**

The extended activated sludge wastewater treatment system is designed to employ aerobic digestion of organic based contaminants within the wastewater stream. Inorganic matter, that may impact the plants ability to digest and produce consistent quality of treated effluents, such as plastics, cigarette butts, sanitary napkins must be prevented from entering the camp wastewater outfall system.

Large volumes of disinfecting agents, oils, grease, high sudsing detergents, or discharge volume from water softening equipment should also be restricted from entering the camp wastewater outfall system.

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WATER REGISTER: N7L1-1762

June 11, 2002

Mr. Randy Hetman  
DAR/Construction Manager  
Shell Canada Limited  
400 - 4 Avenue S.W.  
CALGARY, AB T2P 2H5

Dear Mr. Hetman:

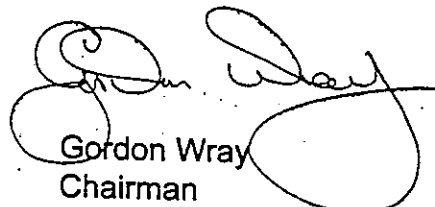
**NOTIFICATION OF MODIFICATION**

Thank you for your letter of May 24, 2002, and additional information provided on May 30, 2002 notifying the Northwest Territories Water Board of the proposed modifications to the sewage treatment facility. The Board has reviewed the notification and is satisfied that the modification is consistent with the current terms and conditions of your Water Licence.

Please note that as per Part E, Item 3 of your Water Licence, as-built plans and drawings of the new sewage treatment system must be submitted to the Board within ninety (90) days of completion. Please submit a revised Camp Farewell Operations and Maintenance Plan for the new sewage treatment system by September 1, 2002.

If you require further assistance, please contact this office. For enquiries of a technical nature, contact Ms Sarah Aho at (867) 669-2402 or Mr. David Milburn at (867) 669-2650 of the Water Resources Division.

Sincerely,

  
Gordon Wray  
Chairman  
N.W.T. Water Board

**Shell Farewell – License N7L1-1762**



**Proposed**  
**Wastewater Treatment Plant Modifications**

Mod. 2002-1

## Background

A RBC system was installed at Camp Farewell in January, 2001 and operated until the end of April before being shutdown for the summer. It was again started up in December and operated until March 1, 2002. Difficulties were experienced in achieving License discharge criteria during both operating periods. The plant was also modified in an effort to improve its performance however insufficient time until camp shutdown did not allow for conclusive results.

## Modification

The wastewater treating plant will be replaced with an "extended aeration system" which is a modified activated sludge system. The activated sludge process has been in existence for close to 100 years and presently represents the most widespread technology for wastewater purification. In general, the activated sludge process is a continuous or semi-continuous aerobic method for biological wastewater treatment.

The activated sludge process is based on:

- Waste water is aerated in a tank
- Bacteria are encouraged to grow by providing oxygen, Food(BOD), correct temperature and time
- As bacteria consume BOD, they grow and multiply
- Treated wastewater flows into a secondary clarifier
- Bacteria cells settle, and removed from clarifier as sludge
- Part of the sludge is recycled back to the activated sludge tank to maintain bacteria population
- Remainder of sludge is wasted

The attached P&ID shows the system design. The proposed process is:

- Raw sewage enters the equalization tank - purpose to smooth out the flows through the unit
- Wastewater is then pumped to the first aeration tank where complete mixing occurs and then flows to the second aeration tank.
- Water then flows to the aerated sludge digester(SHT). It can be recycled from this point for constant flow maintenance.
- Water then enters the final clarifier (FC) which has a sloped bottom for effective sludge removal and recycling.
- Water flows to the chlorine contact tank however this feature will not be utilized at this time.
- The effluent will be disinfected using a dual, oversized ultraviolet light system in series.

The plant has been designed for 120+ people as well as taking into consideration peak loading. It has a nominal treatment capacity of 9000 usgpd and/or a maximum of 37 lbs. BOD5/day. Total volume of the system is approximately 18000 USG.

### **Benefits of the System over Previous System**

The system is conventional in nature, and all design parameters meet typical textbook requirements. Provided these requirements are met, there is extensive operation data available proving that the system can achieve the desired effluent results.

It is being designed and manufactured by Sanitherm Engineering who have 50 years experience in treatment design and a proven track record for camp style units.

The air blowers and the wastewater equalization pumps are duplexed for 100% standby.

This system is not as rate sensitive as the RBC system and has provision for recycling.

The design has taken peak flows into consideration, which the RBC did not.

The RBC had basic design flaws such as flat clarification tank bottom rather than sloped for effective sludge removal.

This system has dual, large ultraviolet lights for disinfection, which are designed for ease of cleaning. The RBC system had one unit, more suitable for potable water disinfection, and very difficult to clean.

Sanitherm will be supplying an extensive operation manual with procedures and tips for the Operator.

Sanitherm has experienced operational personnel on staff and available for process optimization and operator training.

### **Startup**

Installation is anticipated for early July, 2002. Sanitherm personnel with operational expertise will be on site for start up and training of our camp operations personnel.

The Camp Farewell Operations and Maintenance Plan will be updated once the required information on the new treating plant becomes available.

**Shell Farewell – License N7L1-1762**



**Proposed**  
**RBC Wastewater Plant Modifications**

Mod. 2001-1

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## 1. Equipment Modifications

The rotating biological contactor wastewater treatment plant supplied to Western Geco by Eco Tech never produced treated effluent quality required for its discharge into the environment. Our interpretation of the results, suggested the principle reason was due to hydraulic and organic overloading of the plant, particularly during peak influent flow events.

In order to minimize the impacts the peak flow or surge events have on the plant, Eco Tech proposes to implement the following modifications to the equipment:

- Provide a primary/trash tank with a minimum volume of 4000 gallons;
- Provide an aerated surge tank with a minimum volume of 4000 gallons;
- Improve the capacity for suspended solid removal within the treated effluent with the addition of a second Zabel filter to the secondary clarifier;
- Increase the UV dosage to improve the disinfection capability of the clarified effluent.

### Primary/Trash tank – 4000 Gallons

The primary trash tank would be installed between the camp lift station(s) and the equalization tank. The tank size is based on that recommended by Komex within their evaluation report. This tank would provide for reducing organic and inorganic loading of the treatment plant by allowing the heavier constituents to settle out of suspension within the tank. Floatable oil and grease particles would also be retained within the tank by the use of an underflow weir interconnecting the two tank compartments.

Digested sludge from the secondary clarifier would be returned to the primary tank for reprocessing and accumulation. Periodic removal of the accumulated matter within the tank would be necessary.

### Equalization tank – 4000 Gallons

The proposed flow equalization tank with a holding capacity of 4000 gallons will serve to minimize the impacts surge events have on plant performance. Within the camp facilities last year, observed surge events were encountered two to three times per day lasting from one to three hours in duration per event. The surge events observed accounted for an estimated  $\frac{1}{2}$  to  $\frac{2}{3}$ <sup>rd</sup>s of the camp's daily wastewater outfall volume. Periodically, such as crew change or those in which the camp laundry facilities were operating at capacity, the duration and frequency of the surge events was prolonged.

The equalization tank will allow for retention of the surge event volumes while dosing a preset volume into the RBC's bucket feed section over a prolonged time frame. In this way, the potential for hydraulic overloading of the plant is significantly reduced. Eco Tech would install a sewage solids pump within the equalization tank to dose into the bucket feed tank of the RBC.

Control of the dosage would be accommodated in two ways: a level switch within the bucket feed tank would control the pump operation, as well the pump would be plumbed so that the output volume would be split between the bucket feed tank and recirculated through the equalization tank.

A gate valve on the pump discharge line leading into the RBC bucket feed tank will allow for manual regulation of the dosing rate. The remainder would be diverted back into the equalization tank for continued mixing of the fluid.

A regenerative blower would continuously supply oxygen to precondition the fluid prior to delivery into the bucket feed chamber. Complete mixing of the preconditioned fluid with that input from the primary tank, is accomplished by recirculation of the fluid using the dosing pump. It is then more probable that the entire volume of the tank is exposed to per-aeration prior to exiting.

A secondary or high level sewage solids pump would also be installed to prevent the tank from overflowing in the event of mechanical failure of the dosing pump or an unanticipated surge volume event. This pump would be wired to a visual alarm beacon to alert the operator that it has been engaged.

#### Suspended Solids Removal

The inclusion of both the primary and equalization tanks will significantly reduce the entrainment of suspended solids through the secondary clarifier due to the more consistent flow patterns through the RBC bioshaft tank. However, digested sludge build up and inorganic material within the secondary clarifier volume may still contribute significantly to suspended solid concentrations. Removal of this matter is required to reduce interference with disinfection capability of downstream equipment and ensure the treated effluent is within discharge specifications for this parameter.

A second Zabel filter element will be added within the secondary clarifier to essentially double the filtration capacity and solid removal. Each will be plumbed such that they can be temporarily isolated for removal and cleaning of the plate filter cartridge.

#### Disinfection

The existing UV system will be replaced with two additional units. Each of the new units has been sized based on an influent quality of 30 mg/L BOD and 30 mg/L TSS. Each of the system is designed to dose 32,000  $\square W s/cm^2$  at a UV transmission rate of 60%.

These systems will be plumbed to operate in a parallel or series flow configuration. It may be determined by the operator that one could be a standby for use during routine maintenance or equipment failure of the first.

A clean in place (CIP) system is proposed to reduce the frequency of handling the fragile bulbs and quartz sleeves by the operator. The CIP system consists simply of a small reservoir for cleaning solution, recirculation pump and particle filter. The cleaning solution is recirculated through the UV housing back to the reservoir tank. A replaceable cartridge filter element on the recirculation line removes the entrained material.



Indian and Northern  
Affairs Canada

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et du Nord Canada

403 291 1150 P.02/02

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

Your file: Votre référence

Our file: Notre référence

May 2, 2001

License # N7L1-1762

Ms. Cynthia Pyc  
Environmental Biologist  
Inuvialuit Environmental & Geotechnical Inc.  
1338 - 36<sup>th</sup> Avenue N.E. - Bay R  
Calgary, AB T2E 6T6

Dear Ms. Pyc:

Re: Shell Canada - Camp Farwell  
Quality Assurance and Quality Control Plan  
for Collecting Representative Water Samples  
Submitted: March 28, 2001

Thank-you for the submittal of your revised Quality Assurance and Quality Control Plan. Upon review, it has been found that the plan requires some revisions. However, since the changes involve information from the Taiga Environmental Laboratory, I am able to address the changes directly in this letter. Approval of the plan is hereby granted. Please make note of the following for future revisions to the plan:

1. Under Section 4.3, Table 2 Methods of Analysis and Detection Limits, please note that the detection limit for BOD5 is listed incorrectly. The correct value is 2 mg/L.
2. Ammonia and Oil & Grease are not listed in the current scope of testing for Taiga Environmental Laboratory. However, the laboratory intends to add these tests to their scope in their next laboratory assessment, scheduled to take place in September, 2001.

Should you require further information, please do not hesitate to contact me at (867) 669-2781.

Sincerely,

Kathleen Puznicki  
Analyst Under the Northwest Territories Waters Act

cc: Northwest Territories Water Board  
North Mackenzie District  
Water Resources

Canada

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**QUALITY ASSURANCE AND QUALITY CONTROL PLAN**  
**FOR**  
**COLLECTING REPRESENTATIVE WATER SAMPLES**

Prepared for

Shell Canada Ltd.  
150 – 6<sup>th</sup> Avenue SW  
Calgary, AB  
T2P 3E3

Prepared by

Inuvialuit Environmental & Geotechnical Inc.  
1338R – 36 Avenue NE  
Calgary, Alberta  
T2E 6T6

January 2001

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### Appendix

A	Definition of Terms
B	CAEAL Accreditation for Taiga Environmental Laboratory
C	Water Licence Approval and Supporting Documents

## 1.0 INTRODUCTION

This proposal identifies: the types of sampling required; the location of sample collection; the frequency of sampling; proper sample handling methods and documentation; and the analytical parameters for laboratory analysis, to fulfill the requirements of Indian and Northern Affairs Canada Water Resources Division and the Northwest Territories Water Board Class B License N7L1-1762. This License is for Camp Farewell in the Mackenzie River Delta, located at Latitude 69° 12'30" N and Longitude 135° 06'04" W in the Northwest Territories.

Included in the Appendix are basic definitions for terms used for sampling in this proposal.

## 2.0 SAMPLE COLLECTION

### 2.1 Location

Water sample collection for laboratory analysis will occur at sampling station 1762-1 (Treated effluent discharge prior to entering the receiving environment). Sign posting will be used to identify the sampling location. Refer to Table 1.

### 2.2 Sampling Equipment

The collection of effluent at Station 1762-1 will require personal protective gear that should include: disposable latex or Nitrile gloves, rubber boots (waterproof), Tyvek or other protective clothing, and eye protection. For the protection and preservation of the collected water samples, equipment would include: labels for sample identification, laboratory cleaned sample containers (see Table 1), coolers, ice packs, bubble wrap for packing, chain of custody forms, and completed field notes (see section 3.1). Additional equipment that may be required includes a pH meter, electrical conductivity meter, and temperature probe.

TABLE 1  
EFFLUENT WATER COLLECTION

PARAMETER	CONTAINER TYPE	SAMPLE SIZE (ml)	PRESERVATION	MAXIMUM STORAGE TIME	FREQUENCY AND LOCATION
BIWEEKLY SAMPLING					
BOD <sub>5</sub>	Autoclaved (white tape) Polyethylene	500	Refrigerate 4 °C	24 Hours	Biweekly – Station # 1762-1
Total Suspended Solids	(green dot) Polyethylene	1000	Refrigerate 4 °C	24 Hours	Biweekly – Station # 1762-1
Faecal Coliforms	Autoclaved (white tape) Polyethylene	250	Refrigerate 4 °C	24 Hours	Biweekly – Station # 1762-1
Ammonia	(pink dot) Polyethylene	125	1 ml 10% H <sub>2</sub> SO <sub>4</sub> – Refrigerate 4 °C	28 Days	Biweekly – Station # 1762-1
Oil and Grease	(yellow dot) Wide mouth Brown Glass	1000	4 ml 1:1 H <sub>2</sub> SO <sub>4</sub> – Refrigerate 4 °C	N/A	Biweekly – Station # 1762-1

Note: BOD<sub>5</sub> – Biological Oxygen Demand – 5 day incubation.

### 2.3 Sampling Methods

Two main categories of samples will be utilized for this program: Test Samples and Control Samples. The test sample method chosen to best characterize the site is Probability Sampling using the Simple Random Sampling method (see Appendix A). In addition to the test sampling, Quality Control (QC) sampling with field blanks, trip blanks, and duplicate samples should be performed periodically (monthly) to confirm the laboratory results.

All sampling, sample preservation, and analysis shall be conducted in accordance with method described in the current edition of "Standard Methods for the Examination of Water and Wastewater" (20<sup>th</sup> ed., 1998).

When sampling in lakes and ponds, the sample bottle is lowered to mid-depth and rinsed three times before collecting the sample on the forth submersion. Ensure the sample container contains adequate room for mixing, preservative addition and thermal expansion.

When sampling stream water, the sample bottle is plunged towards the current and rinsed three times before collecting the sample on the forth submersion. Ensure the sample container contains adequate room for mixing, preservative addition and thermal expansion.

Glass containers should be used when sampling for hydrocarbon (oil and grease) concentrations.

Deviating from the above sampling protocols, water collected for faecal coliforms and oil and grease analysis, the sample is collected during the first submersion and not rinsed three times first.

In general, the protocol for sampling is as follows:

- Acquire all necessary equipment, including; personal protective equipment, sample labels, writing tool (pencil should be used to avoid running), laboratory clean sample containers, sample documenting forms (field notes, field screening results (field pH, EC, and temp values, if required), chain of custody forms, weigh bill for transportation by commercial carrier), coolers and ice packs for sample refrigeration and transportation to the laboratory, bubble wrap for packing, clear packing tape to protect sample labels and seal cooler, camera to photo document sample collection, and any additional equipment required.
- Don personal protective equipment
- At sampling location, if required, perform field screening of pH, EC, Temperature, and observations of water quality of effluent and record values in field notes.
- Label sample containers with information described in Section 3.1.
- Place clear packing tape over label to protect information from "washing off".
- Open control sample bottles of laboratory deionised (DI) water, and pour into labelled sample containers, add analyte of known concentration (and preservative - if required) seal, and send with other samples for laboratory analysis. Note: Sample labels should not indicate that these are control samples. In addition, it is preferable to fill control sample container with DI water at the sample location.
- Rinse sample containers with water to be sampled if necessary, do not rinse sample containers for faecal coliforms and oil and grease analysis.
- Collect sample in laboratory cleaned sample container (note: it is imperative that the collected samples be representative of the whole population (i.e. the effluent stream)). Qualitative observations of the sample should also be noted in the field notes at this time (i.e. sample colour, odour, clear-opaque, presence of particulates, etc. Complete Chain of Custody form with required analysis listed for each collected sample.

- Carefully bubble wrap the sample containers and place in ice chilled cooler maintained at  $\sim 4^{\circ}\text{C}$  for transport directly to the laboratory for analysis. Note: this entire procedure, including the initial laboratory preparation must be completed within the allowable handling time (Table 1) from the time of sampling (e.g. 24 hours).
- Complete field notes and log samples. Retain paperwork for submission to the Board, if required.

Effluent water samples will be collected on a biweekly basis at Station 1762-1 and sent for laboratory analysis to determine the concentrations of Biological Oxygen Demand ( $\text{BOD}_5$ ), Total Suspended Solids (TSS), Faecal Coliforms, Ammonia, and Oil and Grease. Refer to Table 1 for a summary of parameters to be analyzed, container size, preservation methods, and holding times.

The quality controlled blank and duplicate sample will be statistically compared to laboratory QA/QC samples. The "Quality" of the samples and sampling procedures are evaluated from the results of this comparison. If control samples fall out of the allowable statistical standard deviation, then the sample results are invalid, and the effluent must be sampled again. If upon re-sampling and re-submission to the laboratory, QC samples continue to be "out of range", then a complete review of the storage of containers prior to sampling, sampling procedures, and the storage and transport of the samples to the laboratory is warranted.

### 3.0 SAMPLE HANDLING

As sample-handling procedures are imperative to the integrity of the sample, lag times from the time of sample collection to the time of laboratory analysis must be kept to a minimum. Samples for Faecal Coliforms analysis, for example, have a holding time of 24 hours from the time of sample collection to the time of laboratory analysis. Beyond that time the analysis becomes Quantitative and not Qualitative.

#### 3.1 Documentation

Documentation is an important part of a Quality Assurance Program and includes information on the sample labels as well as in the Field Notebook. The minimum documentation requirements (CCME 1993) for samples include:

- Sampling date
- Sampling time
- Identification number or code
- Sampler's name
- Sampling site (including coordinate/depth where relevant)
- Sampling conditions
- Sample type
- Sampling equipment
- Storage and preservation methods
- Time of storage and of preservation
- Auxiliary information (topography, distance from source, field screening values of pH, EC, and temperature, etc.)
- Deviations from the sampling protocols, if any, and
- Completion of the Chain of Custody (COC) for transport directly to the laboratory.

Additional information on the sample containers to aid in efficient handling includes:

- Analysis required (not just listed on the COC), and
- Label the sample container lid with sample identification number.

A Field Notebook should be retained on-site for future reference and should contain;

- Samplers name, position
- Sampling date
- Weather conditions
- Sampling location conditions
- Time sampling began and ended
- Observations of water (or sample) quality
- Volume of water purged (if applicable)
- Field measurements of pH, EC, and Temperature
- Field Notebook should be photocopied regularly and archived

### 3.2 Preservation

This procedure is used to ensure the integrity of the collected sample until it is laboratory analyzed. Preservation methods include; refrigeration (refrigerated storage or ice packs), the addition of chemicals (acids, other preservatives, etc), and filtration.

Preservation methods can be parameter specific, such as the addition of Sulphuric Acid ( $H_2SO_4$ ) for Ammonia analysis, or can be a universal method, such as, refrigeration. Refer to Table 1 for the specific preservation method used for each parameter to be analyzed.

### 3.3 Transportation

The collected samples with complete documentation (sample identification and chain of custody form, as described in Section 3.1) are to be packed in bubble wrap and placed in coolers with ice packs or refrigerated. The packed samples are to be sent directly to the laboratory for analysis (Taiga Environmental Laboratory in Yellowknife, NWT) as soon as possible. Therefore, due to the remoteness of the site, sample collection times must be logistically organized with transportation schedules to the laboratory. This will ensure the samples arrive at the laboratory and are analyzed within the allowable holding time.

## 4.0 LAB ANALYSIS

### 4.1 Lab Accreditation

See Appendix B for Canadian Association for Environmental Analytical Laboratories (CAEAL) accreditation of Taiga Environmental Laboratory in Yellowknife.

### 4.2 Detection Limits

Refer to Table 2 in Section 4.3 for detection limits for each parameter.

### 4.3 Methodology

Refer to Table 2 in this section for laboratory methods for each parameter.

**TABLE 2**  
**METHODS OF ANALYSIS AND DETECTION LIMITS**

PARAMETER	CODE	TEST METHOD <sup>1</sup>	DETECTION LIMIT
<b>BIWEEKLY SAMPLING</b>			
BOD <sub>5</sub>	BOD-CL	APHA 5210-B 5 Day incubation - O <sub>2</sub> electrode	7
Total Suspended Solids	Solids-TOTSUS	APHA 2540-D Gravimetric	3 mg/L
Faecal Coliforms	FCC-MF	APHA 9221-E Faecal Coliforms Membrane Filter Procedure	1 colony/100 ml
Ammonia	NH4-CL	APHA 4500-NH3/H Colorimetric	0.005 mg/L
Oil and Grease	OGG-ED	APHA 5520-C Hexane METB Extraction/Gravimetric	0.2 mg/L

<sup>1</sup>Standard Methods for the Examination of Water and Wastewater, 20<sup>th</sup> ed., 1998

#### 4.4 Reporting Requirements

As indicated in the "Surveillance Network Program" appended to Shell Canada's Class B Water License N7L1-1762;

"The Licensee Shall, within thirty (30) days following the month being reported, submit to the Board all data and information required by the "Surveillance Network Program" including the results of the approved Quality Assurance Plan."

