PROJECT DESCRIPTION
FOR CAMP FAREWELL'S WATER LICENCE APPLICATION

Prepared for:
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EXECUTIVE SUMMARY

Shell Canada Energy (Shell) is applying for a Water Licence for Farewell Camp and Stockpile Site (Camp Farewell) on the MacKenzie River. The camp is located within the Inuvialuit Settlement Region (ISR) on the northeast bank of Middle Channel near Harry Channel in the Kendall Island Bird Sanctuary (KIBS), Northwest Territories. Camp Farewell has been in existence since 1969, and has been used intermittently since then as a base for approved research, exploration, and development activities. At the present time, Shell plans to continue the use of the site as long term storage for metal rig mats, some shop tools, and lumber.

IEG Consultants Ltd. (IEG) has been commissioned by Shell to prepare the water licence application and this Project Description. In addition to supporting the application, the Project Description is a requirement for the Environmental Impact Screen Committee (EISC). At the time of this submission, Shell does not have any defined projects or a schedule for work at Camp Farewell. In the event that Shell initiates any programs other than site care and maintenance, appropriate regulatory approvals, including Project Descriptions, will be completed and submitted to the EISC.

Camp Farewell is self-contained, providing electrical and heating services and facilities for accommodation, meals, fuel storage, equipment handling, water withdrawal, and wastewater storage. There is a sewage lagoon on the site which is no longer used for the disposal of wastewater. All wastewater that is generated by camp operations is removed from site for disposal in Inuvik. Camp Farewell is currently being used to store fewer drilling supplies than were previously in long term storage on-site. The camp is able to accommodate up to 42 people and covers an area of approximately 14.3 hectares.

Specific features at the camp are:

- permanent accommodation for 42 people, plus kitchen and dining area, gym, men's and women's restrooms, coffee room, sauna, offices, first aid room, a recreation area, water intake structures and a formally approved sewage treatment system that is no longer in use;
- incinerator;
- bermed tank farm with secondary containment with storage capabilities for 2 million litres (not currently in use);
- a barge landing site;
- a 140 m by 200 m storage area; and,
- a 610 m by 30.5 m gravel airstrip.

Water supply is for domestic purposes, and is obtained from the Mackenzie River in the winter and the Unnamed Lake to the north of camp facilities in the summer.

Shell and its subcontractors are committed to following the operational guidelines and environmental protection measures outlined in this Project Description in order to minimize the risk of potential environmental impacts.

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1.0 TITLE AND PURPOSE

1.1 Title

Project Description for Camp Farewell's Water Licence application

1.2 Purpose and Scope of this Document

The purpose of this document is to support the Shell Canada Energy (Shell) Water Licence application for Farewell Camp and Stockpile Site (Camp Farewell) and to provide information on the current infrastructure and planned activities at Camp Farewell. The attached *Farewell Camp and Stockpile Site Operations and Maintenance Plan* (Appendix A) has been developed specifically for Camp Farewell and is an integral part of this Project Description. This plan has been previously approved by the Northwest Territories (NWT) Water Board.

2.0 CONTACT NAME AND ADDRESS – CORPORATE INFORMATION

2.1 Contact Name and Address

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3.0 REGULATORY APPROVALS

Camp Farewell is located on federal Crown land and is under lease to Shell. Two leases, No. 107 C/4-2-15 and No. 107 C/4-1-8, were issued in 2009 and are valid until 2028. Copies of the lease agreements are found in Appendix B.

Table 3-1 provides a list of approvals, licences, and permits that are required to continue the operation and maintenance of Camp Farewell.

Table 3-1: Permit and Licence Requirements for the Continued Operation of Camp Farewell

INSTRUMENT	AGENCY	LEGISLATION	BACKGROUND
Approval of Project Description	Christine Inglangasuk, Environmental Assessment Coordinator Environmental Impact Screening Committee 107 Mackenzie Road, Suite 204 P.O. Box 2120 Inuvik, NT X0E 0T0 Tel: 867-777-2828 Fax: 867-777-2610	*Inuvialuit Final Agreement*	Submit Project Description.
Type B Water Licence	Jan Davies, Executive Director Northwest Territories Water Board 125 Mackenzie Road Suite 302, Professional Building P.O. Box 2531 Inuvik, NT X0E 0T0 Tel: 867-678-2942 Fax: 867-678-2943	*Northwest Territories Water Act* *Northwest Territories Water Regulations*	The former water licence No. N7L1-1762 was issued to Shell on November 1, 2005. An amendment dated January 25, 2011 extended the expiry date of the licence to June 30, 2011. A new water application will be submitted to the NWT Water Board.
Canadian Wildlife Service Migratory Birds Sanctuary Permit	Paul Latour, Biologist Canadian Wildlife Service Environmental Stewardship Branch Prairie and Northern Region Environment Canada 5019 – 52nd Street, 4th Floor P.O. Box 2310 Yellowknife, NT X1A 1T5 Tel: 867-669-4769 Fax: 867-873-8185	*Migratory Birds Convention Act* *Migratory Birds Sanctuary Regulations*	A Canadian Wildlife Service Migratory Birds Sanctuary Permit is renewed for the site each year. The current permit application was submitted in January 2012 and approval is pending. Once approved, a copy of the permit will be submitted to the EISC.

4.0 LOCATION

Camp Farewell is located on the MacKenzie River within the Inuvialuit Settlement Region (ISR) on the northeast bank of Middle Channel near Harry Channel in the Kendall Island Bird Sanctuary (KIBS), NWT. It is approximately 125 km northwest of Inuvik and approximately 135 km west of Tuktoyaktuk.

Location coordinates are:

- Latitude 69° 12’ 30.0” N, Longitude 135° 06’ 04.4” W (UTM 496167.23W 7677487.45N NAD 27)

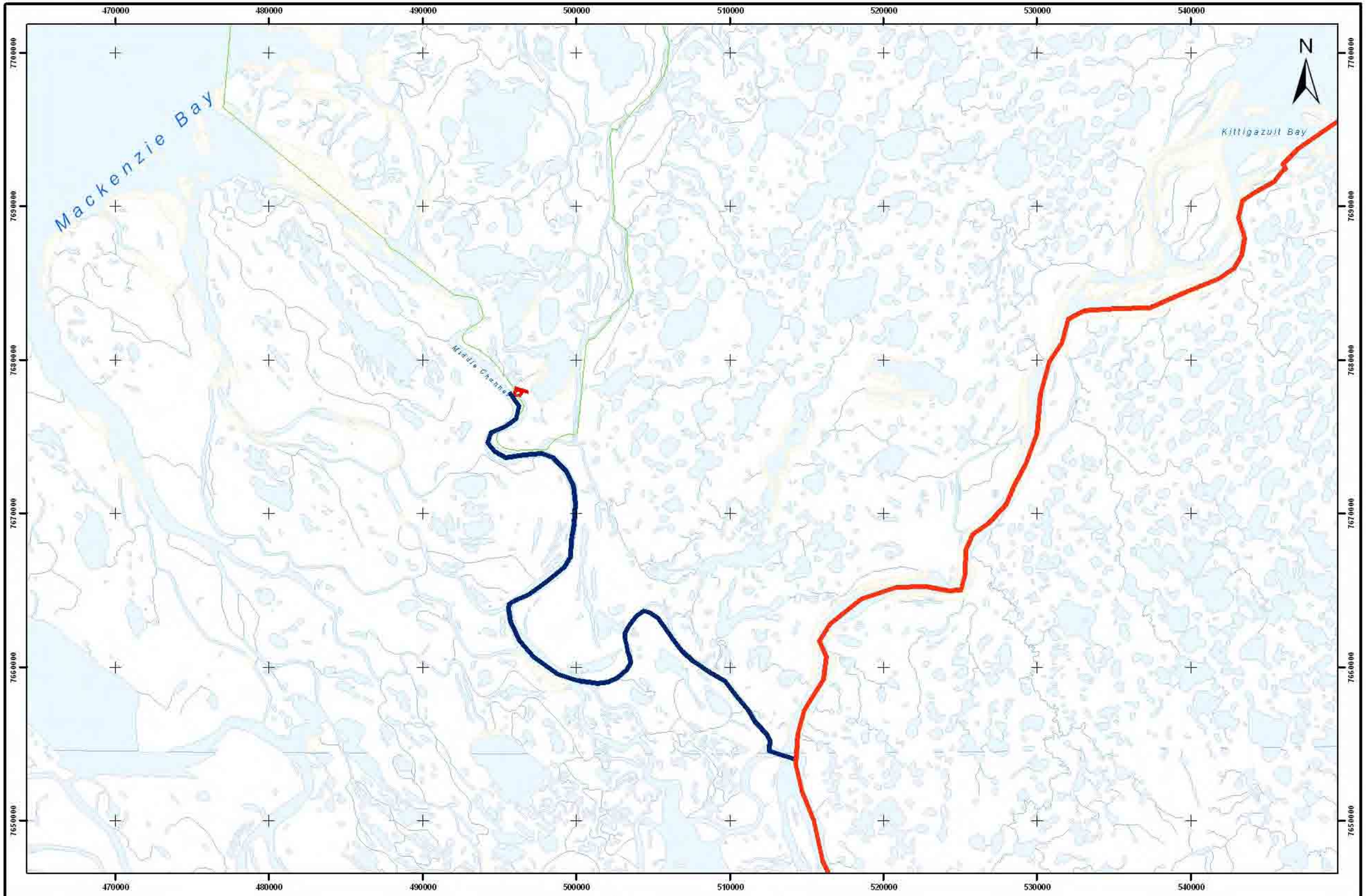
Figure 4-1 and Figure 4-2 show the approximate camp location at a 1:50,000 and 1:250,000 scale, respectively.

Figure 4-1: Location of Camp Farewell (1:50,000)

Location of Camp Farewell (1:50,000)

PROJECTION	DATUM	CONTRACTOR NAME		NOTES	
UTM 8	NAD 83	IEG ENVIRONMENTAL		Background Data NTS map sheet 107C with permission of Her Majesty the Queen in Right of Canada	
DRAWN	CHECK	DATE	SCALE	MAP FIGURE NUMBER	REV.
RR-B	KM	JUNE 15, 2005	1:50,000	FIGURE 4-1	0

Figure 4-2: Location of Camp Farewell and Winter Access Roads (1:250,000)



Legend

- Camp Farewell
- Kendall Island Bird Sanctuary
- Inuvik/Tuktoyaktuk Ice Road
- Camp Farewell Ice Road

0 3 6 12 18 Kilometers

Location of Camp Farewell and Ice Road Access(1:250,000)

PROJECTION: UTM 8	DATUM: NAD 83	CONTRACTOR NAME: IEG ENVIRONMENTAL		NOTES: Background Data NTS map sheet 107C and 107B with permission of Her Majesty the Queen in Right of Canada.	
DRAWN: RR-B	CHECK: KM	DATE: JUNE 15, 2005	SCALE: 1:250,000	MAP FIGURE NUMBER: FIGURE 4-2	REV.: 0

5.0 DEVELOPMENT SUMMARY

5.1 Camp Operation

Shell has operated Camp Farewell as a camp and logistical staging site in support of research, exploration, and development activities since 1969. The site has been used intermittently; however, Shell has continually held leases and permits to operate this site. At the present time, Shell plans to continue the use of the site as long term storage for metal rig mats, some shop tools, and lumber. A clean-up operation at Camp Farewell in 2009 removed drilling mud additives, pipes, and old fuel tanks from the site.

Camp Farewell may be used to support remediation or maintenance activities that may occur at the site. Temporary storage of drilling supplies at the site may occur in the coming years to support regional programs. At the time of this submission, Shell does not have any defined projects or a schedule for work at Camp Farewell. Activities that may occur under this Project Description include: regular site visits to monitor the condition of infrastructure and fuel storage facility; environmental monitoring of soil and groundwater; piling replacement at the camp building; and, building maintenance as required. Shell does not currently have plans to use Camp Farewell to support off-site activities. No further surface disturbance is planned at this time.

In the event that Shell initiates any programs other than site care and maintenance, appropriate regulatory approvals, including Project Descriptions, will be acquired and submitted to the Environmental Impact Screening Committee (EISC) that detail those activities.

Because of the nature of the use of the camp, project-specific schedules are not available until a specific project which proposes to use Camp Farewell is designed and submitted for regulatory approval.

5.2 Camp Overview

Camp Farewell is a self-contained camp, providing electrical and heating services and facilities to handle all aspects of habitation including accommodation, meals, fuel storage, equipment handling, water withdrawal, and wastewater storage. The camp is able to accommodate up to 42 people and covers an area of approximately 14.3 hectares.

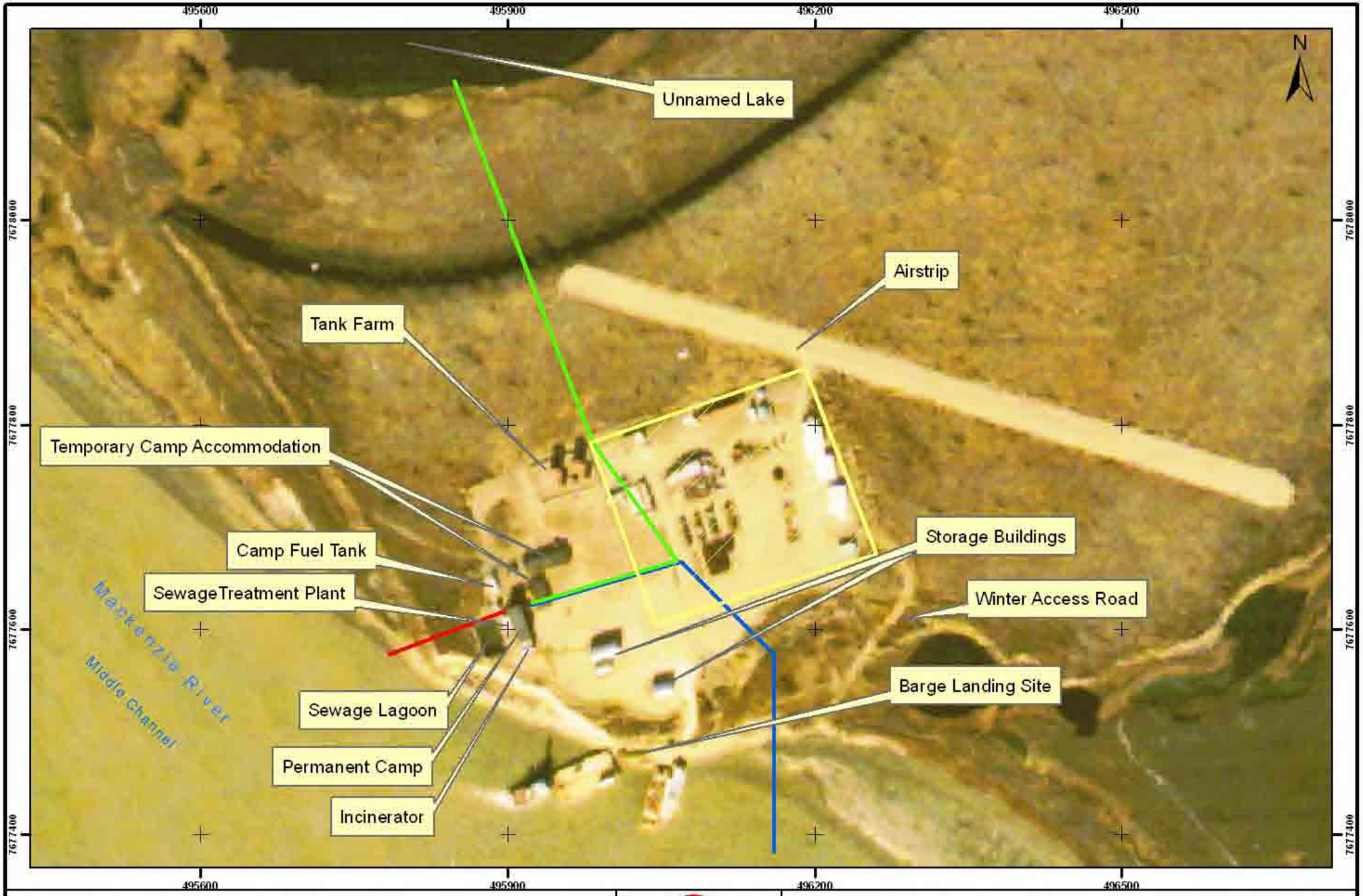
Specific features at the camp are:

- permanent accommodation for 42 people, plus kitchen and dining area, gym, men's and women's restrooms, coffee room, sauna, offices, first aid room, a recreation area, water intake structures, and a formally approved sewage treatment system that is no longer in use;
- a sewage lagoon that is no longer used for the disposal of wastewater;
- incinerator;
- bermed tank farm with secondary containment with storage capabilities for 2 million litres (not currently in use);

- a barge landing site;
- a 140 m by 200 m storage area; and,
- a 610 m by 30.5 m gravel airstrip.

Figure 5-1 provides a site plan of Camp Farewell. The temporary camp listed in previous documents (and on Figure 5-1) is no longer on site.

Figure 5-1: Camp Farewell Site Plan



Legend

- Approximate Location of Unnamed Lake Water Intake
- Approximate Location of Mackenzie River Water Intake
- Approximate Location Wastewater Discharge
- Stockpile Site

0 40 80 160 240 320 Meters

CAMP FAREWELL SITE PLAN

PROJECTION	DATUM	CONTRACTOR NAME	NOTES
UTM 8	NAD 83	IEG ENVIRONMENTAL	Geotiff mosaic colour balanced, acquired on 25.09.2002
DRAWN: RR-B	CHECK: KM	DATE: JUNE 15, 2005	SCALE: 1:5,000

MAP FIGURE NUMBER: FIGURE 5-1 REV: 0

5.3 Access and Transportation Methods

A combination of transportation methods are used to access Camp Farewell, and will continue to be used to transport equipment, materials, and personnel to the site if and when required. They are:

- barge and boat;
- winter access roads; and,
- airstrip and helipad.

5.3.1. *Barges*

Barges will continue to be used as necessary for transporting equipment and supplies required for the operation of Camp Farewell. The barge season is mid-June to late-September. The existing barge landing site will continue to be used (Figure 5-1). Shell has no plans at this time that will require the use of barges.

5.3.2. *Winter Access Roads*

When access to Camp Farewell is required, the existing Inuvik-Tuktoyaktuk public ice road is used to access Tununuk Point and an ice road is then constructed from Tununuk Point to Camp Farewell. The Camp Farewell ice road is cleared and flooded as necessary. Shell has no plans to build an ice road to Camp Farewell at this time. The typical ice road access route is shown on Figure 4-2.

5.3.3. *Aircraft Access*

The existing gravel airstrip at Camp Farewell is approximately 610 m long by 30.5 m wide (Figure 5-1). It will continue to be used for small fixed-wing (Twin Otter) or helicopter access to transport supplies, equipment, and personnel to and from the camp when required.

The use of aircraft in KIBS is restricted seasonally and is defined in the annual Canadian Wildlife Service (CWS) Migratory Birds Sanctuary permit. Minimum flight altitudes are observed when in transit to and from the site to reduce possible effects on wildlife and traditional land users.

Currently the airstrip is maintained when the camp is active. The most recent grading took place in the summer of 2009.

Depending on future use of the camp, the feasibility of lengthening to the strip from 610 m to 650 m would be considered to meet current recommended safe lengths for the intended aircraft. An upgrade to the airstrip would follow the required regulatory review process, however this is currently not planned.

5.4 Water Use

The *Water Management Plan* provided in Appendix C provides a discussion of water conservation measures, and a detailed description of water use and water treatment at Camp Farewell. A summary of the plan is provided in this section. At the present time, there are no plans to occupy the camp.

5.4.1. *Water Conservation*

Shell's commitment to sound environmental management planning includes water conservation. Specific measures that will be employed at Camp Farewell are described in the *Water Management Plan*.

5.4.2. *Water Requirements*

During full operation, the estimated quantity of water required on a daily basis at Camp Farewell is 150 m^3. Fresh water sources used at Camp Farewell are the Middle Channel of the Mackenzie River during winter camp operation and the Unnamed Lake to the north of the camp facilities during summer camp operation (Figure 5-1).

Water is used for domestic purposes within the camp excluding drinking water, which will be trucked or barged in. From time to time, water may be required for ice road or ice pad construction; however, if an ice road is needed, water requirements will be reviewed at that time.

5.4.3. *Water Intake*

Water intakes are screened with 2.54 mm fine mesh to prevent entrainment of fish, in accordance with the Department of Fisheries and Oceans (DFO) *Freshwater Intake End-of-Pipe Fish Screen Guideline* (DFO 1995).

For winter water use, water is withdrawn from the Middle Channel and transported by tank truck to the 27,250 L water storage tank located within the camp. For summer water use, a temporary line from the Unnamed Lake to the water storage tank is used. Water is withdrawn through the intake screen and pumped to a settling tank where sediment and solids settle out prior to water being used. Figure A in the *Water Management Plan* (Appendix C) identifies the water sources and discharge locations.