In addition to the monthly reporting of effluent quality, Shell Canada shall file an Annual Report with the Board not later than March 31 of the year following the calendar year reported. This report shall contain:

- The total quantities in cubic metres of fresh water obtained from all sources,
- The total quantities in cubic metres of each and all waste discharged,
- The results of sampling carried out under the Surveillance Network Program,
- The frequency of field blanks, field replicate sample collection and reporting,
- A summary of any modifications carried out on the Water Supply and Waste Disposal Facilities, including all associated structures,
- A list of any spills and unauthorized discharges, and
- Any other details on water use or waste disposal requested by the Board within forty-five (45) days before the annual report is due.

## APPENDIX A

### Definition of Terms

**Quality Assurance:** is the system of activities designed to better ensure that quality control is done effectively.

**Quality Control:** is the use of established procedures to achieve standards of measurement for the three principal components of quality; precision; accuracy; and reliability.

There are two main categories of samples; Test Samples and Control Samples.

**Test samples** are basic samples used to characterize a site. The number of test samples depends on the degree of confidence required to characterize the site and on the number of samples needed for each analytical method. There are various approaches to collecting test samples:

- **Accessibility Sampling** - The sample is restricted to a part of a population that is readily accessible. It may be justified when resources of time, money or physical access, prevent any other type of sampling being taken, but there is little other justification.
- **Haphazard Sampling** - Taken when, although other samples may be accessible, there is no plan to control the probability of choosing a sample. It is really of value only if a very homogenous population over time and space is being sampled, which is generally unknown at the time of sampling (if it was known, samples would probably not be required). This is very difficult to justify and this method is not recommended.
- **Judgment (or Purposive) Sampling** - Taken when specific samples are selected for their unique value of interest, not for making inferences about the population. Judgment Samples may also be taken when the target population is well defined and homogenous, but the same concerns described for Hap-Hazard Sampling apply. Since you are generally sampling because you do not know the population, this is not recommended.
- **Probability or Representative Sampling (suggested for this project)**. Probability or representative sampling is the most important type of sampling and is aimed at ensuring that valid conclusions can be drawn about a population from a sample. Various approaches to this include;
  - **Random Sampling** – the sample is selected by chance mechanism with known probability of selection. This method of sampling is also divided into Simple Random Sampling and Stratified Random Sampling.
  - **Simple Random Sampling** – When a population is large and homogeneous and every possible sample has an equal probability of being selected.
  - **Stratified Random Sampling** – When a population is large and heterogeneous, it can be subdivided, the subdivisions sampled and, if necessary, the results combined.
  - **Grid Sampling** – When systematic samples are taken in a specified pattern, usually a grid, with the samples collected at the grid nodes.
  - **Stratified Sampling** – When a specified number of random samples are taken in a specified pattern or within a cell, usually a grid.

**Control samples / Quality Control (QC) samples**, which may be simulated samples, are used to control the analytical process. They are often regarded as synonymous with QC check samples. The term is also used to describe samples taken outside the target area, in order to provide a “background” reading.

**Preservation** is control methods used to ensure the integrity of the collected sample until it is laboratory analyzed. Preservation methods include; refrigeration (refrigerated storage or ice packs), the addition of chemicals (acid, base, preservatives, etc), and filtration.

**Detection Limit** refers to the minimum concentration of analyte that can be measured above the background noise of an instrument.

**Analyte** is a solution containing a parameter of interest in a known concentration.

**APPENDIX B**

## APPENDIX C

Shell Canada Limited



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Calgary, Alberta T2P 2H5  
TEL (403) 691-3111

**Camp Farewell Contingency Plan**

**December 2000**

**AMENDED AUGUST, 2002**

CAMP FAREWELL GENERAL EMERGENCY RESPONSE PLAN

August 2002

---

## WELL CONSTRUCTION & GEOPHYSICAL OPERATIONS

### GENERAL EMERGENCY RESPONSE PLAN, August 2002

---

**This is a controlled document.**

This general emergency response plan includes spill contingency plans for liquid, sewage and solid materials. It is effective from September 1, 2002 to November 30, 2005. It applies to Camp Farewell which is located in the Northwest Territories along the east shore of the MacKenzie River – Middle Channel, 50 km downstream from Tununuk Point at Longitude 69°-12'-30" and Latitude 135°-06'-04". License number from Northwest Territories Water Board is N7L1-1762 License type B

#### Controlled Document Distribution

Copy 1      Randy Hetman  
Copy 2      Site Supervisor  
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Copy 4      NWT Water Board  
Copy 5      NWT Water Board Inspector  
Copy 6 – Oil Pollution Emergency Plan   Canada Coast Guard

For additional copies of this Controlled Document Contact

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Shell Canada Limited

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400 4<sup>th</sup> Ave. S.W.

Calgary, Alberta

T2P 0J4

# CAMP FAREWELL GENERAL EMERGENCY RESPONSE PLAN

August 2002

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- 1.2 Different ERP's : Linkages**
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- 1.5 Drilling, Completing, Testing Sour Gas Emergency Response Plan**

### **2. WC&GO GENERAL EMERGENCY RESPONSE PLAN**

#### **2.1 General**

#### **2.2 Incident Command System**

#### **2.3 WC&GO General ERP Response & Notification**

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**WC&GO General ERP : Emergency Contact List**

**WC&GO Phone List**

**WC&GO General ERP : Transportation and Medevac Plans**

**WC&GO General ERP : Spill Plans And Equipment List**

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## 1. Overview and Key Principles

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### 1.1 WC&GO General Emergency Response Plan : Purpose

---

#### WC&GO General Emergency Response Plan : Purpose

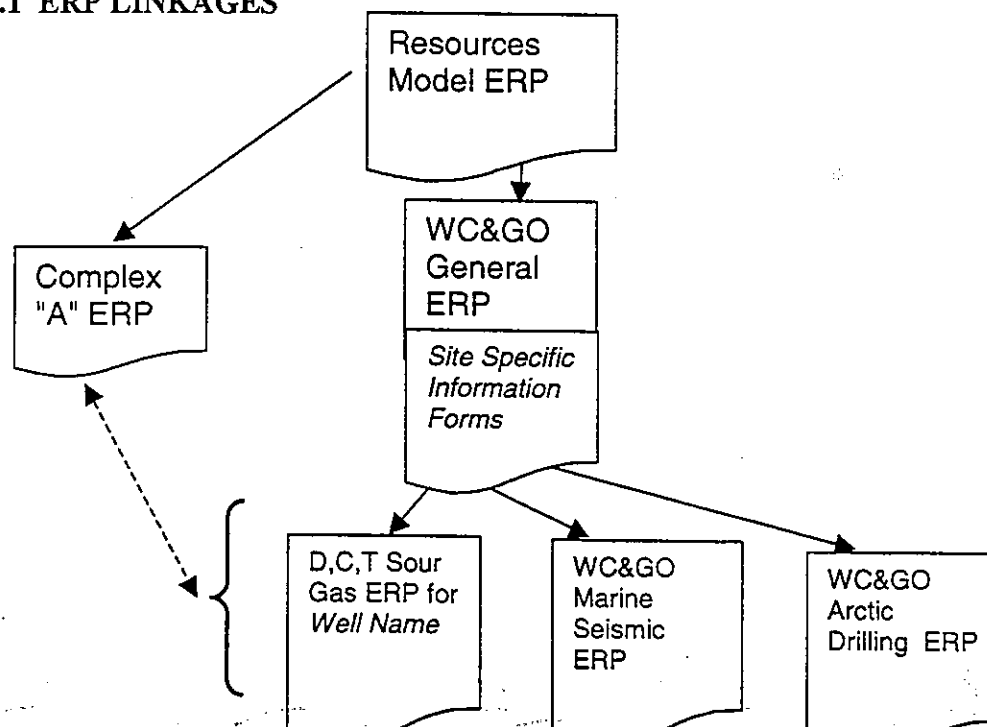
- The purpose of this manual is to describe and provide guidelines as to how **Well Construction & Geophysical Operations WC&GO** handles emergency preparedness and response using the **Incident Command System ICS**.
  - It is a tool for WC&GO staff and consultants who have ICS training, it is not meant to be a complete training document.
  - These guidelines complement the **Resources Model Emergency Response Plan ERP** and provide the link to site specific WC&GO ERP's and Complex (e.g. Waterton) ERPs.
  - This document does not address office emergencies in Shell Centre (see [eswww.shell.ca/corporate/HSE/safety/office safety](http://eswww.shell.ca/corporate/HSE/safety/office%20safety))
  - This document provides some brief descriptions of Shell Canada's ERP system; for full explanations refer to the Resources Model Emergency Response Plan.
  - Emergencies related to sour gas are not addressed in this document. Refer to site specific emergency response plans or applicable complex specific emergency response plans.
-

## 1.2 Different ERP's : Linkages

### Different ERPs : Linkages

- Virtually all of WC&GO activities relate to projects.
- ALL PROJECTS general emergencies will be managed as per this WC&GO General Emergency ERP.
- ALL PROJECTS will have site specific information forms completed (refer to 2.4 WC&GO General ERP Site Specific Information Forms)
- In addition, many projects are more complex and have specific ERPs to cover specific emergencies :
  - **Drilling, Completing, Testing Sour Gas ERP** : drilling and completions projects involving sour gas  $H_2S$ . Focuses on response with the public off site (notification, evacuation, roadblocks, etc). These are often linked to Shell Operating Complex ERPs.
  - **Marine Seismic** : focuses on the specific vessel and location of the survey
  - **Arctic Drilling** : focuses on the cold weather issues, remoteness issues, and spill response issues.
- A project could have 2 ERPs , for example, for a sour gas drilling project, the WC&GO General ERP plus a site specific DC&T Sour Gas ERP.

FIGURE 1.1 ERP LINKAGES



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### 1.3. WC&GO : Projects & Worksite Management

---

**WC&GO Activities :  
Projects**

- The Well Construction and Geophysical Operations WC&GO is a Shell Canada Resources Business Unit that provides project design and execution capability in Drilling, Completions, DAR/Construction, Seismic Acquisition, and Geomatics
- WC&GO provide this capability to the other Resources Business Units (Foothills, Frontier, Peace River) as part of project teams. Overall project management by the project teams is under the framework of Sub Surface Project Management, Drilling the Limit, or general Project Management Principals.
- The actual work is conducted by contractors at field locations remote from office locations. These worksites are managed by a WC&GO Site supervisor.
- **WC&GO has full control of, responsibility for, and accountability for HSSD performance, including Emergency Response, on all its project worksites.**
- On some worksites, an emergency could be managed using the contractor's ERP, however the WC&GO Site supervisor would still be responsible to ensure it is adequately implemented and addresses the emergency.

---

**The following are WC&GO  
areas of activity**

---

**Drilling : Land**

- Deep, sour, wells : foothills and deep plains
- Heavy oil wells (Peace River)
- Arctic wells

---

**Completions : Land**

- Well completions, stimulation, testing, workovers, and downhole abandonment
- Deep, sour, wells : foothills and deep plains
- Heavy oil wells (Peace River)
- Arctic wells

---

**DAR/Construction**

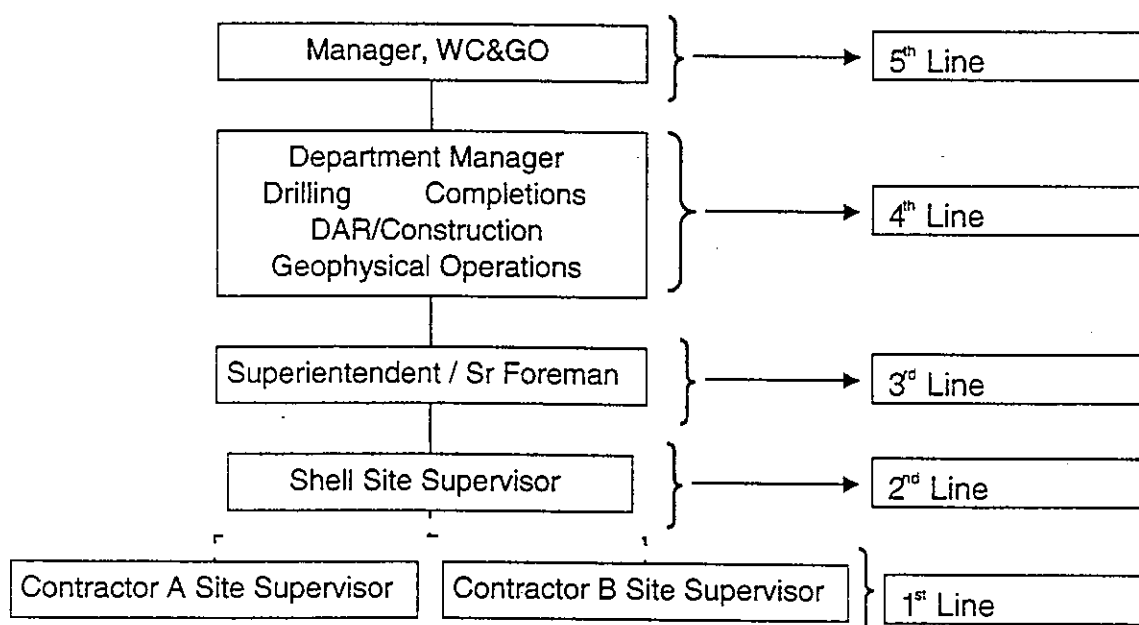
- Wellsite and access construction all Resources onshore activity areas
  - Decommissioning, Abandonment and Restoration of wellsites, access, and other facilities in all of Resources activity areas
-

**Geophysical Operations**

- Seismic Acquisition : Land
  - Foothills low impact seismic
  - Arctic
- Seismic Acquisition : Marine
  - Seismic vessels
  - Support vessels
- Geomatics (surveying and positioning) : land and marine

**WC&GO Project  
Worksites : Management &  
Control**

- All the actual hands on work on WC&GO projects is conducted by contractors and service companies.
- All WC&GO worksites are managed by a Site Supervisor (Shell Staff or consultant).
- Many of the contractors on site have there own HSSD Management Systems, which include Emergency Response. The WC&GO Site Supervisor may use and coordinate the contractor's site ERP, but the resultant ERP must follow the guidelines outlined in this document.

**FIGURE 1.2 WC&GO PROJECT WORKSITE MANAGEMENT**

---

## 1.4. WC&GO HSE Hazard Study, Safety Cases and HSSD Assessments

---

### WC&GO Studies

- WC&GO has conducted Hazard Studies and Safety Cases on operations under its control.
- These studies have demonstrated that major hazards have been identified, assessed, and that the necessary barriers and recovery preparedness measures have been specified.
- In addition, ALL Resources Projects are required to have a HSSD Assessment conducted (Resources HSSD Standard 9 Risk Management) which would identify unique project issues and provide input into the applicable project site specific ERP

---

### WC&GO HSE Hazard Study

- In 2001, WC&GO did a HSE Hazard Study in conjunction with Resources Safety and Environment.
  - This study included a HSE Assessment, which was systematically applied to WC&GO operations and a listing of all significant HSE hazards.
  - The following are the Major Hazards identified, and the corresponding ERP that addresses the hazard:
    - Loss of Well Control (Blowout) : Drilling or Completions > WC&GO Sour Gas ERP
    - Road Transport : vehicle accident > WC&GO General Emergency ERP
    - Air Transport : aircraft accident > WC&GO General Emergency ERP, Marine Seismic ERP, Arctic Drilling ERP
    - Camp Fire : fire, smoke, exposure (evacuation, winter) > WC&GO General Emergency ERP, Marine Seismic ERP, Arctic Drilling ERP
    - Emergency Response : exposure of emergency response personnel (HAZMAT) : fire, toxic effects WC&GO General Emergency ERP, WC&GO Sour Gas ERP, Marine Seismic ERP, Arctic Drilling ERP
-

---

**Marine Seismic HSE Case**

- All marine seismic projects will have a HSE Case (or equivalent ) conducted similar to :  
"HSE Case : Shell Thrumcap 3D  
Vessel : Western Monarch, March 2000"
- A site specific ERP will be developed for each project.
- If a project is a continuation of a previous project, with no major changes in contractor/vessel, HSE Management Systems, or personnel, a review and confirmation of applicability of the pervious HSE Case is acceptable with 5<sup>th</sup> Line Management approval (Manager, WC&GO).
- Note : this was done for the 2001 Trumcap #D project based on the 2000 project.
- The project site specific ERP will be updated as appropriate and re-issued.

---

**Arctic Drilling HSE Case**

- All arctic drilling projects will have a HSE Case (or equivalent ) conducted.
  - A site specific ERP will be developed for each project.
  - If a project is a continuation of a previous project, with no major changes in contractor/vessel, HSE Management Systems, or personnel, a review and confirmation of applicability of the pervious HSE Case is acceptable with 5<sup>th</sup> Line Management approval (Manager, WC&GO).
  - The project site specific ERP will be updated as appropriate and re-issued.
-

---

## 1.5 Drilling, Completing, Testing Sour Gas Emergency Response Plan

---

### General

- For all major sour well projects (Drilling or Completions/Stimulation/Testing) a site specific **Drilling, Completing, Testing Sour Gas Emergency Response Plan** is developed.
- This ERP is required to be approved by the EUB and must be in place before the sour formations are penetrated.
- For minor workovers of sour wells that do not have a site specific sour gas ERP, any sour gas emergency would be handled initially under the WC&GO General ERP and concurrently activating the **Complex ERP** for that well.

---

### Public Review : ERP Layout

- As part of public consultation expectations, the Sour Gas ERP will be available for review and discussion with interested members of the public, and must specifically be reviewed with nearby residents.
- The first 2 sections of the Sour Gas ERP are aimed at providing the general public with a clear understanding of Shell's ERP practices in general as well as for sour gas events.
- The final section provides site specific information and response plans required by the emergency responders.
- Within the Sour Gas ERP, tables can be found that are updated with project specific information for each new project. General non site specific information is found outside of the tables.

---

### Calling Card

- a short general discussion regarding Shell's emergency response philosophy and practices
  - target audience : public with a general interest in how Shell deals with emergencies.
-

---

*Generic Overview of Shell's  
Emergency Response Plan  
(ERP)*

- A more detailed discussion regarding how Shell deals with sour gas emergencies on drilling and completions projects
- Includes discussions on prevention, how ERP's are developed, public consultation, and sour gas emergency response
- Target Audience : public who want more details on sour gas emergencies

---

**Site Specific Drilling,  
Completing, Testing Sour  
Gas Emergency Response  
Plan for *Well Name***

- The details for the specific well covering :
    1. Prevention
    2. H<sub>2</sub>S Release Rate and Emergency Planning Zone
    3. Public Notification & Information
    4. Incident Command System
    5. Emergency Response Strategy
    6. Ignition and SO<sub>2</sub>
  - Target Audience : Shell, contractor, governmental and any other personnel who would actually respond to the emergency
-

---

## 2. WC&GO GENERAL EMERGENCY RESPONSE PLAN

---

### 2.1 General

---

#### General

- All worksites must be prepared to handle minor emergencies (General Emergency Level I : medical, fire, spill, etc), and have a response plan for them.
- They are typically handled by personnel on site, but could escalate to impact off-site.
- The following is the general Incident Command activation and response for typical WC&GO non sour gas emergencies, based on the Level of the emergency.
- This General Emergency ERP does **not apply to major Sour Gas Emergencies**, these are covered by site specific Drilling, Completing, Testing Sour Gas ERPs or Complex ERPs.
- For emergencies not listed, apply the appropriate Level of response as per the general level description.
- Each project will have **Site Specific Information Forms** (see section 2.4) to capture current information :
  - WC&GO General ERP : Emergency Contact List
  - WC&GO General ERP : Transportation Plan
  - WC&GO General ERP : Spill Plan
  - WC&GO Phone List
- It is the Shell Site Supervisor's responsibility to have on site :
  - WC&GO General Emergency ERP
  - current Site Specific Information Forms (see 2.4)
  - additional project specific ERPs as required (e.g., WC&GO Sour Gas ERP)
  - appropriate Shell Complex ERP if the project will call upon that ERP.

---

## 2.2. Incident Command System

---

### Incident Command System (exert from the Resources Model Emergency Response Plan)

- All WC&GO emergencies are handled using the Incident Command System
- The Incident Command System (ICS) is an all-risk system that is Flexible and Adaptable to all EMERGENCIES.
- The system consists of actions that command and control personnel, facilities, equipment and communications.
- It is designed to be activated for ALL EMERGENCIES regardless of the size, from the time an incident occurs until the requirement for Management and Operations no longer exists.
- The structure of the Incident Command System (ICS) can be expanded or contracted depending upon the changing conditions of the emergency incident.