5.4.4. *Wastewater Disposal*

Camp Farewell no longer uses the sewage treatment system that is in place. When the camp is operating at full capacity, it is anticipated that the camp would generate approximately 15 m^3 of wastewater per day. During operation, all wastewater (grey water) and sewage (black water) are combined and stored in two 400-barrel storage tanks (approximately 82,000 L each), which are located between the camp building and the former sewage lagoon. The water is transferred to sewage trucks for transportation via either an ice road or barge to Inuvik's wastewater lagoon as required. Additional tanks could be mobilized to the site if required. In extreme cases where storage is in short supply, water use restrictions would be implemented at the site to avoid overflows. The storage tanks are left empty when the camp is inactive. A letter from the Town of Inuvik indicating that they will accept the theoretical future wastewater produced by Camp Farewell operations is included in Appendix D. During the screening of any future projects that would use Camp Farewell, an updated letter of waste acceptance from the Town would be sought.

It is Shell's understanding that any future changes to the wastewater management system would require either an amendment or new licence application through the NWT Water Board.

5.4.5. *Lagoon Water Disposal*

The sewage lagoon is no longer used for wastewater disposal. The lagoon fills with runoff approximately every two years. To prevent the lagoon from overflowing, the procedure currently used is to decant the melt water in the lagoon to the Middle Channel of the Mackenzie River. Prior to discharge, the ponded water in the lagoon will be tested to ensure it meets the effluent quality requirements as stipulated in the current water licence. If discharge criteria can't be met, amendments will be added to bring the water within criteria. In extreme circumstances, the water may be hauled from site for disposal in Inuvik, pending approval.

Inspector approval is required prior to discharge. The release of effluent to the Mackenzie River will comply with *The Guidelines for the Discharge of Treated Municipal Wastewater in the Northwest Territories* (NWT Water Board 1992).

Future decommissioning and remediation of the lagoon is discussed in the *Abandonment and Restoration Plan* (Appendix E).

5.4.6. *Monitoring*

Camp Farewell is monitored on a regular basis (approximately every 50 days) as required under the annual CWS permit issued for the site. The site visits check the condition of fuel storage tanks, site infrastructure, surrounding vegetation, water levels in the lagoon, signs of erosion on the riverbank adjacent to the lagoon, and any wildlife present.

The site is also monitored in accordance with the *Abandonment and Restoration Plan* and as side conditions warrant.

5.5 Solid Waste Management

When the site is in use, solid waste at Camp Farewell will be handled as follows:

- Combustible non-plastic waste may be burned on-site in the approved incinerator attached to the permanent camp building (Figure 5-1). Larger construction debris such as pallets will be burned in a metal sloop. Ash from the incinerator and sloop will be tested and, if suitable, transported to the Inuvik landfill upon receiving approval. Burn permits will be acquired, if necessary.
- Non-hazardous camp waste that is not incinerated, such as plastics, will be stored in animal-proof containers for shipment to the Inuvik landfill. Solid waste would be stored on-site in a covered metal bin and would be transported to Inuvik in the same metal bin by truck via either an ice road or barge to Inuvik's solid waste landfill. A letter from the Town of Inuvik accepting theoretical solid waste produced by Camp Farewell operations is included in Appendix D. During the screening of any future projects that would use Camp Farewell, an updated letter of waste acceptance from the Town would be sought. While on site, the refuse bin is located near the south corner of the camp building. The solid waste is normally kept on-site until the bin is full (approximately 1 month) and only

when the camp is operational. At the present time, there are no plans to operate the camp and refuse bins are only stored on site when the camp is operational.

- Where possible, recyclable material will be collected and recycled at approved facilities. This can include used drinking containers, oil, antifreeze, and scrap metal.

Section 9 of the attached *Farewell Camp and Stockpile Site Operations and Maintenance Plan* provides further detail on solid waste management and disposal.

5.6 Fuel and Hazardous Materials Storage

5.6.1. *Fuel*

Camp Farewell has permanent bermed facilities for 2.4 million litres of diesel fuel storage (Figure 5-1). The tank farm consists of two 750 m^3 tanks and three 300 m^3 tanks. When in use, the tanks are filled to 85% to allow for expansion and to avoid overflow; thus, the useable volume is 2.0 million litres. The tanks are single-walled with secondary containment. The tank farm was rebuilt in 2002, and a new secondary containment liner was installed. A tray system is located beneath the load-out, which allows potential spills to be captured during fuel discharge.

At present, the majority of fuel tanks on-site are maintained in an empty state. The camp fuel tank currently has a small reserve of fuel (93,798 L as of October 1, 2010). An additional cache of fuel in 205 L drums is currently stored within drip trays in the Warehouse building.

During the winter, fuel may be hauled from Inuvik in a tandem-axle fuel truck to Camp Farewell. The fuel trucks are equipped with spill-absorbents and clean-up equipment in the event of a spill while transferring fuel.

During the summer, the fuel tanks would likely be refilled from a fuel barge. Temporary lines would be supplied by the barge and would be visually monitored while fuel is transferred.

Project-specific fuel requirements may include jet fuel for aircraft use and gasoline for vehicle use.

Section 7 of the attached *Farewell Camp and Stockpile Site Operations and Maintenance Plan* contains the Emergency Response Plan (ERP) which details spill response procedures for liquid, sewage, and solid materials as well as a list of spill containment supplies available on-site. The ERP will be updated when a future project is being initiated at Camp Farewell.

Plans for abandonment and temporary closure of fuel storage facilities are discussed in the *Abandonment and Restoration Plan* (Appendix E).

5.6.2. *Hazardous Materials*

Hazardous materials are not typically required for camp operation. Besides diesel fuel, which is stored in tanks within bermed areas, there are no hazardous materials stored on site. If hazardous materials are required for a project based out of Camp Farewell, they will be securely stored, with the proper documentation and labelling. These wastes would be hauled to an approved facility for disposal. Transportation will be in accordance to Transportation of

Dangerous Goods (TDG) requirements. However, because there are no specific projects planned for the site, any details of possible hazardous material use are unknown. Possible future projects should detail methods of handling related hazardous materials in their applicable Project Description submissions to the EISC.

Plans for abandonment and temporary closure of hazardous waste storage facilities are discussed in the *Abandonment and Restoration Plan* (Appendix E).

5.7 Personnel and Equipment Requirements

The equipment and personnel requirements for Camp Farewell will be project specific. There are no permanent personnel stationed at Camp Farewell. The site is monitored by IEG Consultants Ltd. (IEG) in accordance with CWS permit requirements when significant volumes of fuel are stored at the site. If no fuel is stored, the site is visited at minimum on an annual basis.

The only operational equipment at the site is a Thomas skid steer, which is used on the gravel pad from time to time to conduct general maintenance and could be used to help contain a fuel spill if the need arose.

In accordance with Shell's Benefit Agreement with the Inuvialuit Regional Corporation (by virtue of the Inuvialuit Final Agreement), when the camp is operating, local businesses and people will have the opportunity to supply goods and services such as catering, heavy equipment and operators, water truck, professional services, wildlife monitors, and labourers.

6.0 DEVELOPMENT TIMETABLE

Because of the nature of the use of the camp, project-specific schedules are not available until a specific project which proposes to use Camp Farewell is designed and submitted for regulatory approval.

7.0 NEW TECHNOLOGY

Because of the nature of the use of the camp, technology (conventional or innovative) and procedures which will be utilized are not available until a specific project which proposes to use Camp Farewell is designed and submitted for regulatory approval.

8.0 ALTERNATIVES

An alternative to using Camp Farewell would be the operation of project-specific mobile camps and storage sites. However, because there are no specific projects planned for the site, alternatives are also unknown. Possible future projects should detail possible alternatives in their applicable Project Description submissions to the EISC.

9.0 TRADITIONAL AND OTHER LAND USES

Camp Farewell is located within sensitive areas identified by the Community Conservation Plans (CPPs) and the Inuvialuit Harvest Study (IHS) for Tuktoyaktuk, Aklavik, and Inuvik. The CPPs offer guidelines for development that reflect the views of the hunters, trappers, and anglers in the communities. The guidelines are designed to ensure conservation of renewable resources (Community of Tuktoyaktuk et al. 2008, Community of Aklavik et. al 2008, Community of Inuvik et. al 2008).

Land categories identified in the CPPs range from Category A, which are lands with no known significant and sensitive cultural or renewable resources, to Category E, which are lands where cultural or renewable resources are of extreme significance and sensitivity. Land designations for Camp Farewell are Category C and Category D. Category C is lands and waters where cultural or renewable resources are of particular significance and sensitivity during specific times of the year. Category D is lands and waters where cultural or renewable resources are of particular significance and sensitivity throughout the year.

Details of these areas are provided in Table 9-1.

Table 9-1: Community Conservation Plan Areas Affected by Camp Farewell

SITE NUMBER	AREA	IMPORTANCE TO COMMUNITY
706D	Kendall Island Bird Sanctuary - Tuktoyaktuk, Inuvik, and Aklavik	• breeding / staging area for a number of bird species from May to September • sensitive wetland habitat year-round
304C	Spring Goose Harvesting - Tuktoyaktuk	• key area for subsistence hunting of geese in the spring
312C	Fall Goose Harvesting - Tuktoyaktuk	• key area for subsistence hunting of geese in the fall
322C	Critical Grizzly Bear Denning Areas - Tuktoyaktuk	• important from October to May for denning grizzly bears
715C	Mackenzie River Delta Key Migratory Bird Habitat - Tuktoyaktuk, Inuvik, and Aklavik	• nesting and breeding habitat for birds from May to September • denning areas for grizzly bears from October to May • surrounding waters are important habitat for beluga whales from June to September • polar bear denning area from November to April • past and present subsistence harvesting area, especially for beluga whales (June 15 to August 15) and waterfowl (June to September)

The Inuvialuit CCPs allow development in Category C and Category D lands, but recommend managing them to eliminate, to the greatest extent practical, potential damage and disruption.

When a project is proposed which will use Camp Farewell as a base, Shell will work closely with the Hunters and Trappers Committees (HTCs) to avoid traditional harvesting areas and camps that are in use during the proposed activity.

In 2007, Shell constructed an emergency shelter at Camp Farewell to provide some level of assistance for any stranded travellers at the site.

Because there are no specific projects planned for the site at the present time, significant conflicts with traditional land uses are not expected. Possible future projects should detail any other traditional land uses that may be affected by specific projects in their applicable Project Description submissions to the EISC.

10.0 COMMUNITY CONSULTATION

Shell has not initiated a community consultation program because there are no specific projects planned for the site. In 2010, Shell undertook the remediation of an unrelated drilling site in the Mackenzie River Delta. As part of that remediation program, Shell undertook to maintain communication with the local HTCs. Shell will address any questions regarding the care and maintenance program at Camp Farewell during those on-going consultations with the HTCs. Possible future projects would be expected to undertake community consultations regarding the specifics of those unknown projects prior to submission of their applicable Project Description submissions to the EISC. The HTCs in Tuktoyaktuk, Aklavik, and Inuvik were informed by email of the water licence renewal application on February 9, 2012. The HTCs did not respond; however, they will receive a copy of the Project Description to review, discuss, and make comments.

11.0 ENVIRONMENTAL OVERVIEW

11.1 Climate

Camp Farewell is classified as having a high subarctic ecoclimate, with very cold winters and cool summers. Mean daily temperatures range from –27.6°C in January to 14.2°C in July.

Winters in this area are long and there is a period of approximately two months when the sun does not rise above the horizon. During this period, very cold conditions prevail and may last for several weeks at a time. When temperatures reach such lows, the ability of the air to contain moisture is limited and very little precipitation falls. The mean annual precipitation is 249 mm (Environment Canada 2002).

11.2 Physiography and Bedrock Geology

Camp Farewell is within the Tuktoyaktuk Coastal Plain Ecoregion of the Southern Arctic Ecozone. This ecoregion covers the outer Mackenzie River Delta and Tuktoyaktuk Peninsula bordering the Beaufort Sea [Ecological Stratification Working Group (ESWG) 1996].

There are two main landscape types within the Tuktoyaktuk Coastal Plain Ecoregion. One is composed of distinctive delta landforms at the mouth of the Mackenzie River. These include wetlands, active alluvial channels, and estuarine deposits. Characteristic wetlands, which cover 25–50% of the area, are lowland polygon fens, both the low- and high-centre varieties. The second consists of the broadly rolling uplands. Discontinuous morainal deposits mantle much of the area, except near the coast where fine-textured marine sediments cover the surface. Occurring less frequently are outwash aprons of crudely-sorted sand and gravel, and raised beach ridges along the shores of preglacial lakes. The resulting undulating terrain is studded with innumerable lakes and ponds (ESWG 1996).

The region is underlain by continuous permafrost with high ice content in the form of ice wedges and pingos.

11.3 Soils and Permafrost

Organic and Turbic Cryosols developed on level to rolling organic, morainal, alluvial, fluvioglacial, and marine deposits are the dominant soils of the Tuktoyaktuk Coastal Plain Ecoregion (ESWG 1996). Typically these soils are said to be underlain by a continuous layer of permafrost (> 90% permafrost), though more recent data describe the outer Mackenzie River Delta and portions of Richards Island as being discontinuous permafrost with about 35-65% permafrost beneath the area (Heginbottom 1998).

In the Mackenzie River Delta, permafrost thickness is generally less than 90 m thick, and contains deep unfrozen zones (taliks), which in some cases extend to the base of the permafrost. The depth of the active layer generally ranges from 30 – 100 cm but is largely a function of ground surface insulation, vegetation cover, level of ground disturbance, and winter snow cover.

11.4 Vegetation

Permafrost detracts from soil productivity by chilling the soil and creating waterlogged conditions in the thawed active layer near the soil surface. Plant communities found in the vicinity of the project are relatively simple and are dominated by a few species that are well adapted to poor soil (low nutrient) conditions and the harsh climate.

Vegetation grows on a veneer of unfrozen organic or granular substrate overlying the permafrost boundary. Vegetation in the area is a complex pattern of delta shrub communities on active river terraces, sedge – cotton-grass communities in wet, less active areas and patterned ground composed of low centred polygons, which typically develop in poorly drained conditions. Standing water and moving water are prominent features of the landscape. Camp Farewell is not subject to the seasonal flooding experienced in many parts of the Mackenzie River Delta and is surrounded by stable tundra vegetation and patches of alder and willow.

11.5 Wildlife

11.5.1. *Birds*

Camp Farewell is located within the KIBS. KIBS was established in 1961 to protect valuable waterfowl breeding and staging grounds within the outer Mackenzie River Delta. This area has been classified as a key migratory bird site in the NWT. The 600 km^2 sanctuary provides habitat for over 80 species of migratory birds, including up to 7,500 nesting snow geese. Large numbers of tundra swans, greater white-fronted geese, sandhill cranes, brant, dabbling ducks, and shorebirds also nest and mount within the sanctuary. Although the sanctuary is primarily known for waterbirds, several species of raptors, passerines, and ground-dwelling birds are also present in the area. Other common species include snowy owl, gyrfalcon, peregrine falcon, osprey, common redpoll, gray jay, common raven, red-throated loon, northern shrike, ptarmigan, and fox sparrow.

Under Schedules 1, 2, and 3 of the Species at Risk Act (SARA), there are 10 bird species listed whose range includes the NWT, as follows:

Species	SARA Status
Eskimo Curlew	Schedule 1 – Endangered
Whooping Crane	Schedule 1 – Endangered
Ivory Gull	Schedule 1 – Endangered
Peregrine Falcon anatum subspecies	Schedule 1 – Threatened
Canada Warbler	Schedule 1 – Threatened
Common Nighthawk	Schedule 1 – Threatened
Olive-sided Flycatcher	Schedule 1 – Threatened
Rusty Blackbird	Schedule 1 – Special Concern

Yellow Rail	Schedule 1 – Special Concern
Short-eared Owl	Schedule 3

Additional species not listed above but which are a NWT Species at Risk are the Horned Grebe (Western population), Red Knot (islandica subspecies and rufa subspecies), Barn Swallow, and the Peregrine Falcon anatum-tundrius subspecies. The NWT Species at Risk status is determined by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC).

From these lists, the Peregrine Falcon anatum subspecies, Rusty Blackbird, Short-eared Owl, and Horned Grebe (Western population) are the only species whose range includes the Mackenzie River Delta.

A vast majority of birds that are found in and around the Mackenzie River Delta are migratory and are present from May to October. Consequently, they are not expected to be present during winter operation of Camp Farewell. Summer operation of the camp, however, may be a concern, with such issues as sensory disturbance and water removal from the Unnamed Lake to the north of the camp facilities. At this time, there are no specific projects planned for the site, therefore conflicts are not expected. Habitat loss is not an issue because Camp Farewell is a permanent camp, with no plans to increase its size.

11.5.2. *Mammals*

Terrestrial animals in the area include barren-ground grizzly bear, Arctic and red fox, wolverine, ermine, least weasel, mink, muskrat, Arctic ground squirrel, and several species of small rodents (lemmings and voles). Caribou are not thought to occur on Richards Island, but a domesticated herd of reindeer is typically summered on the island.

Grizzly bears reside year round in the area, although at low density. Most local grizzly denning occurs on south and west facing lake and/or channel banks between sea level and 100 m above sea level within the bear's home range. Low-lying areas around lakes and channels also provide good spring foraging habitat. Grizzly bears forage on bird eggs and thus are attracted to KIBS during the spring waterfowl nesting season.

Polar bears are generally restricted to areas with sea ice and are thus unlikely in the Camp Farewell area. However, maternity dens and secondary winter habitat occur along the coastline of the Mackenzie River Delta and Richards Island.

Under Schedules 1, 2, and 3 of the SARA, there are eight mammal species listed whose range includes the NWT, as follows:

Species	SARA Status
Peary Caribou	Schedule 1 - Endangered
Wood Bison	Schedule 1 - Threatened
Woodland Caribou (Boreal population)	Schedule 1 - Threatened
Bowhead Whale (Bering-Chukchi-Beaufort population)	Schedule 1 - Special Concern
Grey Whale (Eastern North Pacific population)	Schedule 1 - Special Concern
Woodland Caribou (Northern Mountain population)	Schedule 1 - Special Concern
Polar Bear	Schedule 1 - Special Concern
Barren-ground Caribou (Dolphin and Union population)	Schedule 1 - Special Concern

Three mammal species not listed under Schedules 1, 2, and 3 of SARA which are NWT Species at Risk as determined by the COSEWIC are the Grizzly Bear (Northwest population), Wolverine (Western population) and Collared Pika.

From the list above, the Bowhead Whale (Bering-Chukchi-Beaufort population), Grey Whale (Eastern North Pacific Population), Grizzly Bear (Northwestern population), Polar Bear, and Wolverine (Western population) are the only species whose range includes the Mackenzie River Delta.

11.5.3. *Hydrology*

The Mackenzie River Delta is a dynamic complex of lakes, islands, braided channels, and oxbows. The hydrological regime is the primary factor controlling vegetation and wildlife habitat in the area. It is an estuarine delta with poorly developed levees, formed largely from sediments transported by the Mackenzie River over the last 13,000 years. The southwest sector also receives sediment from the Peel River and Rat River. The major channels appear largely unchanged in the last century. The present delta is flat and dotted with numerous lakes, ponds, and river channels, but also contains land varying from stable forested areas to tidal flats [Mackenzie River Basin Committee (MRBC) 1981].

Ice covers the waters of the delta for approximately eight months of the year and can be up to 2.5 m thick in the main stem of the Mackenzie River. Ice break-up usually begins in late April-early May, and ice movement occurs before peak spring water levels. Water levels fall during late summer and into fall. The basic hydrology of the Mackenzie River Delta is a complex interaction of aggrading and degrading forces, with spring break-up the major hydrological event each year (MRBC 1981).

11.5.4. *Fish*

A large number of fish species occur within the freshwater and marine environments of the delta. Fish species that are likely to be present in the Mackenzie River Delta are listed in Table 11-1 along with their spawning habitats and spawning periods.

Under Schedule 1, 2, and 3 of the SARA, there is one species listed whose range includes the NWT, as follows.

Species	SARA Status
Northern Wolf Fish	Schedule 1 – Threatened
Shortjaw Cisco	Schedule 2 - Threatened

An additional species not listed above but which is an NWT species at Risk as determined by the COSEWIC is the Dolly Varden (Western Arctic population).