---

### Incident Command System : KEY OPERATIONAL FACTORS

- See Figure 2.2 TYPICAL WC&GO FIELD BASED COMMAND POST ORGANIZATION
  - Assigns overall authority to one individual, the **Incident Commander**. For WC&GO Worksite emergencies, the initial Incident Commander is the **Shell Site Supervisor**
  - Provides structured authority, roles and responsibilities during emergencies.
  - Provides for manageable span of control.
  - Co-ordinates all incident scene operations.
  - Prevents freelancing during scene operations.
  - System is simple and familiar and is used routinely at all incidents.
  - Communications are structured.
  - There is a structured system for response and assignment of resources.
  - Provides for expansion, escalation and transfer/transition of roles and responsibilities.
  - Emphasizes safety and health as operational priorities.
-

---

**Incident Command System  
: COMPONENTS**

- Incident Command System (ICS) has a number of components working together interactively to provide the basis for an effective concept of operation.
  - Common terminology.
  - Modular organization.
  - Integrated communications.
  - Unified command structure.
  - Consolidated action plans.
  - Manageable span of control.
  - Designated incident facilities.
  - Comprehensive resource management.

---

**Incident Command System  
: ORGANIZATION AND  
OPERATIONS**

- Incident Command System (ICS) has 5 major functional areas:

**1. COMMAND**

What are the Objectives?

**2. OPERATIONS**

What is being Done to Accomplish the Objectives?

**3. PLANNING**

What has Happened?

Is Happening;

Will Happen.

**4. LOGISTICS**

What is needed to Support Operations?

**5. FINANCE**

What are the Costs?

---

---

**Incident Command System  
: KEY ICS POSITIONS**

**INCIDENT COMMANDER**

Person in Charge. NOTE : the Incident commander assumes the responsibilities of all the other Key Positions until they are assigned to someone else..

**SAFETY**

Overall Safety.

**LIAISON**

Works with Governmental Agencies.

**PUBLIC INFORMATION OFFICER**

Media. and Crisis Communication

**LOGISTICS**

Orders Resources.

**OPERATIONS**

Actual Working Operations of Incident.

**STAGING**

Pre-Deployment Area.

**PLANNING (PLANS)**

Incident Action Plan.

12 Hour Plan.

Safety and Health Plans.

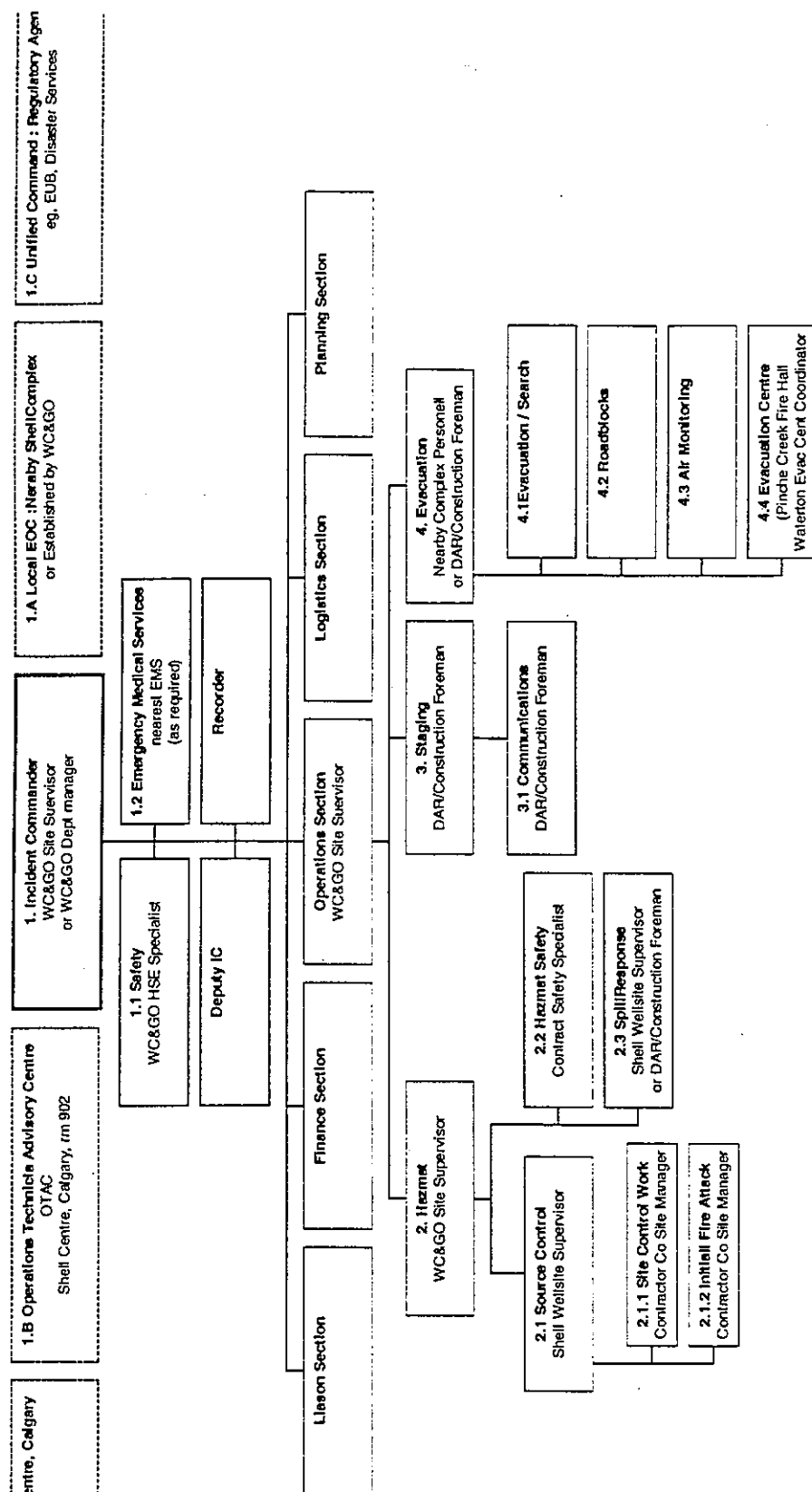
**FINANCE**

Financial Arrangements.

Claims.

---

**Figure 2.2 TYPICAL WC&GO FIELD BASED COMMAND POST ORGANIZATION**



---

## 2.3. WC&GO General ERP : Response & Notification

---

- The following outline the typical ICS Levels of emergency and corresponding response and notification.
- 

### 2.3.1 General Emergency Level I : Low Immediate Impact

---

#### Typical General Level I Emergencies

- Small, contained, controllable fire / explosion
- Small, contained, controllable, hazardous materials spill on-site (see Figure 2.3 Environmental Release Reporting Process)
- Injury requiring medical evacuation.
- Minor vehicle accident
- Journey Management : failure to arrive to a remote location, especially during winter
- H<sub>2</sub>S (Odor complaint or minor sour release that can be immediately contained)
  - most sour gas drilling and completions projects will have a site specific sour gas ERP, which would be implemented.
  - However, if there is no site specific sour gas ERP (e.g., a workover in an existing Shell field), this WC&GO General ERP , and/or the responsible Shell Complex ERP, would be initiated

---

#### Typical General Level I Emergencies : Response & Notification

- **Incident Commander : Shell Site Supervisor**
  - Make contacts as appropriate as per the site specific Information forms (see 2.4)
  - Control regained / response action by onsite personnel or local EMS.
  - Odor complaint or minor sour release : contact the Complex, active the **Complex ERP**
  - Report ASAP, after the fact : to Superintendent/Sr. Foremen
-

---

### 2.3.1 General Emergency Level II : Significant Impact or Potential

---

#### Typical General Level II Emergencies

- Any Level I Emergency that escalates beyond the immediate worksite and impacts people outside Shell.
  - Fire or explosion which has spread or cannot be brought under control
  - Fire or explosion as a result of a hazardous material spill onsite
  - Spill offsite or into a waterbody (see Figure 2.3 Environmental Release Reporting Process)
  - Camp fire requiring evacuation
  - Serious injury that could be life threatening (e.g., head injury)
  - Vehicle accident with serious injury or spill
  - Journey Management : failure to arrive to a remote location, escalating to major search and rescue operations
  - H<sub>2</sub>S (Minor sour release that can not be immediately contained or equipment malfunction that could potentially result in a major release)
    - As with Level I, implement the site specific sour gas ERP or Shell complex ERP
-

---

**Typical General Level II  
Emergencies :****Response & Notification**

- **Initial Incident Commander : Shell Site Supervisor**
    - Notify Immediately : Superintendent/Sr. Foremen
  - **Superintendent/Sr. Foremen: mobilize to site, assume IC responsibilities.**
    - Notify immediately : Department Manager)
  - **WC&GO Department Manager :**
    - Notify immediately : Manager, WC&GO
  - **Manager, WC&GO**
    - Notify immediately : Crisis Evaluation Group CEG Leader
  - **Local EOC :**
    - Activate Local Emergency Operations Centre (EOC), depending upon the emergency duration, OR potential impact to the public or government (may be Complex EOC).
    - Local EOC Incident Commander : complex personnel OR WC&GO Department Manager or WC&GO Manager.
-

---

### **2.3.1 General Emergency Level III : Major Impact or Hazard to Public**

---

#### **Typical General Level III Emergencies**

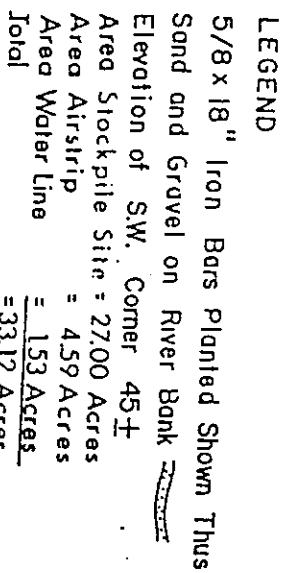
- Any Level II Emergency that escalates beyond the immediate worksite and impacts the public.
  - Major fire or explosion
  - Serious injury / multiple injured / fatality
  - Major uncontained spill offsite or into a waterbody ( see Figure 2.3 Environmental Release Reporting Process)
  - H<sub>2</sub>S (Major uncontrolled or partially controlled sour release)
    - As with Level I, implement the site specific sour gas ERP or Shell complex ERP
-

PLAN SHOWING SURVEY  
OF

## CO-ORDINATES OF S.W. CORNER OF SITE

SCALE 1" = 600

DECEMBER 1971  
AMENDED FEBRUARY 1972  
AMENDED APRIL 9, 1973  
AMENDED APRIL 24, 1974  
AMENDED JUNE 12, 1974 ✓



A.HITTEL D.L.S.

April 9th 1973

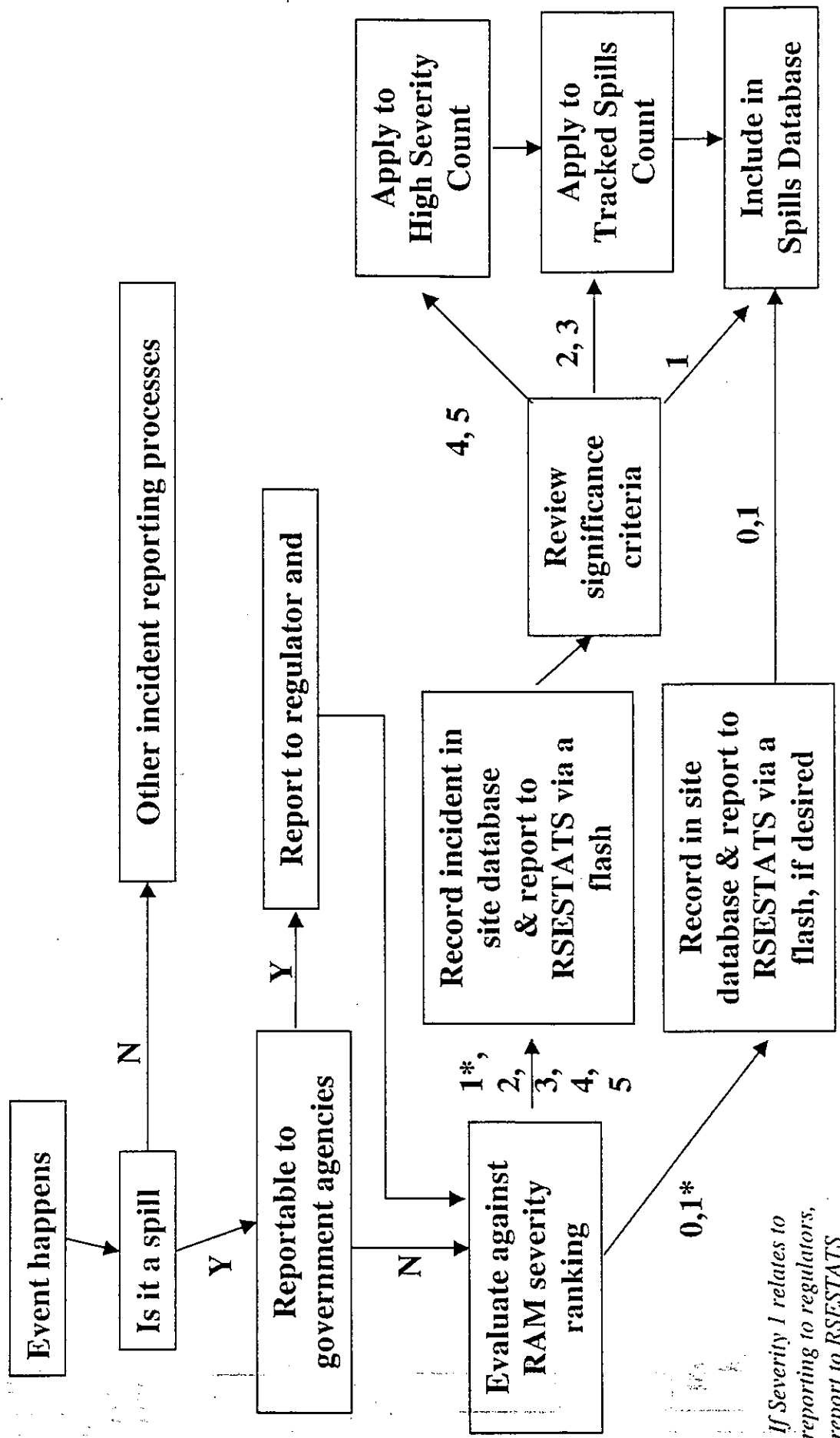
**Typical General Level II  
Emergencies :****Response & Notification**

- **Initial Incident Commander : Shell Site Supervisor**
  - Notify Immediately : Superintendent/Sr. Foremen
- **Superintendent/Sr. Foremen :**
  - Notify immediately : Department Manager)
- **WC&GO Department Manager :**
  - Notify immediately : Manager, WC&GO

**Either Superintendent/Sr. Foremen or WC&GO Department Manager: mobilize to site, assume IC responsibilities.**

- **Manager, WC&GO**
  - Notify immediately : Crisis Evaluation Group CEG Leader
  - Notify immediately : Resources Sr. Operating Officer SOO
  - Immediately mobilize to Local EOC, assume Local EOC IC responsibilities.
- **Local EOC :**
  - Since a Level III emergency WILL have impact offsite during the emergency, and often after the site emergency is under control, a Local EOC should be established to deal with public and government issues.
  - Local EOC Incident Commander : WC&GO Department Manager or WC&GO Manager
- **CEG Leader**
  - Activate Crisis Management Team CMT and Corporate EOC as appropriate
  - Contact SOO
  - Notify President and Chief Executive Officer CEO

Figure 2.3 Environmental Release Reporting Process  
Flowchart For tracked Spills



---

## 2.4. WC&GO General ERP : Site Specific Information Forms

---

### General

- The following are the Site Specific Information Forms that are required to be completed for all WC&GO projects.
    - WC&GO General ERP : Emergency Contact List
    - WC&GO General ERP : Transportation Plan
    - WC&GO General ERP : Spill Plan
    - WC&GO Phone List
  - It is the Shell Site Supervisor's responsibility to ensure these forms are complete and current for the project.
  - for new drilling locations, the DAR/Construction group often completes these forms for the site construction phase of the project.
  - These would then form the basis for the drilling and completions phases, however the drilling and completions site supervisor still need to ensure the information is complete and current.
  - The DAR/Construction foreman also typically completes the Spill Plan.
  - Blank examples of these are included in this document, templates are (for access to the templates see the Sr. Admin Assistant, Drilling).
  - The current WC&GO PHONE LIST is available on the WC&GO N drive ( folder WC&GO Phone List) or from Admin Assistant, Drilling.
-

# WC&GO PROJECT EMERGENCY RESPONSE PLAN

## EMERGENCY CONTACT LIST

PROJECT: Camp FarewellLOCATION : 110 Km NW of Inuvik NWT

LAT : 69 12 35.09 \_\_\_\_\_

LONG : 135 06 17.286 \_\_\_\_\_

DIRECTIONS : BY AIR 110 KMS NW OF INUVIK OR BY BOAT USING EAST  
CHANNEL

RADIO FREQUENCIES : RECEIVE 157.47 TRANSMIT 168.15

WORKSITE CONTACTS	NAME	PHONE	FAX
Shell Site Supervisor 1	Blair Bennett	867 777-5460	867 777-5365
Shell Site Supervisor 2	Shane Millard	867 777-5460	867 777-5365
Camp Supervisor	Kevin Dellaire	867 777-5364	867 777-5365
Yard Supervisor	John Russell	867 777-5364	867 777-5365
MEDIC PARK AMBULANCE	Bob Brennan Dennis Bonin Steve Miller	867 777-5364	867 777-5365
PRIMARY OFFICE CONTACTS			
Shell Canada Limited	800 661-7378		
DAR Construction Manager	Randy Hetman Cellular Residence	403 691-2512 403 813-0408 403 275-0730	403 269-7948
HSSD	Jeff Oshust Cellular Residence	403 691-3949 403 651-1151 403 230-2342	403 269-7948
WG&CO Manager	Mike Read Cellular Residence	403 691-3323 403 245-9900 Pager 44202 403 243-0153	403 269-7948
FOR OTHER WC&GO NUMBERS , SEE WC&GO PHONE LIST			
SHELL OPERATIONS TECHNICAL ADVISORY CENTRE			
SHELL CENTRE, CALGARY, ROOM 902			403-691-3104
SHELL EMERGENCY COMMUNICATIONS TRAILER			
CUSTODIAN : C&V - TRAILER YARD, CALGARY			
CONTACT :	DOUG DELORME	403-620-0442 24HR	403-279-7451 MESSAGE

## WC&GO PROJECT EMERGENCY RESPONSE PLAN EMERGENCY CONTACT LIST

GOVERNMENTAL AGENCIES			
RCMP : Local Detachment		867 777-2935	
Forest Fires		800 661-0800	
Poison Control Centre		800 332-1414	
Safety & Public Services		867 777-7399	
NWT 24 hour Spill Report Line		867 920-8130	867 873-6924
NWT Environmental Protection Division		867 873-7654	867 873-0221
Department of Indian and Northern Affairs		867 777-7230	
Indian & Northern Affairs – Inuvik		867 777-3361	
Environment Canada Yellowknife		867 669-4725	
CANUTEC		613 996-6666	
National Energy Board		403 299-3926	403 292-5875
	Rick Turner	403 299-3868	403 292-5875
	Cellular	403 540 3754	
NEB Staff	John Korec (Office)	403 292-6614	
	John Korec (Home)	403 275-6526	
	Laura Van Ham (Office)	403 299-2769	
	Laura Van Ham (Home)	403 208-0267	
	Andy Graw (Office)	403 299-2790	
	Andy Graw (Home)	403 547-3073	
	Terry Baker (Office)	403 299-2792	
	Terry Baker (Home)	403 239-5032	
Disaster Services / Transportation Of Dangerous Goods		1-800-272-9600 (24 HR)	
Disaster Services : Regional Office			

<b>GOVERNMENTAL AGENCIES</b>			
Fish and Wildlife area office		867-777 -7230	
NWT WCB		867 902 3888	
Coast Guard Hay River		867 874-5500	
Rescue and Response		867 874-5569	

# WC&GO PROJECT EMERGENCY RESPONSE PLAN

## EMERGENCY CONTACT LIST

EMERGENCY SERVICES			
INUVICK AMBULANCE SER.	867 777-4444		
LOCAL 2			
HOSPITALS			
INUVICK HOSPITAL	867 777-8000		
FIRE DEPARTMENT			
LOCAL 1			

EQUIPMENT SPECIAL SERVICES			
NON-EMERGENCY SERVICES			
REPAIRS INUVIK		867 777-2111	
OPERATOR : clearing lines or line interruption		0	
GENERAL INQUIRIES			
SAFETY SERVICES			
United Resources Safety	Emergency Line	1-800-432-1809	24 hr
ENVIRONMENTAL MONITORING			
MOBILE MONITORING			
Monitrex	Calgary	403-291-3590	24 hr
Splash & Dore Safety Ltd	Calgary	1-800-264-5691	24 hr
Key Safety Services	Emergency Line	1-866-FIRE - 911	24 hr
Continuous Stationary			
Maxxam Analytical	Calgary	403-291-3077	Working hrs
		403-651-2436	After hrs/ emergency

[illegible]

MACKENZIE RIVER

LAT. 69° 12' 30.0"  
LONG. 135° 06' 04.4"

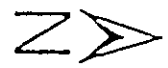
Existing Sump

OUTLINE OF ELEVATED AREA: ELEVATION 35'-50' ABOVE SEA LEVEL.

AIRSTRIIP

Lake

Lake



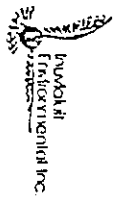
Camp Farewell Wastewater Treatment System

Appendix B

Legend

- Approx Water Intake
- Approx Water Output
- Approx Intake Pipe
- Treatment System
- Camp Buildings

Scale 1" = 600'



**WC&GO PROJECT EMERGENCY RESPONSE: TRANSPORTATION AND MEDEVAC PLAN**

PROJECT: Farewell

DEVELOPED BY: Blair Bennett, R Hetman, C Mac Leod

DATE: 21 August, 2002

<u><b>EMERGENCY NUMBERS</b></u>	<p>Preferred hospital: <b>Inuvik Hospital</b> Number: (867) 777- 8000</p> <p>Preferred Ambulance: <b>Inuvik Ambulance Emergency</b> Number: (867) 777-4444</p> <p>Preferred Police: <b>RCMP</b> Number: (867) 777-2935</p> <p>Preferred Air :Evacuation <b>Canadian Helicopters</b> Number 867 777-2424 867 777-4338</p> <p>Alternate Air: <b>Aklak Air</b> Number 867 777-3777</p>
<p><b>GENERAL INFORMATION</b> Note- If travel distance to Health care facility is:</p> <p><b>CLOSE</b> (&lt; 20 min.) or <b>DISTANT</b> (20 min to 40 min)</p> <p>You may rely on ambulance service from that Health care facility, <u>HOWEVER</u>, if the travel distance of the worksite is greater then 40 min, then it is deemed:</p> <p><b>ISOLATED (&gt;40 min)</b></p> <p>Therefore, you must have transportation that meets the following criteria:</p> <ul style="list-style-type: none"> <li>• Clean</li> <li>• Protects from weather</li> <li>• Equipped with communication</li> <li>• Accommodate a 200 cm stretcher</li> </ul> <p><b>HELICOPTER RESPONSE TIME WILL QUALIFY</b></p>	<p>Type of accident likely to occur: Lacerations, Slips/Trips/Falls</p> <p>Number of workers at site: 15 - 30</p> <p>Distance from a Health Care Facility: greater than 40 min</p> <p>Availability of Ambulance Service: Air evacuation Ambulance emergency response time: Approximately 40min</p> <p>Time of day work is in progress: Day-time</p> <p>Type of transportation needed to get to the worksite: Helicopter or fixed wing</p> <p>Route to site: Flying 110km Northwest of Inuvik</p> <p>Does change in weather effect type of travel? Explain. Increase time by: Depends upon weather. Could be next day.</p>
<p><b>CONTACTS:</b> <b>LOCATION OF PHONES AND RADIOS</b></p>	<ul style="list-style-type: none"> <li>• phones located in offices</li> <li>• hallway</li> <li>• radios on specific personnel</li> <li>• radios in office</li> <li>• specific personnel have cell phones</li> </ul>

<b>EMERGENCY CALL RESPONSIBILITY</b>	Primary responsibility: Medic Secondary responsibility: Shell Site Supervisor Site phone number: 867 777-5364 867 777-5460 Radio Frequency: Receive: 157.47 Transmit: 168.15
<b>INFORMATION YOU NEED TO HAVE</b>	<b>Call air evacuation charter</b> Tell them <ul style="list-style-type: none"> <li>• Medevac required</li> <li>• Your location –Camp Farewell              Lat: 69 12 35.09              Long: 135 06 17.286</li> <li>• Landing (airstrip) condition include lighting, wind speed, wind direction and local weather conditions</li> <li>• Any obstructions or hazards to be aware of in landing</li> <li>• Phone numbers of camp</li> <li>• Radio frequencies of camp</li> <li>• Upon contact to charter, medical contact is mandatory to ensure that proper facilities and attention is given to patient(s).</li> <li>• Number of injured:</li> <li>• Extent of injuries:</li> <li>• What is being done (patient talking, seated, no response, etc):</li> <li>• Obtain confidential medical file to accompany patient</li> </ul> <b>Call to Hospital and ambulance</b> If available and possible, medic shall call the local hospital and ambulance Tell them <ul style="list-style-type: none"> <li>• Medevac in progress and that evacuation charter has been notified</li> <li>• Number of injured:</li> <li>• Extent of injuries:</li> <li>• What is being done (patient talking, seated, no response, etc)</li> <li>• Age, sex of patient</li> <li>• Brief description of accident</li> <li>• Description of injuries or illness</li> <li>• Medic position and qualifications</li> <li>• Type of medical aid already administered</li> <li>• Site phone number</li> <li>• Estimated time of arrival:</li> </ul>
<b>EXPECTATIONS</b>	What the paramedic should expect when he arrives on site:  OR What you can expect when the conveyance vehicle arrives:
<b>COMMUNICATION OF PLAN</b>	<b>First Aiders on site</b> Bob Brennan Dennis Bonin Steve Miller All workers on site as part of orientation

BARNETT, R.T. (Bob) .....	691-3133 .....	286-6234 .....	* HUCULAK, J (Jim) .....	691-2163 .....	[c] 816-4667 .....
..... [c] 680-2799 .....	[c] 403/815-9338 .....	..... [m] 600/700-4116 .....	HURLBUT, M.E. (Murray) .....	691-3470 .....	938-6202 .....
BERRY, M. (Michael) .....	691-2590 .....	..... [c] 850-0282 .....	ISENOR, B. (Brett) .....	691-3976 .....	253-9139 .....
..... [m] 600/700-2930 .....	..... [m] 600/700-2930 .....	..... [m] 600/700-2930 .....	JANZ, H. (Harold).....	691-3384 .....	[c] 874-9890 .....
BELBECK, G.R. (Glen) .....	691-3003 .....	251-4274 .....	KLASSEN, B. (Brandi) .....	691-3368 .....	568-1112 .....
..... [c] (403) 813-2879 .....	..... [p] 209-7440 .....	..... [p] 209-7440 .....	LANG, D.C. (Dennis) .....	691-2909 .....	278-9046 .....
BENNETT, B. (Blair) .....	691-2660 .....	948-3430 .....	..... [m] 403/620-7448 .....	..... [m] 403/620-7448 .....	..... [m] 403/620-7448 .....
* BONKE, C.A. (Carl) .....	691-3079 .....	288-7253 .....	MACLEAN, G. (Gordon).....	691-4453 .....	403/887-8787 .....
..... [f] 288-7392 .....	..... [c] 620-7301 .....	..... [c] 620-7301 .....	..... [c] 620-7301 .....	..... [c] 620-7301 .....	..... [c] 620-7301 .....
BOOTH, J. (Judy).....	691-2317 .....	547-8988 .....	* MACLEOD, D. (Dan).....	509-4352 .....	[c] 403/660-5024 .....
BROWN, J.H. (John).....	691-3502 .....	[c] 861-1352 .....	MCGRATH, S.E.R. (Shaun) .....	691-2948 .....	932-7019 .....
BUJOLD, M. (Maurice) .....	691-4397 .....	932-1411 .....	..... [c] 660-2932 .....	..... [c] 660-2932 .....	..... [c] 660-2932 .....
CALVITTI, R. (Rino).....	691-3615 .....	..... [c] 620-7301 .....	* MUELLER, B. (Brad).....	691-3661 .....	257-5280 .....
* CARTWRIGHT, F.A. (Fred) .....	691-2573 .....	288-4200 .....	..... [c] 403/660-0008 .....	..... [c] 403/660-0008 .....	..... [c] 403/660-0008 .....
..... [c] 650-4200 .....	..... [c] 650-4200 .....	..... [c] 650-4200 .....	** MURPHY, T. (Tom) .....	691-2980 .....	335-4928 .....
CHAN, K. (Ken).....	691-2854 .....	254-6418 .....	..... [c] 804-1713 .....	..... [c] 804-1713 .....	..... [c] 804-1713 .....
* CONLON, M.M. (Marilyn).....	547-7594 .....	[c] 860-4661 .....	NASH, P (Phillip).....	691-2050 .....	246-7237 .....
..... [Fax] 547-8590 .....	..... [Fax] 547-8590 .....	..... [Fax] 547-8590 .....	..... [c] 585-6228 .....	..... [c] 585-6228 .....	..... [c] 585-6228 .....
* CROMBIE, D. (Dave) .....	691-4411 .....	[c] 860-7460 .....	NECAS, E. (Eva) .....	691-4267 .....	239-2866 .....
* CRAWFORD, D. (Del) .....	691-3902 .....	242-4481 .....	NELSON, L. (Len) .....	691-2385 .....	225-1799 .....
..... [c] 510-6127 .....	..... [c] 510-6127 .....	..... [c] 510-6127 .....	NELSON, R. (Russ) .....	691-3030 .....	547-0796 .....
* CRUZ, C. (Claire) .....	691-2913 .....	293-5242 .....	OSHUST, J. (Jeff).....	691-3949 .....	230-2342 .....
* DALLAIRE, J. (Jean-guy) .....	691-3061 .....	257-4306 .....	..... [c] 651-1151 .....	..... [c] 651-1151 .....	..... [c] 651-1151 .....
DEREN, G.W. (Gary) .....	691-3697 .....	285-2868 .....	* PEACH, S. (Steve) [Schlumberger] 691-2486 .....	[c] 860-7359 .....	[c] 860-7359 .....
..... [c] 860-0734 .....	..... [c] 860-0734 .....	..... [c] 860-0734 .....	* PERRY, A. (Amanda) [Baker Hughes].....	691-2869 .....	691-2869 .....
DOUSETT, J. (Jason).....	691-4092 .....	242-3949 .....	..... 537-3451 [Baker Office] .....	[c] 589-0796 .....	[c] 589-0796 .....
DYCK, W. (Walter) .....	691-3435 .....	202-0160 .....	PRATT, C.A (Kip) .....	691-3143 .....	932-5108 .....
ELLIOTT, C (Carol).....	691-2012 .....	403/637-0088 .....	RAMAN, S. (Suresh) .....	691-2448 .....	547-8365 .....
..... [c] 403/660-2825 .....	..... [c] 403/660-2825 .....	..... [c] 403/660-2825 .....	..... [c] 816-5570 .....	..... [c] 816-5570 .....	..... [c] 816-5570 .....
ERICKSON, N. (Neil) .....	691-3487 .....	627-2754 .....	READ, M. A. (Mike) .....	691-3323 .....	243-0153 .....
..... [m] 620-4524 .....	..... [m] 620-4524 .....	..... [m] 620-4524 .....	** (PAGER for MAR or his Delegate).....	Pager 228-8800 (44202) .....	Pager 228-8800 (44202) .....
FAREWELL STOCKPILE.....	867/777-5364 .....	[Fax] 867/777-5365 .....	ROCK, B. (Barry) .....	691-2453 .....	932-9340 .....
* FERGUSON, L. (Larry) .....	691-2268 .....	251-1629 .....	..... [c] 815-7200 .....	[m] 551-1420 .....	[m] 551-1420 .....
FRIESEN, S. (Sheila).....	691-4135 .....	279-7192 .....	RUSHKA, B. (Blair) .....	691-2707 .....	638-4981 .....
* GRAY, J. (John) .....	691-3749 .....	249-5582 .....	..... [c] 813-1804 .....	[c] 813-1804 .....	[c] 813-1804 .....
..... [c] 850-0000 .....	..... [c] 850-0000 .....	..... [c] 850-0000 .....	RYAN, D. (Darrin).....	691-3591 .....	209-0774 .....
GREIG, V. (Van) .....	691-3770 .....	403/646-2178 .....	SCHAU, D. (Darcy) .....	691-3583 .....	[c] 874-8374 .....
..... [c] 660-3143 .....	..... [c] 660-3143 .....	..... [c] 660-3143 .....	SEKELLA, A.J. (Alex) .....	691-3698 .....	948-6504 .....
GROELLER, L. (Les) .....	691-2713 .....	[c] 651-3021 .....	..... [c] 540-3606 .....	..... [c] 540-3606 .....	..... [c] 540-3606 .....
..... [h] 934-3252 .....	..... [s] 600/700-3459 .....	..... [s] 600/700-3459 .....	SELBY, S.D. (Sylvia) .....		

ANDERSEN, B. (Barry) ..... 403/ 346-8741 .....[c] 403/ 350-9530  
(R.G Mallett)

EHERT, C. (Cliff) ..... 403/ 948-5577 .....[c] 403/ 816-3044  
(Pajak Engineering, 403 /264-1197)

HOLM, R (Ron) ..... 306/ 634-8538 .....[c] 403/ 819-7227  
(Fire Creek Resources)

STEFANIC, J (John) ..... 403/ 782-9973 ..... 403/ 318-4177

THOMAS, J (Jamie) ..... 403/ 271-7480 ..... [c] 403/ 860-6415  
(Pajak Engineering, 403 /264-1197) 860-6415 ..... [c] 403/ 850-5594

WILSON, A. (Al) ..... 403/ 488-0723 .....[c] 403/ 318-4747  
(Fire Creek Resources)

BERRY, D (Dave)..... [c] 403/ 815-6995  
KOSTYK, F (Floyd)..... [c] 780/ 689-7686  
LUSIS, D (Don)..... [c] 780/ 719-7780

## WC&amp;GO GENERAL EMERGENCY RESPONSE PLAN

August 2002

**SHELL INFORMATION / RECEPTION: 691-3300****OFFICE COMPUTER**

Landline or Satellite..... 691-2850 ..... 691-2338

Mobile or Cellular ..... 691-2339

**POOL VEHICLE (WC&GO)**[Green Ford F150, License #TXV041, Stall #19](Book Vehicle on  
OpenTime r: WC&GO Pool Vehicle)

KEYS FROM: Randy Hetman, spare from Glen Hallam

POOL CELLULAR ..... [c] 630-9926 ..... [c] 560-6886

\* CONSULTANT / ALLIANCE

\*\* MAB DELEGATE

FOR CHANGES PLEASE CONTACT  
BRANDI KLASSEN @ 691-3368**DRILLING CONSULTANTS**Pajak Engineering, Victor LaPointe..... 403/ 264-1197  
..... Fax 264-1584Fire Creek Resources, Barry Luft..... 403/ 234-9309  
..... Fax 234-9195**DAR / CONSTRUCTION CONSULTANTS**COOK, D. (Don) ..... 403/ 627-3459 .... [c/m] 403/ 627-7666  
(Pajak Engineering, 403 /264-1197)

DELLAIRE, K. (Kevin).....[c] 403/ 860-3511 ..... 403/ 936-5061

ELTER, C. (Carl) .....780/ 624-6802 ..... 780/ 624-2776  
..... [c] 780/ 618-8990GUARD, L. (Larry) ..... 403/ 638-4439 ..... [m] 403/ 551-8579  
(Pajak Engineering, 403 /264-1197)NEUFELD, G. (Glen) ..... 403/ 638-4240 ..... 403/ 638-6402  
(Pajak Engineering, 403 /264-1197)TICE, R. (Rock) ..... 780/ 624-8296  
(R.T Grading & Consulting)[f] 780/ 624-9652 ..... [c] 780/ 618-960

**LIST OF EMERGENCY RESPONSE PLANS**

Sewage Spill  
Bulk Material Spill  
Fuel Spill (water)  
Fuel Spill (land)  
Equipment List  
Fire Procedure

## SEWAGE SPILL EMERGENCY RESPONSE PLAN

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**LOCATION: CAMP FAREWELL**

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---

**DEVELOPED BY: CHARLES MAC LEOD**

---

**DATE: 21 August, 2002**

---

The campsite is located between a small lake and a channel of the MacKenzie River. The sewage treatment plant is self-contained. There is a bypass line from the lift station to an existing lagoon so that any overflow from the lift station goes to the lagoon. If treated water is not up to specification; it will be diverted to the lagoon. The water from the lagoon will then be treated through the sewage plant at a later date for completion to specification.

### TRANSPORTATION

There will be transportation of sludge from the sewage treatment plant to the treatment plant in Inuvik

### MAINTENANCE AND CONTROL

This contingency plan is project specific and will be reviewed:

- As changes to applicable environmental legislation come into effect
- During any on-site training exercises
- After each and every sewage incident.

Changes to phone numbers and names of those individuals identified in this contingency plan will be made on an as required and when required basis.

#### 1. SAFETY

Ensure personal safety

- ◆ Ensure your own personnel safety from existing and potential hazards and fellow worker safety.

#### 2. ISOLATE AND DENY ENTRY

Isolate the area and deny / restrict entry

- ◆ Utilize vehicles or barricades for temporary control.
- ◆ Establish / adjust control perimeters.

#### 3. NOTIFICATIONS

Immediately notify the following

- ◆ Shell's on site supervisor

Notify the following as soon as practical

- ◆ DAR/Construction manager
- ◆ Northwest Territory Emergency Spill Response Line
- ◆ Indian Northern Affairs Canada

- ◆ NEB if spill exceeds .20 m<sup>3</sup> (200litres) and/or spill is not contained and could result in further safety property or environmental damage.

#### 4. COMMAND / MANAGEMENT

Order depends on specific factors

- ◆ Assign Incident Command System roles as resources become available.
- ◆ Develop the response plan.
- ◆ Ensure safety precautions and operating plans and conditions are reviewed with the crew.
- ◆ Determine a need for roadblocks.
- ◆ Ensure proper permits are executed.

#### 5. IDENTIFICATION AND HAZARD ASSESSMENT

Identify the Hazards and Assess the Risks

- ◆ Determine chemical makeup of substance (i.e.: WHMIS, TDG Placards, PIN No.s).
- ◆ MSDS (Material Safety Data Sheets – Chemical).
- ◆ Placards and labels (colours, markings).
- ◆ Shipping papers (Bill of Lading, Way Bill, etc).
- ◆ Technical information (CANUTEC).
- ◆ Other (specialists, monitoring devices).

#### 6. PROTECTIVE EQUIPMENT

Ensure proper personal protective equipment is utilized, and know the level of equipment available

- ◆ Visibility stripes, safety glasses, goggles, life jackets, gloves etc.

#### 7. CONTAINMENT AND CONTROL

Safe defensive containment

- ◆ If safe to do so, and if possible, stop the flow of material.
- ◆ If spill frozen shovel snow /sewage mixture into containers.
- ◆ Deploy absorbent pads, socks as required.
- ◆ See list of emergency spill cleanup equipment in equipment list
- ◆ Recover sorbents and place in steel drums
- ◆ Notify and request assistance if required from external NWT Emergency Spill Response Line.
- ◆ Consider what resources /materials are available within close proximity; i.e.: crawler tractor, loaders, bobcats, vacuum /water trucks, fuel bladders / fiberglass tanks.

#### 8. DECONTAMINATION AND CLEANUP

Collect, cleanup, and sample

- ◆ Decontaminate personnel as required if exposed to the spill. Wash hands and face after clean up.
- ◆ Priority is to high environmentally sensitive areas (municipality water sources, waterfowl staging areas, domestic fishing areas).
- ◆ Store the spilled material in proper containers for disposal;
- ◆ Develop remediation program for the area (if required);
- ◆ Undertake the remediation program:
- ◆ Monitor the progress of remediation as required.

#### 9. DISPOSAL

Dispose of wastes, contaminated clothing and equipment if unable to decontaminate.

- ◆ Incinerate sorbents
- ◆ Warm up containers of snow and sewage mixture to room temperature and then over the time frame of a couple of weeks pour them into the flow equalization tank of the sewage plant. The reason for introducing the snow sewage mixture slowly and at room temperature is to avoid a large shock loading of the plant that will affect the microorganisms or ship containers to Inuvik Sewage Treatment Plant for disposal.

10. DOCUMENTATION

Document all actions and complete reports

- ◆ Assign a recorder to log activities
- ◆ Complete and submit a follow-up spill report to the Northwest Territories Spill Report line.

## BULK MATERIAL RESPONSE PLAN

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**LOCATION: CAMP FAREWELL**

---

---

**DEVELOPED BY: CHARLES MAC LEOD**

---

**DATE: 21 August, 2002**

---

The campsite is located between a small lake and a channel of the MacKenzie River. Bulk Materials are stored in seacans and various other containers.

### TRANSPORTATION

There will be drilling products transported to and from the site.

### MAINTENANCE AND CONTROL

This contingency plan is project specific and will be reviewed:

- As changes to applicable environmental legislation come into effect
- During any on-site training exercises
- After each and every incident.

Changes to phone numbers and names of those individuals identified in this contingency plan will be made on an as required and when required basis.

#### 1. SAFETY

Ensure personal safety

- ◆ Ensure your own personnel safety from existing and potential hazards and fellow worker safety.
- ◆ In addition to standard personal protective equipment, check MSDS sheets for additional requirements

#### 2. ISOLATE AND DENY ENTRY

Isolate the area and deny / restrict entry

- ◆ Utilize vehicles or barricades for temporary control.
- ◆ Establish / adjust control perimeters.

#### 3. NOTIFICATIONS

Immediately notify the following organizations.

- ◆ Shell's onsite supervisor

Notify the following as soon as practical

- ◆ Shell's DAR/Construction manager
- ◆ Northwest Territory Emergency Spill Response Line
- ◆ Indian Northern Affairs Canada
- ◆ NEB if spill exceeds .20 m<sup>3</sup> (200litres) and/or spill is not contained and could result in further safety property or environmental damage.

#### 4. COMMAND / MANAGEMENT

Order depends on specific factors

- ◆ Assign Incident Command System roles as resources become available.
- ◆ Develop the response plan.
- ◆ Ensure safety precautions and operating plans and conditions are reviewed with the crew.
- ◆ Determine a need for roadblocks.
- ◆ Ensure proper permits are executed.

#### 5. IDENTIFICATION AND HAZARD ASSESSMENT

##### Identify the Hazards and Assess the Risks

- ◆ Determine chemical makeup of substance (i.e.: WHMIS, TDG Placards, PIN No.s).
- ◆ MSDS (Material Safety Data Sheets – Chemical).
- ◆ Placards and labels (colours, markings).
- ◆ Shipping papers (Bill of Lading, Way Bill, etc).
- ◆ Technical information (CANUTEC).
- ◆ Other (specialists, monitoring devices).