Table 11-1: Fish Species Likely to be Present in the Mackenzie River Delta

SPECIES	LATIN NAME	SPAWNING HABITAT	SPAWNING PERIOD
FRESHWATER			
Burbot	*Lota lota*	Mouths of creeks. Winter and spring may be abundant in fresh or brackish waters of Kugmallit Bay's coastal embayment.	January to March
Flathad chub	*Platygobio gracilis*	Shallow sandy bars in smaller tributary streams; survives well in turbid water.	Spring and mid Summer
Lake chub	*Couesius plumbeus*	Most of Canada west of Hudson Bay. Cool streams, lakes, and ponds. Moves into deeper water during the summer.	Spring and mid Summer
Arctic cisco	*Coregonus autumnalis*	Mackenzie River and estuary, tributaries to the Mackenzie (spawning habitat), and inland lakes.	Fall
Least cisco	*Coregonus sardinella*	Mackenzie River and estuary, tributaries to the Mackenzie (spawning habitat), and inland lakes. Inner Shallow Bay / Niakunak Bay and Kugmallit Bay are important overwintering and nursery areas.	Early October
Finescale dace	*Chrosomus neogaeus*	Bog ponds, streams, and lakes. Mackenzie River drainage.	April to June
Longnose dace	*Rhinichthys cataractae*	Prefers small streams, generally in riffles of gravel and boulders. Often found in turbulent waters. Also the wave lashed shores of very large lakes and often found in trout streams.	April and May
Inconnu	*Stenodus leucichthys*	Mackenzie River and estuary (rearing habitat). Turbid lakes on Richards Island throughout summer, Mallik, and Mason Bays.	Late September to early October
Arctic grayling	*Thymallus arcticus*	Kugalak River, coastal rivers of North Slope. Occasionally Richards Island.	Spring
Lake trout	*Salvelinus namaycush*	Outer delta lakes (including minor channels) with high oxygen levels, a good connection to adjacent water bodies, small to moderate volumes available, and poor to moderate water quality.	Fall
Northern pike	*Esox lucius*	Tributaries, creeks, and shallow lakes in Mackenzie River Delta.	Early spring
Deepwater sculpin	*Myoxocephalus thompsoni*	Habitat preferences are not known. Spawning areas are not known.	May and June
Slimy sculpin	*Cottus cognatus*	Coldwater streams. Stream bottom.	Late April and May
Spoonhead sculpin	*Cottus ricei*	Turbid rivers or deep areas of lakes.	Fall

SPECIES	LATIN NAME	SPAWNING HABITAT	SPAWNING PERIOD
Pond smelt	*Hypomesus olidus*	Arctic and Pacific drainages from Rae River (Coronation Gulf) and Great Bear Lake in NWT, Canada to Copper River in Alaska. Seining location Shallow Bay near mouth of west channel.	Late spring to early summer.
Rainbow smelt	*Osmerus mordax*	Found only along mainland coast from Bathurst Inlet westward.	Spring
Ninespine stickleback	*Pungitius pungitius*	Shallow vegetated areas of lakes, ponds, and pools of sluggish streams. Sometimes in open water over sand. Seining locations Shallow Bay, Kendall Island, Swan Channel, and East Channel.	Spring and early summer
Longnose sucker	*Catostomus catostomus*	Arctic mainland in lakes and occasionally in the brackish water of estuaries.	Spring
White sucker	*Catostomus commersoni*	Lakes, small rivers, and streams.	Late April to June
Trout-perch	*Percopsis omiscomaycus*	Stream habitats with high water quality, deep pools, and bottoms consisting of sand and gravel. Lake populations avoid mud-filled bays.	May to August
Walleye	*Stizostedion vitreum*	Intermediate to large cool lakes, rivers, and streams. Prefers large shallow lakes with high turbidity.	April to late June
Broad whitefish	*Coregonus nasus*	Several overwintering areas in East Channel and Whitefish Bay. Tuktoyaktuk Harbour, Mason Bay, Mallik Bay, Shallow Bay, streams of Tuktoyaktuk Peninsula, spawning throughout the Mackenzie system.	October and November
Round whitefish	*Prosopium cylindraceum*	Inhabits shallow areas of lakes and clear streams, rarely entering brackish water. Most often found in clear fast flowing water. Outer Mackenzie River Delta.	
SALTWATER			
Capelin	*Mallotus villosus*	Cold deep waters.	June and July
Arctic char	*Salvelinus alpinus*	Fish Hole, Rat River, Big Fish River, Fish Creek, Babbage River, Peel River, Shingle Point, occasionally travel the Mackenzie near Inuvik.	Fall
Arctic cod	*Boreogadus saida*	Within Mackenzie estuary.	Winter
Greenland cod	*Gadus ogac*	Cold temperatures usually inshore regions. Arctic coast of Canada.	
Saffron cod	*Elegiums navaga*	Saline bays and offshore.	
Tom cod	*Microgadus proximus*		
Starry flounder	*Platichthys stellatus*	West coast of Tuktoyaktuk Peninsula and Mallik Bay.	February to April

SPECIES	LATIN NAME	SPAWNING HABITAT	SPAWNING PERIOD
Blue herring	*Clupea spp.*	Mackenzie River and estuary, tributaries to the Mackenzie, and inland lakes.	Late June
Sand lance	*Amodytes sp.*	Shallow intertidal with sandy bottoms.	December to March
Chum salmon	*Oncorhynchus keta*	Pacific and Arctic oceans, spawning in rivers from the Mackenzie westward.	Fall
Pink salmon	*Oncorhynchus gorbusha*	Pacific and Arctic oceans, spawning in rivers from the Mackenzie westward.	Fall
Fourhorn sculpin	*Myoxocephalus quadricornis*	Lakes and streams of the Arctic archipelago.	May and June

12.0 ENVIRONMENTAL PROTECTION MEASURES

Because there are no specific projects planned for the Site, any details of specific protection measures cannot be determined. Possible future projects should detail specific environmental protection measures, whether they are proven or experimental, and the likely impacts on the environment in their applicable Project Description submissions to the EISC. Shell has and will continue to operate Camp Farewell with the intent of minimizing its impact on the environment and local users. General measures followed to achieve this include the following:

Notification of Concerned Parties

Objective: To ensure that all personnel are briefed on camp operation, and that all permits are in place and required regulatory personnel/community groups are notified of camp operations.

- Notification shall be made to appropriate local communities, companies, or regulatory agencies, as per permits and lease agreements.

Clearing and Access

Objective: Disturbance to vegetation, watercourse, and the ground mat shall be kept to a minimum.

- The access for camp operations will be the public Mackenzie River ice road between Inuvik and Tuktoyaktuk and the privately constructed and maintained ice road from Tununuk Point to Camp Farewell.
- Equipment movement shall be limited to the existing camp lease.

Fuel, Hazardous Materials and Garbage

Objective: To ensure the proper storage, handling and disposal of fuel, hazardous materials and garbage, as well as spill prevention and reporting.

- Fuel shall be stored in single walled tanks located within the synthetically lined and bermed area or other secondary containment with a holding capacity of 110% of the largest volume of fuel to be stored at the site. Any tanks without secondary containment shall be double walled. Any hazardous product stored in excess of 20 drums shall have secondary containment or stored in tanks as described above. A dedicated area shall be used for any and all refueling.
- Fuel, oil, or hazardous material storage shall not be allowed within 100 m of a watercourse or waterbody.
- Spent oils, lubricants, filters, and so forth shall be collected at camp and transported to an approved receiver for final disposal or recycling.
- Hydraulic, fuel, and lubricating systems shall be kept in good repair to avoid leakage of deleterious substances.
- Equipment and ancillary vehicles shall be inspected on a regular basis to ensure they are clean and free of leaks.

- Operators, foremen, and responsible supervisory personnel shall be trained to contain spills or leakage from equipment.
- All service vehicles used for refueling must be equipped with automatic shut-off valves that shall be inspected on a regular basis to ensure they are in good working order.
- A spill mat, drip tray, or tarpaulin, which is impervious to all liquids, shall be used under all vehicles or equipment that are being serviced.
- All fuel and service vehicles shall carry a spill kit that contains suitable commercial absorbent materials for ground spills to ensure an immediate response capability in the event of a fuel spill.
- In the event of a spill, procedures shall be implemented as outlined in the ERP (Section 7 of the attached *Farewell Camp and Stockpile Site Operations and Maintenance Plan*).
- All leaks and spills shall be reported to the Site Supervisor to initiate immediate clean up.
- All spills will be reported to the NWT 24-hour Spill Line (867) 920-8130.
- The spill area shall be restored to the satisfaction of the Environmental Inspector, Field Superintendent, and the local Environmental Monitor.
- Construction waste, debris, garbage, and other non-hazardous materials shall not be allowed to accumulate at the camp.
- All combustible garbage shall be continuously collected and, with the exception of plastics, incinerated at the camp in an enclosed container. All plastics and non-combustible materials shall be hauled to Inuvik for disposal in the sanitary landfill site.
- Hazardous material shall have the appropriate Material Safety Data Sheet (MSDS) identification and the sheets available at the camp.
- All hazardous materials stored at the camp shall be contained, labeled, handled and used according to TDG and Workplace Hazardous Materials Information System (WHMIS) regulations.
- Chemicals, sediments, wastes, and/or fuels associated with the project shall not be deposited into any water body.

Water Intake

Objective: To ensure that all water withdrawals conform to permit conditions as set out by DFO and the NWT Water Board.

- The Camp Farewell site supervisor must review the water licence requirements and ensure requirements are executed.
- Only water sources designated for water withdrawal shall be used.
- Water withdrawals shall be less than 150 m^3 per day for duration of camp operations.
- All water intakes shall be properly screened with fine mesh of 2.54 mm to prevent the entrainment of fish, in accordance with DFOs *Freshwater Intake End-of-Pipe Fish Screen Guideline*.

Wastewater and Melt Water Discharge

Objective: To ensure that wastewater and melt water discharge conforms to licence conditions as set out by the NWT Water Board.

- The Camp Farewell site supervisor must be familiar with the operating procedures of the wastewater holding tanks and methods of waste transport and disposal.
- The NWT Water Board Inspector shall be notified 5 days prior to the start of any planned discharge of melt water from the lagoon to the Mackenzie River. Inspector approval is required prior to discharge.
- In the event of a spill, procedures shall be implemented as outlined in the ERP (Section 7 of the attached *Farewell Camp and Stockpile Site Operations and Maintenance Plan*).
- Meeting the DFO *Fisheries Act* specifications are priority. The DFO *Fisheries Act* prohibits the deposit of any deleterious substances into fish-frequented waters. A substance is deleterious if it is harmful to fish, if it limits the use of fish by humans, if it harms the water quality by going through some process of degradation, or if it exceeds a level prescribed by regulation.

Wildlife

Objective**:** Measures shall be implemented to minimize wildlife disturbance at the camp and on the access route.

- A wildlife monitor will be on-site while the camp is in operation to limit the potential for human – wildlife contact. Any effects observed on the listed Species at Risk and its critical habitat will be identified and measures will be taken to avoid or lessen the effects.
- All locations (GPS location data if possible) and dates of any observations of Species at Risk and their behaviour will be recorded and submitted to the Environment and Natural Resources (ENR) office in Inuvik upon completion of the project.
- Wildlife shall not be harassed or fed. With the exception of wildlife monitors, personnel shall not be permitted to have firearms on the site. The recreational use of all-terrain vehicles and snowmobiles by personnel is prohibited. Any incidents with wildlife or collisions with wildlife shall be reported to the CWS. Additionally, any bear sightings and encounters with bears shall be reported to the ENR as soon as possible using the Bear Encounter Response Guidelines and Bear Complaint Checklist (Appendix F).
- The Wildlife Monitor shall identify any bear dens close to the camp before the start up of camp operation.
- Aircraft involved in camp operations shall fly at sufficient altitudes to avoid disturbing wildlife, including nesting sites. The EISC Minimum Flight Altitude Guidelines and Flying Low Brochure documents are included in Appendix F and will be observed as part of any project using Camp Farewell.
- No fishing will be permitted by personnel working on Shell projects.
- All food, domestic wastes, and petroleum-based chemicals must be made inaccessible to wildlife at all times.