#### 6. PROTECTIVE EQUIPMENT

##### Ensure proper personal protective equipment is utilized, and know the level of equipment available

- ◆ Visibility stripes, safety glasses, goggles, life jackets, gloves etc.
- ◆ Check MSDS sheets for additional requirements

#### 7. CONTAINMENT AND CONTROL

##### Safe defensive containment

- ◆ If safe to do so, and if possible, stop the flow of material.
- ◆ Ensure that flow is contained before starting the recovery procedure. Containment and recovery may take place at the same time
- ◆ See list of emergency spill cleanup equipment
- ◆ Shovel spilled material into plastic lined steel drums.
- ◆ If ground frozen, in spring excavate surface area to ensure all spilled material is collected
- ◆ Notify and request assistance if required from external NWT Emergency Spill Response Line.
- ◆ Consider what resources /materials are available within close proximity; i.e.: crawler tractor, loaders, bobcats, vacuum /water trucks, fuel bladders / fiberglass tanks, lost circulation material, straw bales, etc.

#### 8. DECONTAMINATION AND CLEANUP

##### Collect, cleanup, and sample

- ◆ Decontaminate personnel as required if exposed to the spill
- ◆ Priority is to high environmentally sensitive areas (municipality water sources, waterfowl staging areas, domestic fishing areas).
- ◆ Store the spilled material in proper containers for disposal;
- ◆ Determine where the spilled material can be disposed off and ship material there.
- ◆ Develop remediation program for the area (if required)
- ◆ Undertake the remediation program:
- ◆ Monitor the progress of remediation as required.

#### 9. DISPOSAL

##### Dispose of wastes, contaminated clothing and equipment if unable to decontaminate.

- ◆ Consider waste impacts in all decisions
- ◆ Remove the contaminated material and haul to an approved disposal site.

10. DOCUMENTATION

**Document all actions and complete reports**

- ◆ Assign a recorder to log activities
- ◆ Complete and submit a follow-up spill report to the Northwest Territories Spill Report line.

## FUEL/SPILL EMERGENCY RESPONSE PLAN (WATER)

### COAST GUARD OIL POLLUTION EMERGENCY PLAN

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**LOCATION: CAMP FAREWELL**

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**DEVELOPED BY:** Charles Mac Leod, Blair Bennett, Randy Hetman **DATE:** 20 August, 2002

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Camp Farewell is located between a small lake and the Middle Channel of the MacKenzie River. Camp Farewell is 50 km downstream from Tununuk Point at Longitude 69°-12'-30" and Latitude 135°-06'-04". All fuel on site is stored in tanks within secondary containment. A major spill could occur during unloading fuel from barges. To minimize the severity of such an event, water spill control equipment will be at site during the unloading. The deployment of the barge booms will also be requested. A minor spill to water could develop if a land spill is not contained quickly enough.

There are no communities downstream of Camp Farewell.

#### TRANSPORTATION

Liquid fuels will be stored in closed systems during transportation. Access routes will be by barge through channels of the MacKenzie River. During the winter season, fuel will be delivered from Camp Farewell by fuel truck to project locations.

#### MAINTENANCE AND CONTROL

This contingency plan is project specific and will be reviewed:

- As changes to applicable environmental legislation come into effect
- During any on-site training exercises
- After each and every incident.

Changes to phone numbers and names of those individuals identified in this contingency plan will be made on an as required and when required basis. The numbers are to be verified when the camp is opened and/or on an annual basis.

#### ORGANIZATION

Shell Canada Limited utilizes the Incident Command System for all emergencies<sup>1</sup>. All incident responses are modeled after the Disciplined Approach.

#### DISCIPLINED APPROACH TO THE SPILL

##### 1. SAFETY

Ensure personal safety

- ♦ Ensure your own personnel safety from existing and potential hazards and your fellow worker safety.

##### 2. ISOLATE AND DENY ENTRY

Isolate the area and deny / restrict entry

- ♦ Establish / adjust control perimeters.

##### 3. NOTIFICATIONS

Notify the following immediately.

- ♦ Shell's onsite supervisor
- ♦ Barge Captain

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<sup>1</sup> ICS system description plus Roles & Responsibilities of all organizational positions are described in Shell's Emergency Response Manual - Model

Notify the following as soon as practical.

- ◆ Shell's DAR/Construction manager
- ◆ Northwest Territory Emergency Spill Response Line
- ◆ Canadian Coast Guard
- ◆ Indian Northern Affairs Canada
- ◆ NEB if spill exceeds .20 m<sup>3</sup> (200litres) and/or spill is not contained and could result in further safety property or environmental damage.

#### 4. COMMAND / MANAGEMENT

Order depends on specific factors

- ◆ The Onsite Supervisor will assume the role of Incident Commander.
- ◆ Assign Incident Command System roles, as resources become available.
- ◆ Develop the response plan.
- ◆ Ensure safety precautions and operating plans and conditions are reviewed with the crew.
- ◆ Ensure proper safe work permits are executed.

#### 5. IDENTIFICATION AND HAZARD ASSESSMENT

Identify the Hazards and Assess the Risks

- ◆ Confirm product and determine chemical makeup of substance.
- ◆ MSDS (Material Safety Data Sheets – Chemical).
- ◆ Placards and labels (colours, markings).
- ◆ Shipping papers (Bill of Lading, WayBill, etc).
- ◆ Technical information (CANUTEC).
- ◆ Other (specialists, monitoring devices).

#### 6. PROTECTIVE EQUIPMENT

Ensure proper personal protective equipment is utilized, and know the level of equipment available

- ◆ Fire retardant clothing, safety glasses, goggles, life jackets, gloves etc.
- ◆ Check MSDS sheets for additional requirements

#### 7. CONTAINMENT AND CONTROL

Safe defensive containment

- ◆ If safe to do so, and if possible, stop the flow of product.
- ◆ Deploy primary and secondary booms to contain or divert spill to recovery area. Ensure that the spill is contained before starting the recovery procedure.
- ◆ Deploy absorbent pads, socks as required. Recover oiled sorbents and place them in containers.
- ◆ Use the oil skimmer to recover spilled fuel if spill is too large to recover with sorbents.
- ◆ Store recovered small volumes of oil/water mixture in steel drums.
- ◆ Store recovered large volumes of oil/water mixture in empty fuel tank for disposal at a later time.
- ◆ Notify and request assistance, if required, from external NWT Emergency Response Line.
- ◆ Consider what resources/materials are available within close proximity, i.e. crawler tractor, loaders, bobcats, vacuum trucks, fuel bladders/fiberglass tanks, lost circulation material, straw bales etc.

8. DECONTAMINATION AND CLEANUP**Collect, cleanup, and sample**

- ◆ Decontaminate personnel as required if exposed to the spill
- ◆ Priority is to high environmentally sensitive areas (shore lines)
- ◆ Store the spilled material in proper containers for disposal
- ◆ Develop remediation program for the area (if required)
- ◆ Undertake the remediation program
- ◆ Monitor the progress of remediation as required.

9. DISPOSAL

Dispose of wastes, contaminated clothing and equipment if unable to decontaminate.

- ◆ Consider waste impacts in all decisions
- ◆ Consider onsite incineration, movement to approved disposal sites etc

10. DOCUMENTATION

Document all actions and complete reports

- ◆ Assign a recorder to log activities
- ◆ Complete and submit a follow-up spill report to the Northwest Territories Spill Report line.

SCENARIO

Fisheries and Oceans Canada - Coast Guard require an Oil Pollution Emergency Plan and Oil Pollution Incident Procedures. Equipment and Resources Scenario as required by regulation SOR/95-405.

## a) Nature and amount of oil

Shell will be unloading 2,000,000 liters of diesel fuel from barge. Aviation fuel is transported in drums. All equipment coming to site will be diesel powered so amount of gasoline on site is about 6 - 45-gallon drums. The most likely spill scenario is a hose leak. The volume used in this scenario for this type of spill is 2.0 m3.

## b) Type of ship being unloaded

Series 1000 barges from NTCL will deliver the diesel fuel. The maximum pump rate is 85 m3/hour. The boat has a shut-off valve located on it for emergency shutdown of the fuel. The fill line is 150mm.

## c) Tides and currents

There are no tides in this area. Current speed in this channel of the MacKenzie River is about 8 knots.

## d) Meteorological conditions

Anticipated that unloading will take place above or near freezing conditions with the possibility of there being breezes.

## e) Environmental Sensitivities

There are no communities near Camp Farewell. The camp is located within a bird sanctuary. Whenever possible, unloading of fuel will take place in fall when most waterfowl have already left.

There will be approximately 600 meters of fuel filling line. It will go from dock, across 200 meters of gradually rising ground to a hill. From there the line will go to the fuel tanks.

## f) Measures to minimize spill

The measures taken to minimize the possibility of a spill are as follows:

- Four on site, supervisory people have received the two-day *Arctic Oil Spill* course. They are Blair Bennett, Shane Millard, Kevin Dellaire and John Russell.
- The Shell site supervisor for the unloading will become the Incident Commander if there is a spill.
- Hoses, connections and valves will be inspected on the Shell fill line prior to use
- Drip pans will be installed under each connection
- There will be quick shutting shut-off valves at each end.
- During diesel fuel filling operations, the fill line will be patrolled. There will be men at each shut-off valve. All men will have radios. In case of line break, the valves will be shut off to minimize the spill.
- Coast Guard will be informed that an unloading is scheduled. At the time of that phone call, the site contact for the Coast guard will be given.

## g) Training Exercise

The two-day *Arctic Oil Spill* course included an equipment deployment exercise. There will be additional training in 2003. An exercise is also planned for 2003. Prior to unloading of barges, a meeting will be held to review the Oil Pollution Emergency Plan.

## h) Response Time Control and Containment

- Prior to start of unloading of diesel fuel, a boom will be, at the Captain's decision, set up around the unloading barge
- An oil spills containment and clean up boat will be on site. This boat is from Mutual Aid.
- Because of environmental regulations and the nature of the soil a berm cannot be installed along the shoreline.
- Prior to start of unloading of diesel fuel a line of 3 meter long booms will be constructed on shore ready for deployment as a primary containment. If required it will be immediately deployed.
- Prior to start of unloading of diesel fuel a line of 1.6 meter booms will be constructed on shore further downstream for deployment as a secondary containment. If required, it will be immediately deployed.
- Prior to start of unloading of diesel fuel, a meeting will be held of all participants to review the oil spill plan and their responsibilities and roles to both prevent a spill and contain and clean up a spill.
- Prior to start of unloading of diesel fuel Shell owned sorbents and skimmers will be set out and ready for use.
- Responsibility for the pre-transfer work will be Shell Site Supervisor.

## i) Response Time Clean up

Clean-up will start as soon as the spill is controlled and contained because a spill control and clean up boat will be on site. If additional resources are required they will be obtained from mutual aid, local businesses and/or the MacKenzie Delta Spill Response Corporation. This group has equipment, material and trained staff.

## j) Scenario Details

The oil spill control boat will come complete with sorbents, boom, vane boom deployer and skimmers.

Time	Description	Person responsible
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Pre Transfer	<ul style="list-style-type: none"> <li>• Barge booms deployed</li> <li>• Spill Equipment readied</li> <li>• Product, hazards &amp; controls identified</li> <li>• Prejob safety meeting held</li> </ul>	Barge Captain Incident Commander Incident Commander Incident Commander
Zero	<u>Spill occurs &amp; discovered</u> <ul style="list-style-type: none"> <li>• Shut down pumps on barge</li> <li>• Radio order to shut valves on hoses</li> </ul>	Barge Captain Incident commander
5 minutes	<ul style="list-style-type: none"> <li>• Closing of valves on line</li> </ul>	Source Control (Men located at each valve)
15 minutes	<ul style="list-style-type: none"> <li>• Primary boom will be deployed.</li> <li>• First Aid (if required)</li> </ul>	Spill Group Supervisor Medic
45 minutes	<ul style="list-style-type: none"> <li>• If necessary, secondary boom will be deployed</li> </ul>	Spill Group Supervisor
60 minutes	<ul style="list-style-type: none"> <li>• Oil spill boat will start cleaning up spill</li> <li>• Land group will start cleaning up spill</li> <li>• Notifications</li> </ul>	Spill Group Supervisor Spill Group Supervisor Incident Commander
Post Recovery	<ul style="list-style-type: none"> <li>• Follow-up notifications</li> <li>• Decon &amp; Cleanup</li> <li>• Disposal</li> <li>• Incident Debrief</li> <li>• Documentation</li> </ul>	Incident Commander

## k) Response Authorization

Response will be in accordance with Shell's Emergency Response plan for Camp Farewell. The on-site *Incident Commander* will be Blair Bennett (alternate Shane Millard) with backup as required from Calgary

## l) Restart of unloading

Unloading will not be restarted until the causes of the spill have been determined and remedies to prevent a similar incident are in place. The spill will either have been cleaned-up or there will be sufficient workers to clean up the spill and unload before unloading is restarted.

## m) Clean up equipment

- ♦ See list of emergency spill cleanup equipment in Fuel/Spill ERP (Land)
- ♦ Additional equipment for unloading diesel fuel is as follows:  
 Spill response boat with booms, vane boom deployer and skimmer  
 Booms and skimmers

**FUEL/SPILL EMERGENCY RESPONSE PLAN (LAND)**

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**LOCATION: CAMP FAREWELL**

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**DEVELOPED BY: CHARLES MAC LEOD**

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**DATE: 21 August, 2002**

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The campsite is located between a small lake and a channel of the MacKenzie River. All fuel on site is stored in tanks within secondary containment. This ERP also applies to non-fuel spills (motor oil, hydraulic oil, cooking oil etc.). A minor spill to water could develop if a land spill is not contained quickly enough.

**TRANSPORTATION**

Liquid fuels will be stored in a closed system during transportation. Diesel fuel will be delivered from Camp Farewell by fuel truck. Aviation fuel will be transported in drums. All equipment coming on site will be diesel powered so amount of gasoline on site is minimal.

**MAINTENANCE AND CONTROL**

This contingency plan is project specific and will be reviewed:

- As changes to applicable environmental legislation come into effect
- During any on-site training exercises
- After each and every incident.

Changes to phone numbers and names of those individuals identified in this contingency plan will be made on an as required and when required basis.

**1. SAFETY****Ensure personal safety**

- ♦ Ensure your own personnel safety from existing and potential hazards and fellow worker safety.

**2. ISOLATE AND DENY ENTRY****Isolate the area and deny / restrict entry**

- ♦ Utilize vehicles or barricades for temporary control.
- ♦ Establish / adjust control perimeters.

**3. NOTIFICATIONS****Immediately notify the following**

- ♦ Shell's onsite supervisor

**Notify the following as soon as practical**

- ♦ Shell's DAR/Construction manager
- ♦ Northwest Territory Emergency Spill Response Line
- ♦ Indian Northern Affairs Canada
- ♦ NEB if spill exceeds .20 m<sup>3</sup> (200 litres) and/or spill is not contained and could result in further safety property or environmental damage.

**4. COMMAND / MANAGEMENT****Order depends on specific factors**

- ◆ Assign Incident Command System roles as resources become available.
- ◆ Develop the response plan.
- ◆ Ensure safety precautions and operating plans and conditions are reviewed with the crew.
- ◆ Determine a need for roadblocks.
- ◆ Ensure proper permits are executed.

**5. IDENTIFICATION AND HAZARD ASSESSMENT****Identify the Hazards and Assess the Risks**

- ◆ Determine chemical makeup of substance (i.e.: WHMIS, TDG Placards, PIN No.s).
- ◆ MSDS (Material Safety Data Sheets – Chemical).
- ◆ Placards and labels (colours, markings).
- ◆ Shipping papers (Bill of Lading, Way Bill, etc).
- ◆ Technical information (CANUTEC).
- ◆ Other (specialists, monitoring devices).

**6. PROTECTIVE EQUIPMENT****Ensure proper personal protective equipment is utilized, and know the level of equipment available**

- ◆ Fire retardant clothing, safety glasses, goggles, life jackets, gloves etc.
- ◆ Check MSDS sheets for additional requirements

**7. CONTAINMENT AND CONTROL****Safe defensive containment**

- ◆ If safe to do so, and if possible, stop the flow of material.
- ◆ Ensure that flow is contained before starting the recovery procedure.
- ◆ Construct dikes, dams or drainage trenches to limit size of spill and prevent fuel from migrating. Contain as close to source as safe and practical to do
- ◆ In winter, areas are usually snow covered so spill areas are easily seen. Build dikes using plastic sheeting to line face of dike. Use mechanical and hand equipment to scrape up snow/liquid mixture and place it in containers.
- ◆ See list of emergency spill cleanup equipment for clean up materials
- ◆ Isolate (deny entry via keeping safe distance from spilled material).
- ◆ Divert, disperse, dilute cover
- ◆ Pump as much liquid product as possible into empty drums or tanks for disposal.
- ◆ Deploy absorbent pads, socks as required.
- ◆ Recover oiled sorbents and place them in steel drums for burning in on-site incinerator. Sorbents should be incinerated as soon as possible to avoid spontaneous combustion.
- ◆ Immediate burning may be required to prevent the spread of fuel into water courses.. If burning done, pick up the residue after-burn.
- ◆ Notify and request assistance, if required, from external NWT Emergency Response Line.
- ◆ Consider what resources/materials are available within close proximity. i.e. crawler tractor, loaders, bobcats, vacuum trucks, fuel bladders/fiberglass tanks, lost circulation material, straw bales etc.

**8. DECONTAMINATION AND CLEANUP****Collect, cleanup, and sample**

- ◆ Decontaminate personnel as required if exposed to the spill

- ◆ Priority is to high environmentally sensitive areas (municipality water sources, waterfowl staging areas, domestic fishing areas).
- ◆ Store the spilled material in proper containers for disposal;
- ◆ Develop remediation program for the area, if required
- ◆ Collect and analyze soil samples from the remaining spill area, if required
- ◆ Undertake the remediation program:
- ◆ Monitor the progress of remediation as required.

9. DISPOSAL

**Dispose of wastes, contaminated clothing and equipment if unable to decontaminate.**

- ◆ Consider waste impacts in all decisions
- ◆ Remove the contaminated material and haul to an approved disposal site.

10. DOCUMENTATION

**Document all actions and complete reports**

- ◆ Assign a recorder to log activities
- ◆ Complete and submit a follow-up spill report to the Northwest Territories Spill Report line.

## Emergency Spill Cleanup Equipment

4	pairs	Baffin Winter Boots (Sz 10 - 2, Sz 11 - 2)	Clothing
1	set	Chainsaw Chaps	Clothing
25	pairs	Disposable Coveralls	Clothing
5	pairs	Insulated Coveralls - XL	Clothing
20	pairs	Winter Monkey Grip Gloves	Clothing
6	sacks	Floor Dry	Consumable
9	sacks	Saw Dust	Consumable
9	bags	Sorbent - Loose	Consumable
20	bundles	Sorbent Pads	Consumable
11	boxes	Sorbent Socks	Consumable
2	each	24' x 48' Tarps	Containment
6	each	Aluminum Scoop Shovels	Containment
2	each	Brooms	Containment
12	each	Empty 45 Gallon Drums	Containment
2	each	Ice Scrapers	Containment
2	each	Long Handle Square Mouth Shovels	Containment
2	each	Pitch Forks	Containment
2	each	Rakes	Containment
2	each	Snow Shovels	Containment
4	each	1" x 15' Tiedown Straps	Miscellaneous
2	each	2" x 15' Tiedown Straps	Miscellaneous
2	each	5 Ft Pry Bars	Miscellaneous
3	each	Bungy Cords	Miscellaneous
2	each	Clipboards	Miscellaneous
1	each	Disposable Camera	Miscellaneous
2	each	Funnels	Miscellaneous
2	each	Greenlee Tool Box	Miscellaneous
2	each	Padlocks	Miscellaneous
2	each	Pencils	Miscellaneous
2	each	100 Ft Extension Cords - 15amp	Power
5	litres	2 Cycle Oil	Power
1	each	2 Gallon Jerry Can Oil/Gas Mix	Power
1	each	5 Gallon Jerry Can Diesel Fuel	Power
2	each	5 Gallon Jerry Can Gasoline	Power
2	each	50 Ft Extension Cords - 15amp	Power
2	each	50 Ft Extension Cords - 30amp	Power
1	each	Chain Saw - Makita DCS400	Power
12	litres	Engine Oil - Synthetic	Power
1	each	Generator - Kodiak - SGB5500HX	Power
6	each	Halogen Bulbs - Spare for Work Lights	Power

# WC&GO GENERAL EMERGENCY RESPONSE PLAN

August 2002

2	each	Halogen Lights with Stands	Power
4	each	Halogen Work Lights	Power
1	each	Herman Nelson	Power
12	each	6 Volt Batteries	Safety
6	each	Blankets	Safety
2	each	Fire Axes	Safety
2	each	Fire Extinguishers - 20lb ABC	Safety
1	each	First Aid Kit - 10 Man #3	Safety
8	each	Flashlights	Safety
10	each	Highway Cones	Safety
5	each	Highway Vests	Safety
5	each	Roadside Flares	Safety
1	each	Tool Box	Tools
1	each	50' Tape Measure	Tools
1	set	Allen Key Set	Tools
1	each	Chainsaw File	Tools
1	each	Crescent Wrench - 10"	Tools
1	each	Crescent Wrench - 12"	Tools
1	roll	Duct Tape	Tools
1	roll	Electrical Tape	Tools
1	each	Flat File	Tools
1	each	Hacksaw	Tools
4	each	Hacksaw Blades	Tools
1	each	Hammer - Ball Peen 24 oz	Tools
1	each	Hammer - Claw 20 oz	Tools
1	roll	Mechanics Wire	Tools
1	each	Pipe Wrench - 18"	Tools
1	each	Pipe Wrench - 24"	Tools
1	each	Pipe Wrench - 36"	Tools
1	each	Pliers - Needle Nose	Tools
1	each	Pliers - Regular	Tools
1	each	Screwdriver - Large Flat Blade	Tools
1	each	Screwdriver - Multi Tip	Tools
1	set	Socket Set - 20 piece	Tools
1	each	Tin Snips - 3 piece	Tools
1	each	Utility Knife	Tools

## Special Equipment for Barge unloading

During fuel unloading from a barge, a completely equipped oil spill control boat will be on site. It will have sorbents, booms, vane boom deployer and skimmers.

## Fire Procedure

Muster area: BIG SHOP Southwest side of yard

All personnel

- Sound the fire alarm
- Assess the fire: if it is small enough, extinguish with fire extinguisher
- Shut door(s) and window(s) in the room you are evacuating
- If smoke builds up, stay low to the ground
- Remain calm, do not run
- Notify the incident commander immediately
- Remove your vehicle to the perimeter of the campsite
- Evacuate to and remain at the muster area until instructed to do otherwise by incident commander

Medic

- Evacuate to the muster area
- Take a radio for communication
- Treat any burns or related injuries
- If required, transport patients to hospital via ECV or helicopter, depending on nature of injury

Incident Commander

- Take a radio and satellite phone for communication. Ensure that fire alarm has been sounded throughout the camp
- Quickly go to the fire scene to assume command
- Meet with the emergency Support Team to assess action already taken and further action required

Emergency response team

Shall consist of

- Blair Bennett or Shane Millard
- Kevin Dellaire or John Russell
- Ensure that each member has a radio for communication
- As first line of defense, shut the breakers to the trailer(s) off.
- Check each room to ensure that all camp personnel have vacated the trailers.
- Report to the incident commander for a head count and debriefing.
- Protect yourself and fellow workers
- If it is safe to do so, extinguish the fire. Only use the water supply (i.e. water truck, fire hose etc.) when informed that the generator is shut off.
- Take a head count of camp personnel.
- If required and safe to do so, locate missing personnel.

National Energy  
Board



Office national  
de l'énergie

## NOTICE TO OPERATORS

NEB: 9720-A000-7-2  
6 February 2002

Ms. Shelley H.E. Brown  
Administrative Assistant  
Foothills E&P Business  
Shell Canada Lt.  
400, 4th - Ave. SW  
P.O. Box 100, Station M  
Calgary, AB  
T2P 2H5

Dear Ms. Brown:

### **Revised Spill Reporting Procedures for NEB-Authorized Works or Activities in the Northwest Territories and Nunavut under the *Canada Oil and Gas Operations Act***

The attached Notice to Operators refines spill reporting requirements for National Energy Board (NEB) authorized activities under the *Canada Oil and Gas Operations Act* (COGOA) in the Northwest Territories and Nunavut.

Following NEB's review of the 2001 N.W.T. Spill Reports, we noted a number of reporting irregularities and omissions. Consequently, the NEB reminds all oil and gas operators of the following requirements. Please note in particular items 3 and 7 in the attached. Item 3 represents a change in reporting to the NEB and item 7 is intended to correct a common reporting problem.

Please ensure that these reporting requirements are distributed to the appropriate field personnel and any contractors responsible for reporting spills. The remainder of the NWT Spill Report Form should be filled out as appropriate. If you have any questions regarding these revised requirements, please contact Mr. John Korec, Environmental Assessment Officer at (403) 292-6614. Thank you.

Yours truly,

T. M. Baker  
Chief Conservation Officer

444 Seventh Avenue SW  
Calgary, Alberta T2P 0X8

444, Septième Avenue S.-O.  
Calgary (Alberta) T2P 0X8

Canada

Telephone/Téléphone : (403) 292-4800  
Facsimile/Télécopieur : (403) 292-5503  
<http://www.neb.gc.ca>

## NOTICE TO OPERATORS

06 February 2002

### Revised Spill Reporting Procedures for NEB-Authorized Works or Activities in the Northwest Territories and Nunavut under the *Canada Oil and Gas Operations Act*

The NEB is a signatory<sup>1</sup> to the *Northwest Territories / Nunavut Spills Working Agreement (July 1999)* and is the Lead Agency for oil and gas exploration and production related spills<sup>2</sup>. The following revised requirements apply to spills in the Northwest Territories and Nunavut.

#### General

1. The Operator, i.e., the company authorized under the COGOA to carry out the exploration or production work or activity, must ensure that the spills are promptly reported, controlled and cleaned up as per the Operator's approved Spill Contingency Plan. This includes any spills by contractors employed by the Operator.
2. Report all spills, regardless of volume, to the 24-Hour Report Line (867-920-8130; fax 867-873-6924). The Spill Line administrator will assign the Lead Agency and notify the NEB and other agencies.
3. **The Operator is not required to provide a separate spill notification to the NEB unless:**
  - (a) the spill is not yet contained and could result in further safety, property or environmental damage; and/or
  - (b) the spill exceeds 0.20 m<sup>3</sup> (200 litres) or slightly more than a standard-sized barrel.The NEB contact list is attached.

#### N.W.T. Spill Report Form

4. **Boxes A & B.** Report all spills as soon as possible after appropriate, safe action has been taken as per the Operator's approved Spill Contingency Plan to contain and control the spill and any damage.
5. **Box C.** Provide an updated report once the Operator is satisfied that the spill cleanup is complete.
6. **Box D.** In addition to the specified requirements, indicate whether the spill occurred into or on
  - a water body (e.g., stream or lake),
  - Crown Land, or
  - First Nation owned landThe Spill Line administrator requires this information to determine the appropriate Lead Agency. For instance, the Inuvialuit land Administration would be assigned as the Lead Agency for spills on Inuvialuit Settlement Land, also known as 7(1)(a) and 7(1)(b) land.

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<sup>1</sup> Other signatories to the Spills Working Agreement include Canadian Coast Guard (CCG), Environmental Protection Branch of Environment Canada (EPB), Government of the Northwest Territories (GNWT), Government of Nunavut (GN), Indian and Northern Affairs Canada (INAC), and Inuvialuit Land Administration (ILA)

<sup>2</sup> The Lead Agency designation is assigned by the Spills Working Agreement administrator according to the "Spill Line Contractor Procedures (April 2000)". For exploration and production oil and gas spills, the Lead Agency is typically the NEB. Lead Agency for spills on Inuvialuit-owned Land is the ILA.

## NOTICE TO OPERATORS

06 February 2002

### Revised Spill Reporting Procedures for NEB-Authorized Works or Activities in the Northwest Territories and Nunavut under the *Canada Oil and Gas Operations Act*

7. **Box E.** The Operator must be identified in this box even if the spill is a result of the actions of a contractor employed by the Operator. For instance, if a geophysical contractor or a trucking company is identified as the "party responsible for the spill", then add the Operator's name and the specific program that was authorized by the NEB (see the attached example).
8. **Box Q.** Indicate what corrective actions have been taken and how contaminated material (soil, snow, sorbent pads, etc.) will be disposed. Corrective actions should include any design or procedural changes that will be made to prevent the spillage from occurring again. Also indicate when final cleanup is anticipated and whether an inspector, including the agency<sup>1</sup> name, (NEB, INAC, GNWT, ILA, CCG, or EPB) has been at the site.

(Oil, Gas, Hazardous Chemicals or other Materials)

**24-Hour Report Line**  
Phone (867) 920-8130  
Fax (867) 873-6924

<b>A</b> Report date and time Report ASAP after appropriate, safe action has been taken		<b>B</b> Date and time of spill (if known)		<b>C</b> Original Report Update when cleanup is completed Update Report		Spill number	
<b>D</b> Location and map coordinates (if known) and direction (if moving) Indicate if spill is into or on: a water body; Crown Land; or First Nation private land (e.g., Inuvialuit Settlement land)							
<b>E</b> Party responsible for spill e.g., geophysical contractor for Operator (name) for NEB-authorized program (name)							
<b>F</b> Product(s) spilled and estimated quantities (provide metric volumes/weights if possible)							
<b>G</b> Cause of spill							
<b>H</b> Is Spill terminated? yes    no		<b>I</b> If spill is continuing, give estimated rate		<b>J</b> Is further spillage possible? yes    no		<b>K</b> Extent of contaminated area (m2)	
<b>L</b> Factors affecting spill recovery (weathering conditions, terrain, snow cover, etc.)					<b>M</b> Containment (natural depression, dykes, etc.)		
<b>N</b> Action, if any, taken or proposed to contain, recover, clean up or dispose of product(s) and contaminated materials							
<b>O</b> Do you require assistance? no    yes, describe:				<b>P</b> Possible hazards to persons, property, or environment			
<b>Q</b> Comments and/or recommendations • Corrective actions taken; • Disposal of contaminated materials (e.g., soil, snow, sorbent pads, etc.); • Anticipated final cleanup date; • Inspector/agency on site						<b>FOR SPILL LINE USE ONLY</b>	
						Lead Agency	
						Spill significance	
						Lead Agency contact and time	
Reported by		Position, Employer, Location		Is this file now closed?		Telephone	
Reported to		Position, Employer, Location				Telephone	

NOTICE TO OPERATORS

06 February 2002

Revised Spill Reporting Procedures for NEB-Authorized Works or Activities in the  
Northwest Territories and Nunavut under the *Canada Oil and Gas Operations Act*

N.W.T. Spill Line Contractor Procedures

APPENDIX 2-E

Lead Agency Contact Procedures in the Event of a Spill

NATIONAL ENERGY BOARD (NEB)

1. DURING THE DAY (normal working hours) 0800 hr – 1630 hr  
AND AFTER HOURS AND WEEKENDS

Contacts listed in order of priority (Area Code: 403)

<u>Person</u>	<u>Work #</u>	<u>Home #</u>
John Korec	292-6614	275-6256
Laura Van Ham	299-2769	208-0267
Andy Graw	299-2790	547-3073
Terry Baker	299-2792	239-5032

2. FACSIMILE (403) 292-5875 (24 HOURS A DAY)

06 February 2002

NORTHWEST  
TERRITORIES  
WATER BOARD



WATER REGISTER: N7L1-1762

November 28, 2001

Mr. Randy Hetman  
DAR/Construction Manager  
Shell Canada Ltd.  
P.O. Box 100, Stn. M  
400 - 4 Avenue S.W.  
CALGARY, AB T2P 0J4

Dear Mr. Hetman:

AMENDMENT OF A "B" TYPE LICENCE

The Northwest Territories Water Board has reviewed your application for amendment to the discharge limits of your current Water Licence.

The Board hereby approves this request. Please find attached an amendment which reflects changes to the discharge limits. The other duplicate of this amendment has been filed with the Water Resources Division of the Department of Indian Affairs and Northern Development.

If you require further assistance, please contact this office. For technical enquiries, contact Ms Shannon Pagotto at (867) 669-2658 or Mr. David Milburn at (867) 669-2650 of Water Resources Division.

Sincerely,

Gordon Wray  
Chairman  
N.W.T. Water Board

Attach.

# NORTHWEST TERRITORIES WATER BOARD

## LICENCE AMENDMENT

---

LICENSEE: Shell Canada Ltd.

LICENCE NUMBER: N7L1-1762

EFFECTIVE DATE: November 28, 2001

---

Pursuant to the *Northwest Territories Waters Act* the Northwest Territories Water Board hereby grants the following Licence Amendment.

1. PART A, Item 2 is hereby enhanced with:

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

**"Freeboard"** means the vertical distance between water line and crest on a dam or dyke's upstream slope;

**"Geotechnical Engineer"** means a professional engineer registered with the Association of Professional Engineers, Geologists, and Geophysicists of the Northwest Territories and whose experience is the design and construction of earthworks in a permafrost environment;

**"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 capacity to transmit water through a medium;

**"Project Description"** refers to the report titled "Project Description for the Proposed Petro-Canada Mackenzie Delta Kugpik and Kurk Seismic Program", and dated September, 2000 prepared by Inuvialuit Environmental Inc.;

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

**"Sewage Treatment Facilities"** comprises the area and engineered structures designed to contain sewage as identified in Appendix B of the Project Description, titled **"Camp Farewell and Sewage System Drawings"**, and also includes a Sump constructed of impervious material and or with an impervious liner;

**"Sump"** means an excavation for the purpose of catching or storing water and/or waste;

**"Water Supply Facilities"** comprises the area and engineered structures designed to withdraw and treat Water for potable use, as described in Section 4.3.3 of the Project Description;

PART B, Item 1 is hereby enhanced with:

- g) details on the restoration of any Sumps; and
- h) any revisions to the approved Contingency Plan.

PART B, Item 1 (d) is hereby rescinded and replaced with:

- d) a summary of any Modifications carried out on the Water Supply and Sewage Treatment Facilities, including all associated structures;

PART D, Item 7 and 8 are hereby added:

7. A freeboard limit of 1.0 metre in the Sewage Treatment Facilities shall be maintained at all times or as recommended by a Geotechnical Engineer and as approved by the Board.
8. 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.

PART D, Item 4 is hereby rescinded and replaced with:

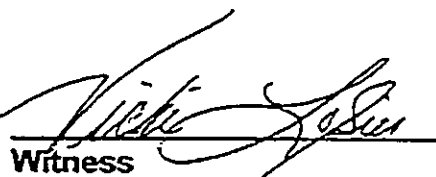
4. All Sewage effluent discharged by the Licensee from the Sewage Treatment Facilities at "Surveillance Network Program" Station Number 1762-1 shall meet the following effluent quality requirements:

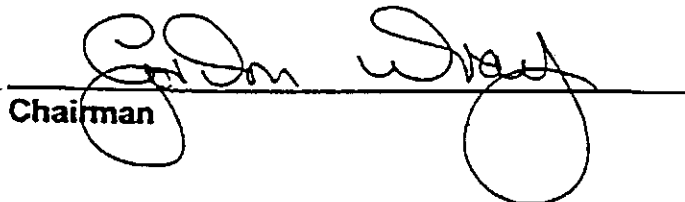
<u>Sample Parameter</u>	<u>Maximum Average Concentration</u>
BOD <sub>5</sub>	70.0 mg/L
Total Suspended Solids	70.0 mg/L
Faecal Coliforms	10E4 CFU/dL
Oil and Grease	5.0 mg/L

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

This Licence Amendment issued and recorded at Yellowknife, Northwest Territories on November 28, 2001.

**NORTHWEST TERRITORIES WATER BOARD**

  
Witness

  
Chairman

NORTHWEST  
TERRITORIES  
WATER BOARD



ALBERTA  
WATER BOARD

Rec'd 12/11/2  
A

WATER REGISTER: N7L1-1762

November 30, 2000

Mr. Randy H. Hetman  
Construction Manager  
SHELL CANADA  
400-4th Ave. S.W.  
PO Box 100, Station M  
CALGARY, ALBERTA T2P 2H5

Dear Mr. Hetman

ISSUANCE OF A "B" TYPE LICENCE

Attached is a duplicate of Licence No. N7L1-1762 granted to SHELL CANADA. by the Northwest Territories Water Board in accordance with the *Northwest Territories Waters Act*. The other original of this Licence has been filed with the Department of Indian Affairs and Northern Development in Yellowknife, Northwest Territories.

Also attached are general procedures for the administration of licences in the Northwest Territories. I request that you review these and address any questions to the Board's office.

In conclusion, please be advised that this letter with attached procedures, all inspection reports, and correspondence related thereto are part of the public Water Register, and are intended to keep all interested parties informed of the manner in which the Licence requirements are being met. All Water Register material will be considered when the Licence comes up for renewal or amendment.

The full cooperation of SHELL CANADA is anticipated.

Sincerely,

Gordon Wray  
Chairman  
N.W.T. Water Board

Attachments (2)

**GENERAL PROCEDURES FOR THE ADMINISTRATION OF LICENCES  
ISSUED UNDER THE NORTHWEST TERRITORIES WATERS ACT  
IN THE NORTHWEST TERRITORIES**

1. At the time of issuance, a copy of the Licence is placed on the Water Register in the Office of the Northwest Territories Water Board in Yellowknife, and is then available to the public.
2. To enforce the terms and conditions of the Licence, the Minister of Indian Affairs and Northern Development has appointed Inspectors in accordance with Section 35(1) of the *Northwest Territories Waters Act*. The Inspectors coordinate their activities with officials of the Water Resources Division of the Department of Indian Affairs and Northern Development. The Inspector responsible for Licence No. N7L1-1762 is located in the North Mackenzie- Inuvik District.
3. To keep the Water Board and members of the public informed of the Licensee's conformity to Licence conditions, the Inspectors prepare reports which detail observations on how each item in the Licence has been met. These reports are forwarded to the Licensee with a covering letter indicating what action, if any, should be taken. The inspection reports and covering letters are placed on the public Water Register, as are any responses received from the Licensee pertaining to the inspection reports. It is therefore of prime importance that you react in all areas of concern regarding all inspection reports so that these concerns may be clarified.
4. If the renewal of Licence No. N7L1-1762 is contemplated it is the responsibility of the Licensee to apply to the Water Board for renewal of the Licence. The past performance of the Licensee, new documentation and information, and points raised during a public hearing, if required, will be used to determine the terms and conditions of any Licence renewal. Please note that if the Licence expires and another has not been issued, then water and waste disposal must cease, or you, the Licensee, would be in contravention of the *Northwest Territories Waters Act*. It is suggested that an application for renewal of Licence No. N7L1-1762 be made at least eight months in advance of the Licence expiry date.
5. If, for some reason, Licence No. N7L1-1762 requires amendment, then a public hearing may be required. You are reminded that applications for amendments should be submitted as soon as possible to provide the Water Board with ample time to go through the amendment process. The process may take up to six (6) months or more depending on the scope of the amendment requested.

The Surveillance Network Program annexed to the Licence can be modified at the discretion of the Board and does not require a public hearing. A request for any proposed change to the Surveillance Network Program should be forwarded to the Board in writing, including a rationale for the change.

# NORTHWEST TERRITORIES WATER BOARD

Pursuant to the Northwest Territories Waters Act and Regulations the Northwest Territories Water Board, hereinafter referred to as the Board, hereby grants to:

SHELL CANADA

(Licensee)

400-4th Avenue S.W.

PO BOX 100, STATION M

of \_\_\_\_\_ Calgary, Alberta T2P 2H5

(Mailing Address)

hereinafter called the Licensee, the right to alter, divert or otherwise use water subject to the restrictions and conditions contained in the Northwest Territories Waters Act and Regulations made thereunder and subject to and in accordance with the conditions specified in this Licence.

Licence Number

N7L1-1762

### Licence Type

"B"

### Water Management Area

NORTHWEST TERRITORIES 07

### Location

LATITUDE 69°12'30" N. AND

LONGITUDE 135°06'04" W.

NORTHWEST TERRITORIES

## Purpose

## WATER USE AND WASTE DISPOSAL FOR MUNICIPAL UNDERTAKINGS

Quantity of Water Not  
To Be Exceeded

150 CUBIC METRES DAILY

Effective Date of Licence

DECEMBER 1, 2000

Expiry Date of Licence

NOVEMBER 30, 2005

This Licence issued and recorded at Yellowknife includes and is subject to the annexed conditions.

NORTHWEST TERRITORIES WATER BOARD

**Witness**

**Chairman**

6. Specific clauses of your Licence make reference to the Board, Analyst or Inspector. The contact person, address, phone and fax number of each is:

BOARD: Executive Assistant  
Northwest Territories Water Board  
P.O. Box 1500  
YELLOWKNIFE, NT X1A 2R3

Phone No: (867) 669-2772

Fax No: (867) 669-2719

ANALYST: Analyst  
Water Laboratory  
Northern Affairs Program  
Department of Indian Affairs  
and Northern Development  
Box 1500  
4601 - 52nd Avenue  
YELLOWKNIFE, NT X1A 2R3

Phone No: (867) 669-2780

Fax No: (867) 669-2718

INSPECTOR: Inspector  
Inuvik District Office  
Northern Affairs Program  
Department of Indian Affairs  
and Northern Development  
P.O. Box 2100  
INUVIK, NT X0E 0T0

Phone No: (867) 777-3361

Fax No: (867) 777-2090

**PART A: SCOPE AND DEFINITIONS**

**1. Scope**

- a) This Licence entitles Shell Canada to use water and dispose of waste for municipal undertakings in oil and gas exploration and associated uses at Camp Farewell in the MacKenzie River Delta, located at Latitude 69°12'30" N. and Longitude 135°06'04" W., Northwest Territories;
- b) 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
- c) 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: N7L1-1762

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

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

**"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;

**"Maximum Average Concentration"** means the moving average of any four (4) consecutive analytical results submitted to the Board in accordance with the sampling and analysis requirements specified in the "Surveillance Network Program";

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

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

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

**"Waters"** mean 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 not later than March 31 of the year following the calendar year reported which shall contain the following:
  - a) the total quantities in cubic metres of fresh water obtained from all sources;
  - b) the total quantities in cubic metres of each and all waste discharged;
  - c) the results of sampling carried out under the Surveillance Network Program;
  - d) a summary of any modifications carried out on the Water Supply and Waste Disposal Facilities, including all associated structures;
  - e) a list of any spills and unauthorised discharges; and
  - f) any other details on water use or waste disposal requested by the Board within forty-five (45) days before the annual report is due.

2. 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.
3. The "Surveillance Network Program" and compliance dates specified in the Licence may be modified at the discretion of the Board.
4. 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.
5. The Licensee shall, within thirty (30) days of the issuance of this Licence, post the necessary signs, to identify the stations of the "Surveillance Network Program". All postings shall be located and maintained to the satisfaction of an Inspector.
6. Prior to the use of water for municipal 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 Two Hundred Fifty Thousand dollars (\$250,000.00) in a form suitable to the Minister.
7. 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 the Mackenzie River or the unnamed lake 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 150 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.