13.0 CUMULATIVE EFFECTS

Camp Farewell is an existing facility, and environmental impacts either have been or will be minimized by the following:

- The tank farm was rebuilt in 2002 including a new secondary containment liner.
- A tray system is located beneath the fuel loadout, which allows all potential spills to be captured during fuel discharge.
- The attached *Farewell Camp and Stockpile Site Operations and Maintenance Plan* includes a spill contingency plan for the site. Any future project undertaken at Camp Farewell will have a renewed and applicable spill contingency plan as part of the EISC approval process.
- Combustible debris is burned in an incinerator or in a contained metal sloop.
- Recyclable materials are removed from the site to an approved facility.

As indicated in Section 8 (Alternatives), the operation of mobile camps and temporary storage sites would be the likely alternatives to the continued operation of Camp Farewell. Thus in terms of reducing cumulative effects of activity in the Mackenzie River Delta, the continued operation of Camp Farewell would have a positive impact because it is already in existence and requires no further surface disturbance.

14.0 EMERGENCY RESPONSE PLAN

Section 7 of the attached document *Farewell Camp and Stockpile Site Operations and Maintenance Plan* contains the ERP for Camp Farewell. Any future project undertaken at Camp Farewell will have a renewed and applicable ERP as part of the EISC approval process.

15.0 SITE RECLAMATION AND DECOMMISSIONING

The *Abandonment and Restoration Plan* provided in Appendix E was prepared by WorleyParsons Canada (WorleyParsons) in March 2011. The purpose of this plan was to summarize the existing conditions of Camp Farewell as well as Shell's plans for abandoning and restoring the site at the time of closure. The report is based on the Mine Site Reclamation Guidelines for the NWT published by Indian and Northern Affairs Canada (INAC) in January 2007.

16.0 OTHER ENVIRONMENTAL ASSESSMENTS

Table 16.1 lists the previous environmental assessments that took place at Camp Farewell. The assessments are described in greater detail in the *Abandonment and Restoration Plan* included in Appendix E.

Table 16-1: Previous Environmental Programs at Camp Farewell

ENVIRONMENTAL PROGRAM	AUTHOR
Baseline Environmental Site Assessment, Camp Farewell, Mackenzie Delta, Northwest Territories	Golder 2000
Phase I and Phase II Environmental Site Assessment of the Shell Farewell Stockpile and Campsite	Komex 2001
Interim Abandonment and Restoration Plan	Komex 2002
Phase II Environmental Site Assessment, Camp Farewell, NWT.	WorleyParsons Komex 2006
Interim Abandonment and Restoration Plan	WorleyParsons 2008
Interim Abandonment and Restoration Program Report	WorleyParsons 2010
Abandonment and Restoration Plan	WorleyParsons 2011
Ongoing environmental monitoring	various

Environmental impacts identified at the site in the 2006 Phase II environmental site assessment continue to be managed through the treatment of soil on site and the monitoring of soil and water chemistry at the site.

17.0 REFERENCES

Canadian Wildlife Service. 2000. Hinterland Who's Who. Ottawa/Hull. Website: http://www.hww.ca/index_e.asp#

Casselman, L.M., D.M. Dickinson, and A. M. Martell. 1984. *Wildlife of the Mackenzie Delta Region.* Boreal Institute for Northern Studies. Occasional Publication No. 15. Edmonton, Alberta.

Community of Aklavik, Wildlife Management Advisory Council (NWT) and Joint Secretariat. 2008. *Aklavik Inuvialuit Community Conservation Plan (AICCP).*

Community of Inuvik, Wildlife Management Advisory Council (NWT) and the Joint Secretariat. 2008. *Inuvik Inuvialuit Community Conservation Plan (IICCP).*

Community of Tuktoyaktuk, Wildlife Management Advisory Council (NWT) and the Joint Secretariat. 2008. *Tuktoyaktuk Community Conservation Plan (TCCP).*

Department of Fisheries and Oceans. 1995. *Freshwater Intake End-of-Pipe Fish Screen Guideline.*

Ecological Stratification Working Group. 1996. *A National Ecological Framework for Canada*. Centre for Land and Biological Resources Research, Research Branch, Agriculture and Agri-Food Canada, State of the Environment Directorate, Environment Conservation Service, and Environment Canada, Ottawa/Hull. Website: http://www.sis.agr.gc.ca/cansis/publications/ecostrat/cad_report.pdf

Environment Canada. 2002. Canadian Climate Normals 1931 – 2000 for Inuvik A, Northwest Territories. Website: http://www.climate.weatheroffice.gc.ca/climate_normals/index_e.html

Environmental Impact Screening Committee. 2004. *Operating Guidelines and Procedures.* Joint Secretariat. Inuvik, NWT. 55 pp.

Gill, D.A. 1971. *Vegetation and environment in the Mackenzie River Delta, NWT.* A study in subarctic ecology. Ph.D. thesis. U.B.C., Vancouver, B.C.

Government of Canada. 2002. Species at Risk Act. Website: http://www.sararegistry.gc.ca/

Government of the Northwest Territories, Department of Environment and Natural Resources. 2010. *Species at Risk in the Northwest Territories*. 68 pp.

Heginbottom, J.A. 1998. Permafrost Distribution and Ground Ice in Surficial Materials. In the Physical Environment of the Mackenzie Valley: Baseline for the Assessment of Environmental Change. Geological Survey of Canada, (eds) L.D. Dyke and G.R. Brooks.

Imperial Oil Resources Ventures Limited. 2004. *Environmental Impact Statement for Mackenzie Gas Project, Volume 2: Project Description*. Table 6-7.

Mackenzie River Basin Committee. 1981. *Mackenzie River Basin Study Report.* A Report under the 1978-1981 Federal-Provincial Study Agreement Respecting the Water and Related Resources of the Mackenzie River Basin.

Northwest Territories Water Board. 1992. *The Guidelines for the Discharge of Treated Municipal Wastewater in the Northwest Territories*. 25 pp.

Sekerak, A.D., N. Stallard and W.B. Griffiths. 1992. *Distribution of fish and fish harvests in the nearshore Beaufort Sea and Mackenzie Delta during ice-covered periods, October – June*. Environmental Studies Research Funds Report No. 117. Calgary. 157 p. + appendices.

Appendix A: Farewell Camp and Stockpile Site Operations and Maintenance Plan

FAREWELL CAMP & STOCKPILE SITE

OPERATIONS AND MAINTENANCE PLAN

Sewage and Solid Waste Treatment Facilities

November 2001
Amended August 2002
Amended May 2003
Amended July 2003
Amended January 2006

CAMP FAREWELL & STOCKPILE SITE

OPERATIONS & MAINTENANCE PLAN

November 2001
Amended May 2002
Amended August 2002
Amended May 2003
Amended July 2003
Amended January 2006

1. OPERATIONAL PLAN

2. STP – GENERAL DESCRIPTION

3. SITE PLANS, SURVEY & EQUIPMENT DRAWINGS

4. STP – OPERATIONS & MAINTENANCE GUIDE

5. MODIFICATIONS

6. QA/QC PLAN

7. EMERGENCY RESPONSE / CONTINGENCY PLAN

8. LICENSE N7L1-1762

9. SOLID WASTE DISPOSAL PLAN

10. MISC. & CORRESPONDANCE

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.
- 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. See "Water License MAC Calculations" in Water License Section 8.
- 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 the 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.
- 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.

Water License On-Site Requirements

Check List

	Circle appropriate answer	Date	Initials
Copy on site: Operations & Maintenance Plan	Yes / No		
Water License*	Yes / No		
Current ERP/Contingency Plan*	Yes / No		
QA/QC Plan* *Located in O&M Plan Binder	Yes / No		
Inspector Approval prior to Discharge	Yes / No		
Screened Water Intake (1/10" mesh)	Yes / No		
Discharge Sample Point Sign in place w/ "1762-1 Treated Effluent Discharge Sample Point"	Yes / No		
Volumes of Water withdrawn and waste discharged (for the camp) are recorded	Yes / No		
Treatment Facilities were modified. If yes: 5 Day Notice to Inspector As-builts submitted within 90 days of completion	Yes / No Yes / No Yes / No		
When taking water from the lake, **dissolved oxygen & temperature profile** must be obtained prior to withdrawal and prior to demob.	Yes / No Yes / No		

Biweekly Discharge Samples

	Date Sampled	***Sampler***		***Date Sampled***	***Sampler***
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

Year: _____

Water Withdrawal Volumes

Camp Farewell

Water License On-Site Requirements

Number of cubic meters for Camp Farewell Use Only Permit#N7L1-1762 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												
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25												
26												
27												
28												
29												
30												
31												
Total Loads												
Total M3												

Note: Maximum Licensed Volume = 150 m3/d

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

Camp Farewell **Year: _____**

Waste Water Disposal Volumes

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												
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28												
29												
30												
31												
Total M3												

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

Extended Aeration Activated Sludge Unit

Waste Water Treatment System

General Description

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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 ½” wide by 8- 9 ½” 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 smoothes 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.