**PART D: CONDITIONS APPLYING TO WASTE DISPOSAL**

1. The Licensee shall within one (1) year of the issuance of this Licence, submit to the Board for approval an Operation and Management Plan for the Sewage and Solid Waste Treatment Facilities. This plan shall include but not necessarily be limited to details on the design, operational capacity, management and maintenance, and disposal of sludges.
2. The Licensee shall direct all piped and pumpout sewage to the Sewage Treatment Facilities or as otherwise approved by the Board.
3. The Licensee shall provide at least five (5) days notice to an Inspector prior to commencement of any discharges to the Mackenzie River.
4. All Sewage effluent discharged by the Licensee from the Sewage Treatment Facilities at "Surveillance Network Program" Station Number 1762-1 shall meet the following effluent quality requirements:

<u>Sample Parameter</u>	<u>Maximum Average Concentration</u>
BOD <sub>5</sub>	30.0 mg/L
Total Suspended Solids	35.0 mg/L
Faecal Coliforms	250 CFU/dL
Oil and Grease	5.0 mg/L

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

5. The Licensee shall maintain the Sewage Treatment Facilities to the satisfaction of and Inspector.
6. The Licensee shall dispose of all solid wastes in a manner acceptable to the Inspector.

**PART E:     CONDITIONS APPLYING TO MODIFICATIONS**

1.    The Licensee may, without written approval from the Board, carry out modifications to the Water Intake and Waste Treatment Facilities provided that such modifications are consistent with the terms of this Licence and the following requirements are met:
  - a)    the Licensee has notified the Board in writing of such proposed modifications at least forty-five (45) days prior to beginning the modifications;
  - b)    such modifications do not place the Licensee in contravention of either the Licence or the Act;
  - c)    the Board has not, during the forty-five (45) days following notification of the proposed modifications, informed the Licensee that review of the proposal will require more than forty-five (45) days; and
  - d)    the Board 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 the Board.
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 CONTINGENCY PLANNING**

1.    The Licensee shall submit to the Board for approval within thirty (30) days of issuance of this Licence, a Contingency Plan in accordance with the Board's "Guidelines for Contingency Planning, January 1987," or subsequent edition.
2.    If, during the period of this Licence, an unauthorised discharge of waste occurs, or if such a discharge is foreseeable, the Licensee shall:
  - a)    employ the appropriate contingency plan;

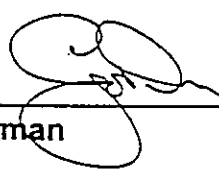
- b) report the incident immediately via the 24 Hour Spill Report Line. The current telephone number is (867) 920-8130; and
- c) submit to an Inspector a detailed report on each occurrence not later than thirty (30) days after initially reporting the event.

**PART G: CONDITIONS APPLYING TO ABANDONMENT AND RESTORATION**

- 1. The Licensee shall submit to the Board for approval within one year of issuance of this Licence, an Interim Abandonment and Restoration Plan in accordance with the Board's "Guidelines for Mines in the Northwest Territories," September 1980, or subsequent edition.
- 2. The Licensee shall implement the Plan specified in Part G, Item 1 as and when approved by the Board.
- 3. The Licensee shall review the Abandonment and Restoration Plan every two years and shall modify the Plan as necessary to reflect changes in operations, technology. All proposed modifications to the Plan(s) shall be submitted to the Board for approval.

**NORTHWEST TERRITORIES WATER BOARD**

\_\_\_\_\_  
Witness

  
\_\_\_\_\_  
Chairman

# NORTHWEST TERRITORIES WATER BOARD

LICENSEE: SHELL CANADA  
LICENCE NUMBER: N7L1-1762  
EFFECTIVE DATE OF LICENCE: DECEMBER 1, 2000  
EFFECTIVE DATE OF  
SURVEILLANCE NETWORK PROGRAM: DECEMBER 1, 2000

## SURVEILLANCE NETWORK PROGRAM

### A. Location of Sampling Stations

<u>Station Number</u>	<u>Description</u>
1762-1	Treated Effluent Discharge Prior to Entering the Mackenzie River

### B. Sampling and Analysis Requirements

1. Water at Station Number 1762-1, shall be sampled every two weeks, and analysed for the following parameters:

BOD <sub>5</sub>	Total Suspended Solids
Oil and Grease	Faecal Cloiforms
Ammonia	

2. More frequent sample collection maybe required at the request of an Inspector.
3. All sampling, sample preservation, and 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 approved by an Analyst.
4. All analysis shall be performed in a laboratory approved by an Analyst.
5. The Licensee shall, by January 31, 2001, submit to an Analyst for approval a Quality Assurance/Quality Control Plan.
6. The plan referred to in Part B, Item 5 shall be implemented as approved by an Analyst.

**C. Reports**

1. The Licensee shall, within thirty (30) days following the month being reported, submit to the Board all data and information required by the "Surveillance Network Program" including the results of the approved Quality Assurance Plan.

**NORTHWEST TERRITORIES WATER BOARD**

\_\_\_\_\_  
Witness

  
\_\_\_\_\_  
Chairman

Shell Canada Limited



400 - 4th Avenue, S.W.  
P.O. Box 100, Station M  
Calgary, Alberta T2P 2H5  
TEL (403) 691-3111

November 27, 2001

Executive Assistant  
Northwest Territories Water Board  
P.O. Box 1500  
YELLOWKNIFE, NT  
X1A 2R3

**Subject: Shell Farewell Water License N7L1-1762**

In accordance with the subject License, please find attached the following documents:

1. Abandonment and Reclamation Plan titled "Reclamation Plan – Shell Farewell Water System" – Komex International Ltd
2. Operation and Management Plan for the Sewage and Solid Waste Treatment Facilities
3. Notification and description of proposed modification to the treatment system.

Should additional information be required, please contact the undersigned at (403) 691-2521 or [randy.hetman@shell.ca](mailto:randy.hetman@shell.ca).

Yours truly,

A handwritten signature in black ink, appearing to read "Randy H. Hetman", with a long horizontal flourish extending to the right.

R. (Randy) H. Hetman  
DAR/Construction Manager

cc- Inspector – Inuvik District Office, DIAND (w/attachments)

Attachments

Our File: 5076-01  
Via Fax

November 14, 2001

Northwest Territories Water Board  
P.O. Box 1500  
2<sup>nd</sup> Floor Goga Cho Building  
Yellowknife, NWT  
X1A 2R3

Attention: Mr. Gordon Wray  
Chairman, Northwest Territories Water Board

Dear Mr. Wray:

**Re: DFO and Environment Canada letters of advice for the Shell Canada Ltd. Camp Farewell Type B Water License Amendment Application**

Inuvialuit Environmental & Geotechnical Inc. (IEG), on behalf of Shell would like to take this opportunity to respond to the letters of advice written by DFO and Environment Canada with regards to the above captioned application for a water license amendment. Both of these agencies have noted that other operators have modified their treatment systems to meet existing effluent limits or have opted to transport their wastewater to a different treatment facility. It has been suggested that Shell explore these options as well.

Shell does intend to modify the wastewater treatment system at Camp Farewell. However, prior to doing so, Shell is interested in ensuring that appropriate consideration is given to the determination of the effectiveness of these modifications at similar facilities in the Delta.

Regarding the other suggested alternative, transporting wastewater to a different facility is not seen as a practical long-term solution for a semi-permanent facility such as Camp Farewell. A number of operators, including Shell (i.e., seismic sleigh camp), have opted to truck their wastewater to either Inuvik or Tuktoyaktuk for disposal. The additional draw on the resources in those centers could be significant and Shell would prefer to explore another solution that can be implemented on site.

DFO and Environment Canada have also proposed that Shell consider other disposal methods such as the Snowfluent™ process. Shell did consider this option for their sleigh camp. Discussions with the INAC Water Resources inspector in Inuvik did not achieve agreement that this system would satisfy their requirements. It has been acknowledged that this system has not been field tested in the Mackenzie Delta.

Shell is seeking this amendment to provide them with operational flexibility over the upcoming season. They are very interested in the long term reduction to their discharge values and will endeavor to do so through the evaluation of alternative technologies that are proven to be effective.. Shell proceeded with their water license amendment application based on flow values. Stephen Harbicht and Dale Ross of the Water Survey Division have acknowledged that the flow rate data and calculations are accurate and capable of meeting the 100-1000:1 effluent dilution. This being the case, Shell's proposed amendment will allow them to be in compliance with the *Guidelines for the Discharge of Treated Municipal Wastewater in the Northwest Territories* Shell is not seeking a relaxation of the existing guidelines but would like to operate within existing guidelines while continuing to make effective improvements to their treatment systems.

If you have any questions or comments, please do not hesitate to contact me at the above noted address or by phone at (403) 291-0777, by e-mail at [erin.bradley@ieg.ca](mailto:erin.bradley@ieg.ca) or via fax at (403) 291-1150.

Thank you.

Sincerely,

INUVIALUIT ENVIRONMENTAL & GEOTECHNICAL INC.

Erin Bradley  
Project Manager

cc. Greg Cook, Water Resources Division, INAC  
Meighan Wilson, Water Resources Division, INAC  
Randy Hetman, Shell Canada Ltd.



# Inuvialuit Environmental & Geotechnical Inc.

IEG Calgary Office  
1338R - 36th Ave. NE Calgary, AB T2E 6T6  
Tel: (403) 291-0777 • Fax: (403) 291-1150  
www.ieg.ca

August 31, 2001

Indian and Northern Affairs Canada  
Water Resources Division  
3<sup>rd</sup> Floor - Bellanca Building  
P.O. Box 1500  
Yellowknife, NT  
X1A 2R3

Attention: Meighan Wilson

Re: Request for Water Licence N7L1-1762 Amendment for Shell Canada - Camp Farewell

Dear Meighan,

Inuvialuit Environmental and Geotechnical, on behalf of Shell Canada, has researched the flow of the Mackenzie River - Middle Channel near Camp Farewell to better understand the dilution of the current release of effluent from the camp.

While we were unable to find any direct flow information for the Mackenzie River in the immediate vicinity of Camp Farewell, we utilized a model of the Mackenzie River system, which has been developed by Environment Canada, to estimate flow values for this reach of the river. Our contact at Environment Canada was Mr. Vir Khanna, an engineer based in Calgary.

Mr. Khanna has been developing the 1D Hydrometric model of the Mackenzie River over the past several years. This model allows the flows of a number of the channels of the Mackenzie River to be calculated using water level information. Upon speaking with Mr. Khanna we were able to secure modeled daily flow values for 1995 to 1999 for the Middle Channel at a water monitoring station 21 km upriver from Camp Farewell. The station is located below Langley Island at 69° 5' 7" N, 135° 7' 20" W; where Arvoknar Channel joins the Middle Channel.

We calculated a variety of flow averages based on the modeled information. The daily average over the five years was 4170 m<sup>3</sup>/s, the summer average was 7228 m<sup>3</sup>/s and the winter average was 1346 m<sup>3</sup>/s. Average monthly flows were also calculated for each month in the five year data set. The lowest average flow for a single month was 611 m<sup>3</sup>/s, which occurred during the winter season. Environment Canada validated the modeled information for the river in this area around Tununuk Point, using actual measured flow values. They determined that the model was fairly accurate for spring and summer flow values (+3% and -4% respectively), underestimated flow in the fall (-49%) and overestimated winter flow by 114%.

Schedule III  
(Subsection 6(1))

APPLICATION FOR LICENCE, AMENDMENT OF LICENCE, OR RENEWAL OF LICENCE

APPLICATION/LICENCE NO:  
(amendment or renewal only) NTL1-1762

1. Name and Mailing Address of Applicant

Shell Canada Ltd.  
400 - 4<sup>th</sup> Avenue SW  
P.O. Box 100, Station M  
Calgary, AB T2P 0J4  
Attention: R. (Randy) H. Hetman

Telephone: 403-691-2521

Fax: 403-269-7948

2. Address of Head office in Canada if incorporated

Same as previous

Telephone:

Fax:

3. Location of Undertaking (describe and attach a map, indicating watercourses and location of any proposed waste deposits)

Camp Farewell; east shore of the Mackenzie River - Middle Channel, 50 km downstream from Tununuk Point (Bar C).

Latitude 69° 12' 30" N

Longitude 135° 06' 04" W

4. Description of Undertaking (describe and attach plans)

Revision of water quality requirements for wastewater discharged from water treatment system at Camp Farewell, due to calculated flow rates. For a description; see attached letter to Indian and Northern Affairs Water Resources Division, Meighan Wilson, dated August 31, 2001

5. Type of Undertaking

1. Industrial

2. Mining and milling

3. Municipal

☒

4. Power

5. Agriculture

☐

6. Conservation

7. Recreation

☐

8. Miscellaneous (describe)

☐

6. Water Use

To obtain water

To cross a watercourse

To modify the bed or bank of a watercourse

☒

☐

☐

Flood Control

To divert water

To alter the flow of, or store, water

☐

☐

☐

Other (describe) Release treated wastewater into the Mackenzie River - Middle Channel.

7. Quantity of Water Involved (litres per second, litres per day or cubic metres per year, including both quantity to be used and quantity to be returned to source)

Quantity of water to be used not to exceed 150 m<sup>3</sup>/day (150,000 litres/day). Actual volume of water withdrawn from the Mackenzie River - Middle Channel is approximately 25,000 litres/day; with approximately 25,000 litres/day of treated water returned to the Mackenzie River - Middle Channel.

To calculate the effluent dilution factor, the lowest average monthly flow of the five year period was used as the most conservative value. To allow for the model's overestimation of flow values in the winter we divided the lowest average monthly flow value in half ( $305.5 \text{ m}^3/\text{s}$ ) and then calculated the dilution of the effluent discharged on the basis of this flow value.

According to their water license application, Camp Farewell currently releases no more than  $150 \text{ m}^3/\text{day}$  of treated effluent into the Middle Channel. The estimated rate of discharge of the effluent reported in the municipal questionnaire included with Shell's water licence was  $0.29 \text{ l/s}$  ( $0.00029 \text{ m}^3/\text{s}$ ). The dilution ratio of the effluent associated with this release was then calculated at greater than one million to one.

At present, the Camp Farewell water licence specifies discharge limits in accordance with the "Guidelines for the Discharge of Treated Municipal Wastewater in the Northwest Territories" for effluent discharged to a river with a dilution of  $>10:1$  and  $<100:1$ . While we have received verbal approval to use the guidelines associated with an effluent dilution of  $>100:1$  and  $<1000:1$  for discharge to most channels of the Mackenzie River, the actual discharge dilution at Camp Farewell is significantly greater.

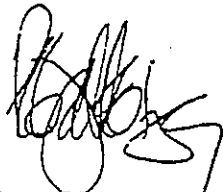
A RBC Wastewater Treatment Plant was installed for the 2000-2001 winter season. However, Shell was unable to achieve the wastewater effluent quality criteria set out in their water licence.

On behalf of Shell Canada, we would like to request a review of the Camp Farewell water licence with consideration given to amending the discharge limits to more accurately reflect the effluent discharge dilution for wastewater released from Camp Farewell.

Thank you for your attention to our comments and inquiry. If you have any questions or concerns, please contact myself at 219-1248 or by e-mail at [peter.jalkotzy@ieg.ca](mailto:peter.jalkotzy@ieg.ca).

Sincerely,

INUVIALUIT ENVIRONMENTAL & GEOTECHNICAL INC.



Peter Jalkotzy, P. Biol.  
Vice President, Environment

## SCHEDULE III - Concluded

## APPLICATION FOR LICENCE, AMENDMENT OF LICENCE, OR RENEWAL OF LICENCE - Concluded

## 8. Waste Deposited (quantity, quality, treatment and disposal)

Approximately 25 m<sup>3</sup>/day of effluent to be deposited. Sewage and grey water currently being treated using a Rotating Biological Contactor (RBC) system. Currently effluent is released to comply with the >10:1 to <100:1 dilution guidelines put forth in the *Guidelines for the Discharge of Treated Municipal Wastewater in the Northwest Territories* for discharge to a river.

## 9. Other Persons or Properties Affected By This Undertaking (give name, mailing address and location; attach list if necessary)

N/A

## 10. Predicted Environmental Impacts of Undertaking and Proposed Mitigation

No changes from original application.

## 11. Contractor and Sub-Contractors (names, addresses and functions)

Camp is being used by WesternGeco Oilfield Services;

Rick Calvert  
WesternGeco  
Mackenzie Delta Operations  
P.O. Box 2313  
#302 - 125 Mackenzie Road  
Inuvik, NT  
Phone: (867) 777-8875  
Direct: (867) 777-8878  
Fax: (867) 777-4002  
Cell: (780) 814-0693  
e-mail: calvert@calgary.geco-prakla.slb.com

## 12. Studies Undertaken to Date (attach list if necessary)

Enhanced Phase I Environmental Assessment - Golder &amp; Associates

Enhanced Phase I Environmental Assessment - Inuvialuit Environmental Inc.

Phase I and II Environmental Site Assessment - Komex Environmental Ltd.

## 13. Proposed Time Schedule

Start date November 1, 2001

Completion date October 31, 2010

Randy H. Hetman  
NAME (Print)

D.A.R./Construction Manager  
TITLE (Print)

SIGNATURE

DATE

2778

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APPLICATION FEE	Amount: \$ 30.00	Receipt No.: _____
WATER USE DEPOSIT	Amount: \$ _____	Receipt No.: _____

## Dilution Ratio Calculation for Wastewater Currently Released to the Mackenzie River from Camp Farewell

Dilution ratio calculation is based on daily flow values modeled for Monitoring Station 10MC0110 near Camp Farewell on the Middle Channel of the Mackenzie River. Flow values were modeled with the One-D hydrodynamic model of the Mackenzie Delta developed by Environment Canada: Atmospheric & Hydrologic Sciences Division, Arctic Section. Model was calibrated for 1982-1995 and then was validated for 1996-1999. Model results are 'fairly good' for spring (+3%) and summer (-4%), but underestimates fall (-49%) and overestimates winter (-114%) flow. (As per communication from Vir Khanna of Environment Canada)

**Monthly Flow Averages for Mackenzie River - Middle Channel  
in the Vicinity of Camp Farewell 1995 - 1999 (m³/s)  
(rounded to the nearest full unit)**

Month	1995	1996	1997	1998	1999
January	1522	1190	2437	1588	1331
February	1210	990	1963	1703	1183
March	1101	930	1775	1883	1041
April	779	611	1373	2087	692
May	5983	5519	7744	9938	6186
June	5891	9521	11066	9560	10254
July	3794	7980	8961	6456	8574
August	3563	7290	8063	5873	7851
September	4064	6891	6249	5968	7661
October	2232	4166	4931	5224	5899
November	841	1732	2759	2837	3193
December	1333	2077	1509	1371	928

\* Lowest monthly flow average from 1955 - 1999 was 611 m³/s

To allow for overestimation of flow values during the winter season, the lowest average monthly flow value estimated by the model was divided in half.

$$611 \text{ m}^3/\text{s} / 2 = 305.5 \text{ m}^3/\text{s}$$

Estimated daily rate of discharge at camp farewell is 0.29 litres/s

$$0.29 \text{ litres/s} = 0.00029 \text{ m}^3/\text{s}$$

Dilution ratio is calculated as:

$$= \frac{\text{minimum average monthly flow}}{\text{average effluent flow released daily}}$$

$$= 305.5 \text{ m}^3/\text{s} / 0.00029 \text{ m}^3/\text{s}$$

$$= 1,053,448 \quad \text{or } 1,053,448 : 1$$

Our File: 710-00  
Via Courier

September 12, 2000

Schlumberger Oilfield Services  
525 - 3<sup>rd</sup> Ave. SW  
Calgary, AB T2P 0G4

Attention: Marty Swagar  
Licensed Land Agent

Dear Mr. Swagar:

**Re: Camp Farewell Water Licence Application**

Please find enclosed copies of the *Schedule III - Application for Licence, Amendment of Licence, or Renewal of Licence* and *Municipal Questionnaire for Water Licence* applications. These applications and fee payments (\$30.00 application fee and \$30.00 water usage fee) were forwarded to the NWT Water Board today along with the Petro-Canada Seismic Program Project Description, which includes a detailed description of the proposed Water Treatment Facility.

If you have any questions or comments, please do not hesitate to contact me at the above noted address or by phone at (403) 291-0777, by e-mail at [cpvc@sorel.ca](mailto:cpvc@sorel.ca) or via fax at (403) 291-1150.

Thank you.

Sincerely,

INUVIALUIT ENVIRONMENTAL INC.

Cynthia Pyé  
Environmental Biologist

cc. John Kerkhoven, Supervisor, Surface Land, Petro-Canada  
Randy Hetman, Construction Manager, Shell Canada Ltd.

Schedule III  
(Subsection 6(1))

APPLICATION FOR LICENCE, AMENDMENT OF LICENCE, OR RENEWAL OF LICENCE

APPLICATION/LICENCE NO:  
(amendment or renewal only)

## 1. Name and Mailing Address of Applicant

Shell Canada  
400 - 4<sup>th</sup> Ave. SW  
P.O. Box 100, Station M  
Calgary, AB  
T2P 2H5  
Attention: R. (Randy) H. Hetman

## 2. Address of Head office in Canada if incorporated

Same as previous

Telephone: (403) 691-2521

Fax: (403) 269-7948

Telephone:

Fax:

## 3. Location of Undertaking (describe and attach a map, indicating watercourses and location of any proposed waste deposits)

Camp Farewell - north shore of the Mackenzie River, Middle Channel

Latitude

69° 12' 30" N

Longitude

135° 06' 04" W

## 4. Description of Undertaking (describe and attach plans)

Installation of water treatment system at camp to replace the existing wastewater sump to service a maximum of 120 camp personnel.

## 5. Type of Undertaking

1. Industrial

2. Mining and milling

3. Municipal

X

4. Power

5. Agriculture

6. Conservation

7. Recreation

8. Miscellaneous (describe)

## 6. Water Use

To obtain water

To cross a watercourse

To modify the bed or bank of a watercourse

X

Flood Control

To divert water

To alter the flow of, or store, water

Other (describe) Release treated wastewater into the Mackenzie River.

## 7. Quantity of Water Involved (litres per second, litres per day or cubic metres per year, including both quantity to be used and quantity to be returned to source)

Approximately 25 m<sup>3</sup>/day to be withdrawn from the Middle Channel of the Mackenzie River.

Approximately 25 m<sup>3</sup>/day of treated water to be returned to the Middle Channel in accordance with "Guidelines for the Discharge of Treated Municipal Wastewater in the Northwest Territories"

## SCHEDULE III - Concluded

## APPLICATION FOR LICENCE, AMENDMENT OF LICENCE, OR RENEWAL OF LICENCE - Concluded

## 8. Waste Deposited (quantity, quality, treatment and disposal)

Approximately 25 m<sup>3</sup>/day of waste to be deposited. Sewage and grey water will be treated using a Rotating Biological Contactor (RBC) system (details attached). All wastewater criteria will be at or below *Guidelines for the Discharge of Treated Municipal Wastewater in the Northwest Territories*.

## 9. Other Persons or Properties Affected By This Undertaking (give name, mailing address and location; attach list if necessary)

N/A

## 10. Predicted Environmental Impacts of Undertaking and Proposed Mitigation

Please see attached questionnaire.

## 11. Contractor and Sub-Contractors (names, addresses and functions)

Camp to be sublet to Schlumberger Oilfield Services for seismic operations conducted on behalf of Petro-Canada in the winter of 2000/2001. In the future, Schlumberger or other contractors may also use the camp.

Contact: Mr. J. Marty Swagar  
Licensed land Agent  
Schlumberger Oilfield Services  
525 -3<sup>rd</sup> Ave. SW  
Calgary, AB T2P 0G4  
Phone: (403) 506-4000  
Fax: (403) 509-4217

## 12. Studies Undertaken to Date (attach list if necessary)

Enhanced Phase I Environmental Assessment - Golder &amp; Associates

Environmental Assessment in progress by Komex International Ltd.

## 13. Proposed Time Schedule

Start date October 1, 2000Completion date: October 31, 2010

## FOR OFFICE USE ONLY

APPLICATION FEE	Amount: \$ <u>30.00</u>	Receipt No.: _____
WATER USE DEPOSIT	Amount: \$ <u>30.00</u>	Receipt No.: _____

## GENERAL

### SECTION A

1. Date 12 09 2000  
dd / mm / yy

2. Applicant Shell Canada Ltd.  
municipality or district

400 - 4<sup>th</sup> Avenue S.W.  
postal address

P.O. Box 100, Station M

Calgary, Alberta T2P 2H5

(403) 691-2521 (403) 269-7948  
telephone number facsimile number

3. Contacts Randy H. Hetman  
municipal contact

Construction Manager  
position

(408) 691-2521 (408) 269-7948  
telephone number facsimile number

\_\_\_\_\_ alternate contact  
\_\_\_\_\_ position  
( ) ( )  
telephone number facsimile number

4. Community Status ☐ City ☐ Village ☐ Town ☒ Camp  
☐ Hamlet ☐ Settlement Corporation

5. Population (according to most recent census results)

N/A

\_\_\_\_\_  
Estimated growth rate over next 5 years %

Indicated the status of the municipality's licence on the date of application.

☒ New Application

☐ Renewal → Water Licence # \_\_\_\_\_

7. Has any baseline data been collected for the main water bodies in the area?

☒ No ☐ Yes

If yes, please attach all data gathered on the physical, biological and chemical characteristics at each sampling location. Attach a summary of program details indicating sampling locations, description of waste at each location, sampling frequency, and parameters analyzed. Include an outline of Quality Assurance/Quality Control methods being applied to sampling, preservation and analysis within the program.

8. Has any baseline data collection and evaluation been undertaken with respect to the various biophysical components of the environment potentially affected by the project (e.g. wildlife, soils, air quality), i.e. In addition to water related information requested in this questionnaire?

☒ No ☐ Yes ☐ Unknown

If yes, please attach copies of the reports or cite titles, authors and dates.

Prepared by	Title	Completion Date
-------------	-------	-----------------

Komex - Enhanced Phase I Environmental Site Assessment		September 2000
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Inuvialuit Environmental Inc. - Numerous environmental assessments related to use of cam on operations housing in support of seismic operations. (September 2000).

If no, are such studies being planned? ☐ No ☐ Yes

If yes, briefly describe the proposals.

9. Attach detailed maps which show the relative locations of the:

- a. raw water intake, ✓
- b. water treatment facilities, ✓
- c. fuel & chemical storage,
- d. sewage treatment area and discharge outlets, ✓
- e. wastewater treatment area and discharge outlets, ✓
- f. solid waste disposal areas and drainage patterns.
- g. Hazardous waste disposal area,
- h. Transportation access routes, ✓
- i. Existing waterbodies/courses and any changes to these water bodies/courses which have or may occur as a result of water use of waste disposal facilities, locations of environmental monitoring sites.

10. Attach detailed scale plan drawing(s) of the proposed (or present) sewage treatment system. The drawing(s) must be stamped by an engineer registered in NWT and include the following:

- (a) details of pond size and elevation; N/A
- (b) precise details of all retaining structures (dimensions, materials of construction, etc.); N/A
- (c) details of the drainage basin, and existing and proposed drainage modifications; N/A
- (d) details of all decant, siphon mechanisms etc, including sewage treatment facilities; OK
- (e) details regarding direction and route followed by wastewater flow from the area; OK
- (f) indications of the distance to nearby major watercourses, and fish bearing waters; OK
- (g) location and construction of liners; N/A
- (h) leachate and groundwater collection systems; and N/A
- (i) control structures. N/A

See Appendix B in attached Project Description.

11. Attach detailed scale plan drawings of the proposed (or present) solid waste disposal area. The drawings must include the following:

- (a) precise details of all retaining structures (dimensions, materials of construction, etc.); N/A
- (b) details of the drainage basin, and existing and proposed drainage modifications; N/A
- (c) details regarding direction and route followed by wastewater flow from the area; OK
- (d) indications of the distance to nearby major watercourses, and fish bearing waters; OK
- (e) all sources of seepage presently encountered in the vicinity of these areas; N/A
- (f) the volume of each seepage flow ( $m^3/day$ ); and N/A
- (g) the direction of each flow.

12. Attach the present or proposed contingency plan which will be used for each portion of the waste control system in the event it fails to operate properly.

In case of system failure, water will be directed to the old sewage lagoon located at Camp Farewell. When system starts again, water in the lagoon will be passed through system before release.

13. Attach the present or proposed spill contingency plan which will be employed in case a spill of hazardous materials occurs. Describe courses of action, mitigative methods and equipment available for use.

Note: Individual detailed large scale drawings of all facilities (dam, decant system, ditch, dike, water treatment plant, etc) constructed or proposed must be attached. Specific details with regards to the methods of construction, materials used, etc. are required.

See attached Project Description.

## WATER SUPPLY

### Section B

#### 1. Volume of water use

System of Distribution	Estimated number of people on each system	Estimated average water use (L/c/d)	Total water use (L/d)
Piped and/or	120	208 L/pp/d	25000 (L/d)
trucked			(L/d)
			(L/d)
other			(L/d)
other			(L/d)
Total:			25,000 (L/d)

$$\frac{25\,000}{\text{Water usage (L/d)}} \times \frac{1\text{ m}^3}{1000\text{ L}} = \text{Water Usage: } 25\text{ (m}^3\text{/d)}$$

$$\frac{25}{\text{Water usage (m}^3\text{/d)}} \times 365\text{ days Year} = \text{Water Usage: } 9125\text{ (m}^3\text{/y)}$$

\* may not be used 365 days/year

#### 2. Type of source

☒ Lake
 ☒ River
 ☐ Well
 ☐ Other \_\_\_\_\_

#### 3. Name of raw water source and alternative, if any.

Mackenzie River (Winter)  
 Primary Source

Lake (Summer)  
 Alternative Source

Usual break-up and freeze-up months:

May – June
October

break-up

freeze-up

5. Please provide short descriptions for the following:

Freshwater intake facility

Pump and pipe or truck

Operating capacity of the pumps used 25 m<sup>3</sup>/day

Intake screen size 0.5"

6. Type of water storage facility (check where applicable)

☐

Reservoir

☒

Storage Tank

☐

None

☐

Other

description

7. What is the capacity of the water storage facility?

25 m<sup>3</sup>

8. What is the rate of withdrawal from the source?

25 (m<sup>3</sup>/d)

9. Is water drawn from the source ☒ intermittently ☐ continuously

If it is drawn intermittently, during what month(s) is it drawn? During camp occupation.

For what time period is it drawn (days/weeks/months)? Varies

10. What is the rate of flow of source (if river) or size (if lake)?

Mackenzie River. Size of lake north of Camp Farewell to be determined.

11. At the intended rate of water usage, describe the effects on the river or lake from which water will be drawn.

Minimal effects are expected as water outfall will equal water intake.

12. General condition of:

(a) Water supply facility

☒ Satisfactory      ☐ Unsatisfactory

If unsatisfactory, explain. \_\_\_\_\_

(b) Storage facility

☒ Satisfactory      ☐ Unsatisfactory

If unsatisfactory, explain. \_\_\_\_\_

(c) Distribution system

☒ Satisfactory      ☐ Unsatisfactory

If unsatisfactory, explain. \_\_\_\_\_

13. Are there any changes planned in the water supply system?      ☒ No      ☐ Yes

If yes, please attach a copy of the plan, or describe changes.

## WATER TREATMENT

### Section C - N/A

1. Indicate the quality of the raw water prior to treatment & distribution.

☒ good    ☐ fair    ☐ poor

Describe.

2. Indicate the capacity of the treatment facility. 25 m<sup>3</sup>/day

3. Type of water treatment facility

☒ Filtration & Chlorination    ☐ Chlorination only    ☐ None

☐ Other

Description

4. Describe in detail the method of water treatment (i.e. Backwash, flocculation, sedimentation, chemicals used). and provide the results of the most recent bacteriological and chemical analysis. Attach a diagram if possible.

See attached Project Description including Appendix B.

5. Have there been any problems or health and environmental concerns with the water treatment facilities?

☒ No    ☐ Yes

If Yes, please describe

6. Are there any changes planned in the water treatment facilities?

☒ No    ☐ Yes

If yes, please attach a copy of the plan or indicate changes.

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## SEWAGE DISPOSAL

### Section D

1. Indicate the level of treatment the sewage will be receiving:

☒ primary      ☒ secondary      ☒ tertiary

Pre-treatment (if applicable): ☐ screening      ☐ maceration

Lagoons (if applicable): ☐ anaerobic      ☐ aerobic      ☐ facultative

2. Indicate the capacity of the sewage treatment facility 25 m<sup>3</sup>/day

3. Indicate the retention time of the sewage while in the treatment facility. 1 Day

4. Indicate the estimated rate of discharge of wastewater. 0.29 L/sec

5. Indicate the location of the discharge point. On map in Appendix B. See attached Project Description.

6. Will the discharge be: ☒ seasonal      ☐ continuous

If the discharge is seasonal, during what month(s) is it done? When camp is in use

What is the duration of the discharge (days/weeks/months)? Various

7. Comment on the general condition of the:

(a) Sewage collection system Good. System to be installed will be an upgrade to existing facilities.

(b) Discharge control system Good

(c) Dams, diversion dykes, herms N/A

8. Have there been any problems or health and environmental concerns with the sewage disposal facilities:

☒ No ☐ Yes

If Yes, please describe. \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

9. The average depth of the wastewater lagoon is \_\_\_\_\_ m N/A

10. What is the design freeboard? \_\_\_\_\_ m N/A

11. Is there any harvesting of fish or shell fish in the waters where waste is discharged?

☒ No ☐ Yes

If Yes, please indicate species harvested, and estimated amounts

\_\_\_\_\_

\_\_\_\_\_

12. Will the municipality be using a honey bag pit?

☒ No ☐ Yes

If Yes, describe its:

Location \_\_\_\_\_

Drainage \_\_\_\_\_

Operation & Maintenance \_\_\_\_\_

13. Are there any sources of commercial or industrial liquid waste being discharged or deposited to the municipal system which may affect the quality of the effluent or leachate produced?

☒ No ☐ Yes

If Yes, please describe. \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

14. Have any spills occurred in the past five years?

☒ No ☐ Yes

If Yes, please describe

15. Have there been any operating problems with the lagoon?

☐ No ☐ Yes

If Yes, please describe. N/A

16. Are any changes planned in the sewage disposal facilities?

☐ No ☒ Yes

If yes, please describe and, if possible, attach a copy of the plan.

This application relates to the installation of a new wastewater and sewage treatment system.

## SOLID WASTE DISPOSAL

### Section E

1. Indicate the capacity of the disposal area. \_\_\_\_\_ m<sup>3</sup> N/A

2. The average depth of the solid waste disposal site is \_\_\_\_\_ m N/A

3. Are there any sources of commercial or industrial solid waste being deposited in the municipal system which may affect the quality of the effluent or leachate produced?

☒ No ☐ Yes

If Yes, please describe. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

4. Briefly describe how the solid waste will be picked up & delivered to the disposal area.

Tanked and barged or trucked to approved landfill site. \_\_\_\_\_  
\_\_\_\_\_

5. Is the solid waste site fenced? N/A

☐ No ☐ Yes

6. Will the municipality be using a dead animal pit? N/A

☐ No ☐ Yes

If Yes, describe its:

Location \_\_\_\_\_

Drainage \_\_\_\_\_

Operation & Maintenance \_\_\_\_\_

7. Will the municipality be using a bulky metal waste disposal area? N/A

☐ No ☐ Yes

If Yes, briefly describe its location and operation plan:

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8. Will the municipality be using a hazardous waste disposal area? N/A

☐ No ☐ Yes

If Yes, describe its:

Location 

---

Structure 

---

Operation & Maintenance

---

9. Are there any hazardous commercial wastes entering the solid waste disposal system? N/A

☐ No ☐ Yes

If Yes, describe and not amounts and special handling/disposal methods for these wastes.

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10. If any natural watercourse may gain access to the proposed solid waste disposal area, what methods will be used to decrease the amount of runoff water entering these areas? Indicate the volume of water which may enter these areas from the source(s) in question and attach all pertinent details of proposed diversions. N/A

Source

Volume (m<sup>3</sup>/day)

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11. Please describe the nature of any diversions of watercourses:

N/A

---

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12. Have there been any problems or health and environmental concerns with the solid waste disposal facilities? N/A

☐ No ☐ Yes

If Yes, please describe.

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---

13. Are any changes planned in the solid waste disposal system? N/A

☐ No ☐ Yes

If Yes, describe and note amounts and special handling/disposal methods for these wastes.

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## ABANDONMENT AND RESTORATION PROGRAM

### Section F

1. List and describe the locations of abandoned or restored water treatment facilities.

N/A

2. List and describe the locations of abandoned or restored sewage treatment facilities.

Lagoon/sump to be replaced with new system. Lagoon is located to west of the camp. (see Appendix B and photographs)

3. List and describe the locations of abandoned or restored solid waste disposal facilities. N/A

4. Do you have an abandonment and restoration plan?

☐ No ☒ Yes

If Yes, please attach a copy of the plan.

One (1) composite sample will be taken from the existing lagoon to assess water quality. If water meets Municipal Treatment guidelines it will be pumped into the Mackenzie River. Water that does not meet guidelines will be passed through new system before release. The remaining sump pit will remain as a contingency to the new system.. Final empty sump abandonment plans are yet to be determined.

## Water Quality Monitoring Program

### Section G N/A

1. Briefly describe the methodology that is presently used to sample the raw water supply.

As per NWT Water Board licencing requirements.

2. Briefly describe any monitoring that is done on wastewater effluent and leachate.

As per NWT Water Board licencing requirements.

3. Recognized laboratory performing analysis of samples.

To be determined.

name

contact name

postal address

postal address

telephone number

facsimile number

4. Are any changes planned in the water quality monitoring program?

☐ No ☐ Yes

If Yes, describe.

As per NWT Water Board licencing requirements.

## ENVIRONMENTAL ASSESSMENT AND SCREENING

### Section H

1. Has this project ever undergone an initial environmental review, including previous owners?

☒ No      ☐ Yes

If Yes, by whom/when \_\_\_\_\_

☐ Unknown

2. Has approval been obtained or sought from the Department of Fisheries and Oceans for using any fish bearing waterbodies for containment or disposal of waste?

☒ No      ☐ Yes

DFO has been contacted and input will be solicited upon submission of application.

3. Are there any environmental studies ongoing or planned?

☐ No      ☒ Yes

If Yes, list:

Prepared by      Title

Completion Date

Komex - Enhanced Phase I Environmental Site Assessment      September 2000

Inuvialuit Environmental Inc. - Numerous environmental assessments related to use of cam on operations housing  
in support of seismic operations. (September 2000).



**9. Camp Farewell Operations and Maintenance Plan - Solid Waste Disposal**

Solids designated for disposal and the disposal options varies depending on the material. Six major solid waste streams have been identified and the disposal plans are addressed as follows:

1. Combustible camp waste will continue to be burned in the incinerator located within the camp.
2. The larger construction debris (pallets etc) that was previously burned in an earthen pit onsite will now be burned in a metal sloop. This will contain the fire and eliminate the introduction of waste materials to the soil. The residual ashes from the incinerator and burn sloop will be transported to the Inuvik landfill for final disposal after obtaining appropriate approval.
3. Recyclable materials will be collected and recycled. Materials including, but not limited to used oil, used anti-freeze, oily rags, etc. will be shipped to suitable facilities located in Alberta. Metal including aluminum and scrap steel are separated into bins that will be shipped from the location to appropriate recycling facilities.
4. Un-usable drilling products including, but not limited to cement, potash, caustic soda, etc. are either recycled or shipped to appropriate disposal facilities in Alberta.
5. Upon approval of the District Inspector, the digested sludge and sediment that has accumulated in the sewage lagoon is to be air dried to reduce hydrocarbons and pathogens. The sediment can then be used onsite as fill or as a topsoil amendment as a component of site reclamation. See Camp Farewell Reclamation Plan, submitted under separate cover, for additional details.

All waste materials will be managed and disposed of in accordance with Northwest Territories Regulations and Guidelines.

Shell Canada Limited



400 - 4th Avenue S.W.  
P.O. Box 100, Station M  
Calgary, Alberta T2P 2H5  
TEL (403) 691-3111

June 3, 2002

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

**SUBJECT: Water Register: N7L1-1762**  
**Camp Farewell O&M Plan: Sewage and Solid Waste Facilities**

Thank you for reviewing the Camp Farewell Operations and Maintenance Plan previously submitted for your approval and your response of May 2, 2002.

Shell's plan to ensure post-treatment wastewater will meet the Water License limits is to replace the current RBC unit with an extended aeration, activated sludge system. This plan and the benefits of the system has been outlined in the Notification of Modification 2002-1 May 24, 2002 (rev May 30, 2002). Continuing with the current system did not provide us the confidence that the License limits could be achieved. As stated in the notification, Sections 2-4 of the O&M Plan will be updated as soon as the information is provided from the vendor.

Attached is a summary of the disposal plan for solids waste management at Camp Farewell. Please insert as Section 9 in the existing Camp Farewell Operations and Maintenance Plan. Also, please replace the Table of Contents with the attached version, which reflects the addition of the solids waste management section.

We trust this meets your requirements. Should any additional information be required, please contact the undersigned.

Yours truly,

A handwritten signature in black ink, appearing to read "Randy H. Hetman".

R. (Randy) H. Hetman  
DAR/Construction Manager  
Ph. (403) 691-2521  
Fax (403) 269-7948  
Email: [randy.hetman@shell.ca](mailto:randy.hetman@shell.ca)

cc- Inspector -- Inuvik District Office, DIAND (w/attachments)

Attachments *R. C. C. - Western Area - Inuvik (w/attachments)*

NORTHWEST  
TERRITORIES  
WATER BOARD



ALJ  
b7c

WATER REGISTER: N7L1-1762

May 2, 2002

*Rec'd May 15/2002 AB*  
*Due June 14, 2002*

Mr. Randy Hetman  
DAR/Construction Manager  
Shell Canada Limited  
P.O. Box 100, Stn. "M"  
400 - 4<sup>th</sup> Avenue S.W.  
CALGARY, NT T2P 2H5

Dear Mr. Hetman:

**CAMP FAREWELL O&M PLAN: SEWAGE AND SOLID WASTE FACILITIES**

The Northwest Territories Water Board has reviewed the above Operations and Maintenance Plan as required by your Water Licence, Part D, Item 1.

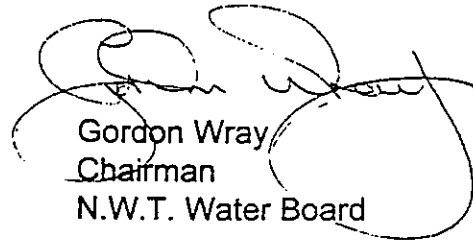
The Plan is a good manual for the operation and maintenance of the RBC Sewage Treatment Facilities. However, the Board is concerned that this system is producing wastewater that is not meeting the Water Licence discharge limits. What is Shell's plan to ensure that the post-treatment wastewater will meet the Water Licence limits?

Also, the Plan is lacking the required information on the Solid Waste Management Facilities, specifically, any reference to the disposal of the combustible and non-combustible solid wastes generated by the camp and operation. Therefore, the Board is requesting that a revised Plan be submitted for review and approval within forty-five (45) days of the date of this letter.

- 2 -

If you require further assistance, please contact this office. For enquiries of a technical nature, contact Ms Sarah Aho at (867) 669-2402 or Mr. David Milburn at (867) 669-2650 of the Water Resources Division.

Sincerely,



Gordon Wray  
Chairman  
N.W.T. Water Board