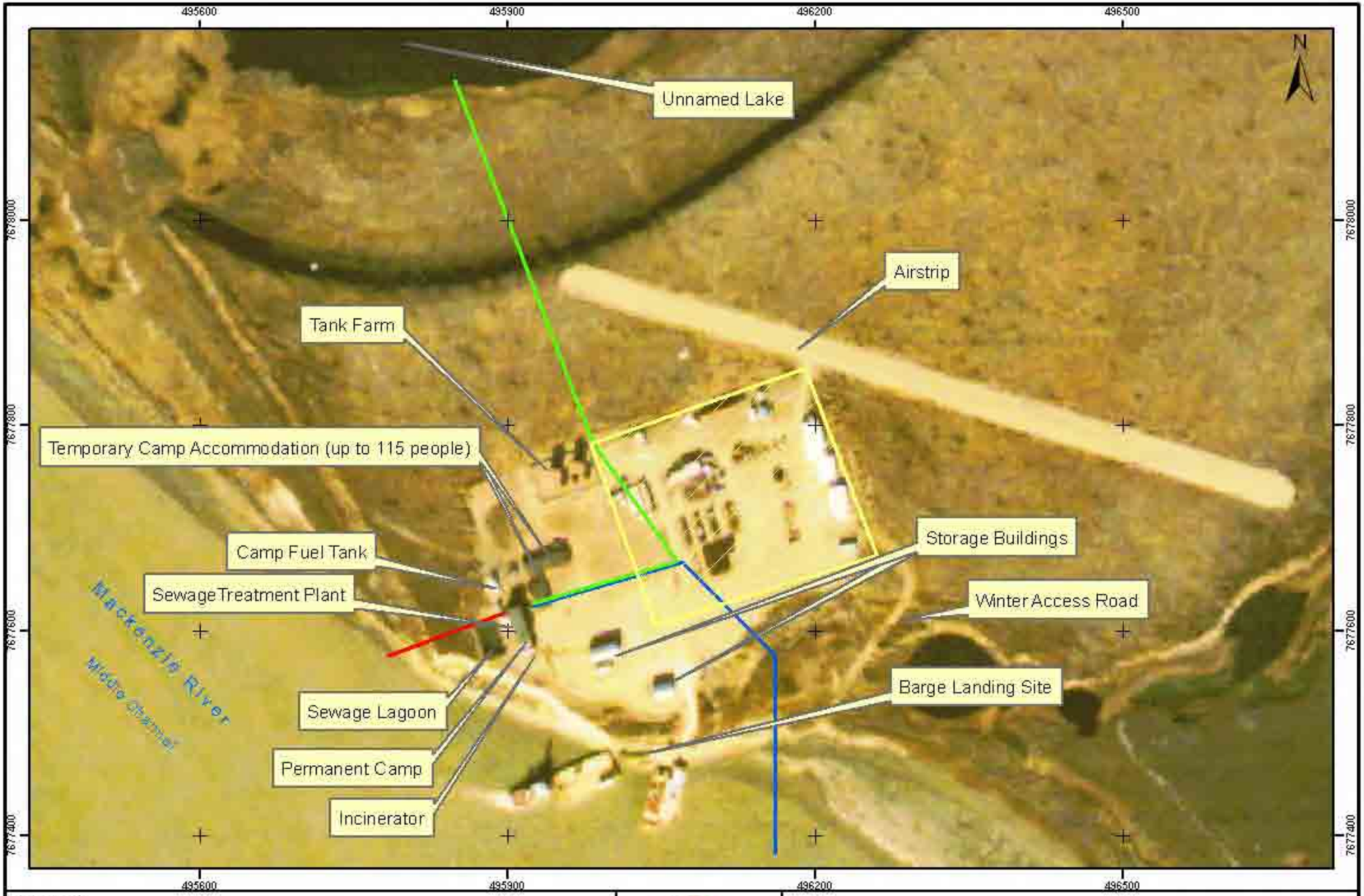
After about four hours of settling the clear, treated discharge water runs over a weir to a holding tank. The settled sludge containing microorganisms is then pumped using airlifts to the aeration tanks. This is the 2 " PVC RAS (Returning Activated Sludge) line shown on the Saniterm P&ID drawing. Two 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.



Legend

- Approximate Location of Unnamed Lake Water Intake
- Approximate Location of Mackenzie River Water Intake
- Approximate Location Wastewater Discharge
- Stockpile Site

0 40 80 160 240 320 Meters

CAMP FAREWELL SITE PLAN

UTM 8	NAD 83	IBG ENVIRONMENTAL		Geoffmosaic color balanced, acquired on 25.09.2002	
RP-8	KM	JUNE 15, 2005	1:5,000	FIGURE 5-1	0

SHELL CANADA LIMITED

PLAN SHOWING SURVEY

OF

Farewell Stock Pile Site & Access Road

CO-ORDINATES OF S.W. CORNER OF SITE

LATITUDE 69° 12' 30.0" LONGITUDE 135° 06' 04.4"

SCALE 1" = 600

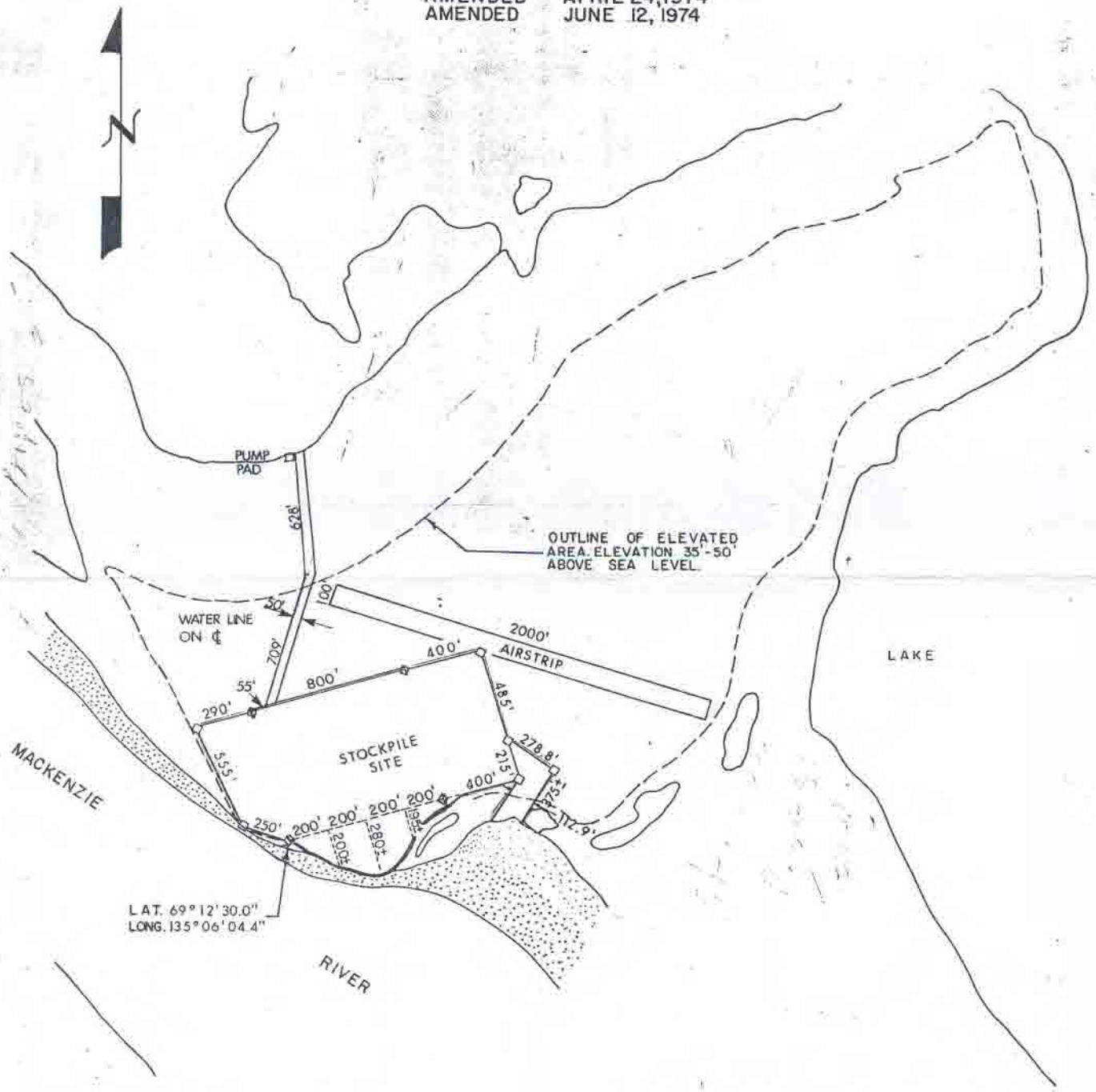
DECEMBER 1971

AMENDED FEBRUARY 1972

AMENDED APRIL 9, 1973

AMENDED APRIL 24, 1974

AMENDED JUNE 12, 1974



LEGEND

5/8 x 18" Iron Bars Planted Shown Thus

Sand and Gravel on River Bank

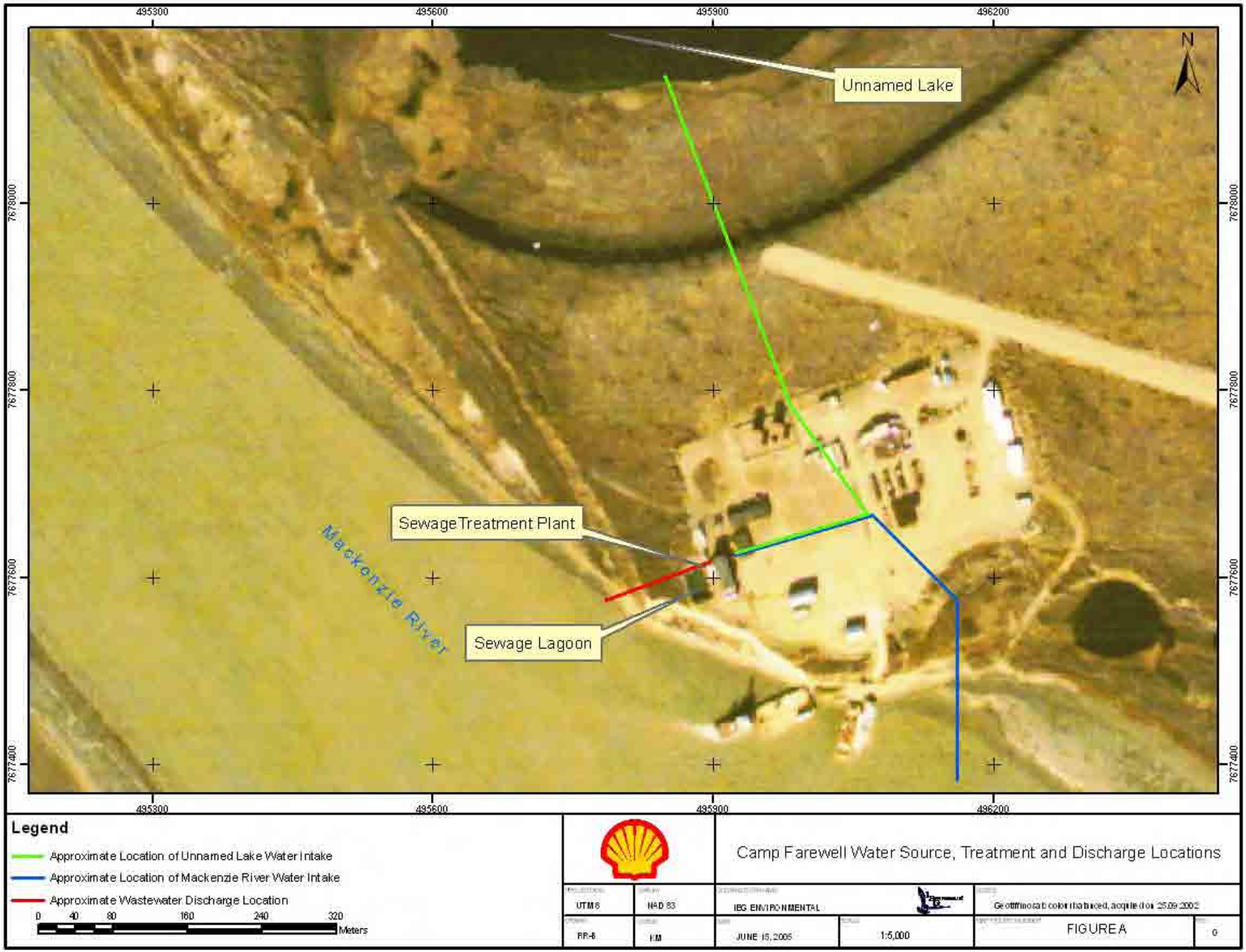
Elevation of S.W. Corner 45±

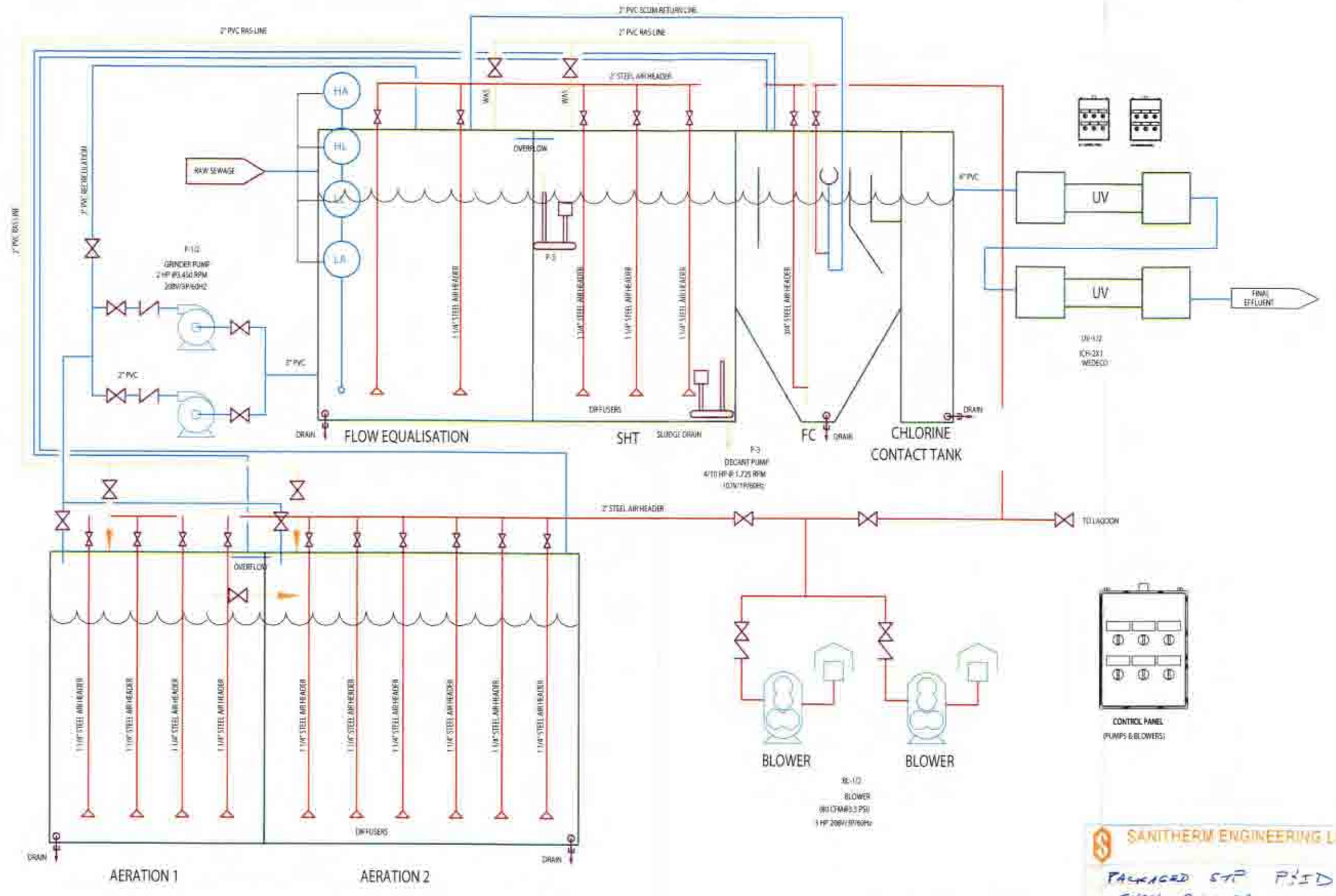
Area Stockpile Site	= 27.00 Acres
Area Airstrip	= 4.59 Acres
Area Water Line	= 1.53 Acres
Total	= 33.12 Acres

I certify that the survey represented by this plan is correct to the best of my knowledge and was completed on the 16th. day of December 1971. Revised as shown.

C. Hittel April 9th 1973

A. HITTEL D.L.S.

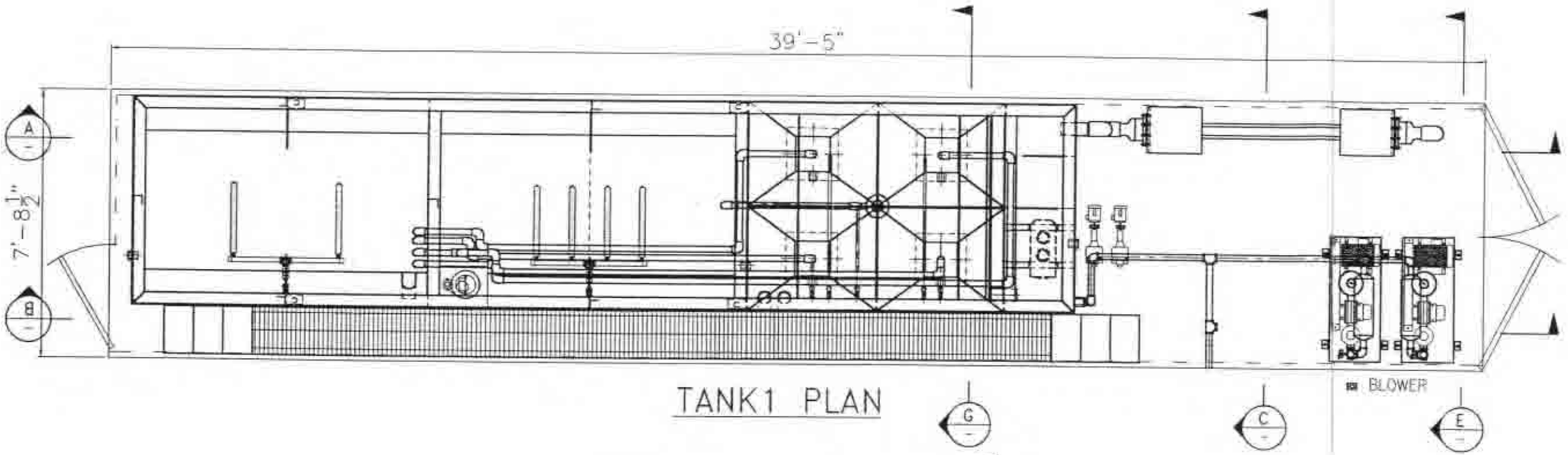

495300
495600
495900
496200
7678000
7677800
7677600
7677400
N
Unnamed Lake
Sewage Treatment Plant
Mackenzie River
Sewage Lagoon
Legend
Approximate Location of Unnamed Lake Water Intake
Approximate Location of Mackenzie River Water Intake
Approximate Wastewater Discharge Location
0 40 80 160 240 320
Meters
Camp Farewell Water Source, Treatment and Discharge Locations
UTM 8
NAD 83
IBG ENVIRONMENTAL
GeoEye natural color rebalanced, acquired on 25.09.2002
RP-8
I:M
JUNE 15, 2005
1:5,000
FIGURE A
0



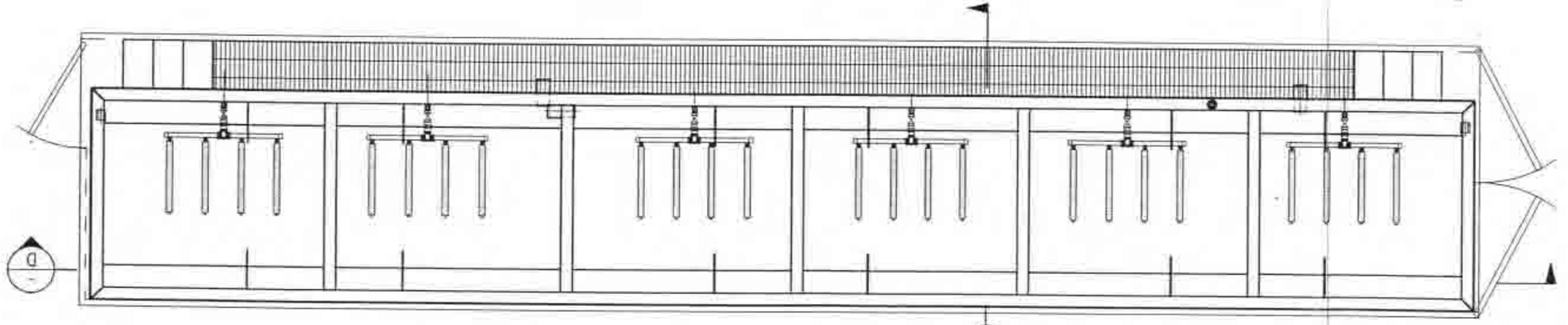
SANITHERM ENGINEERING LIMITED

PACKAGED STP P&ID
SHELL CANADA LIMITED
CAMP FAREWELL 120 MM STP

07/02 AS BUILT



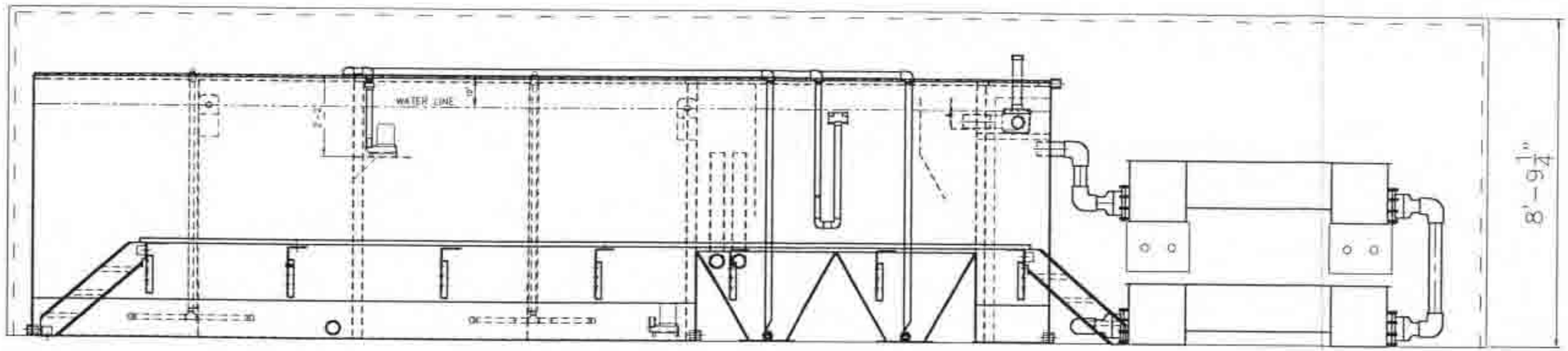
TANK1 PLAN



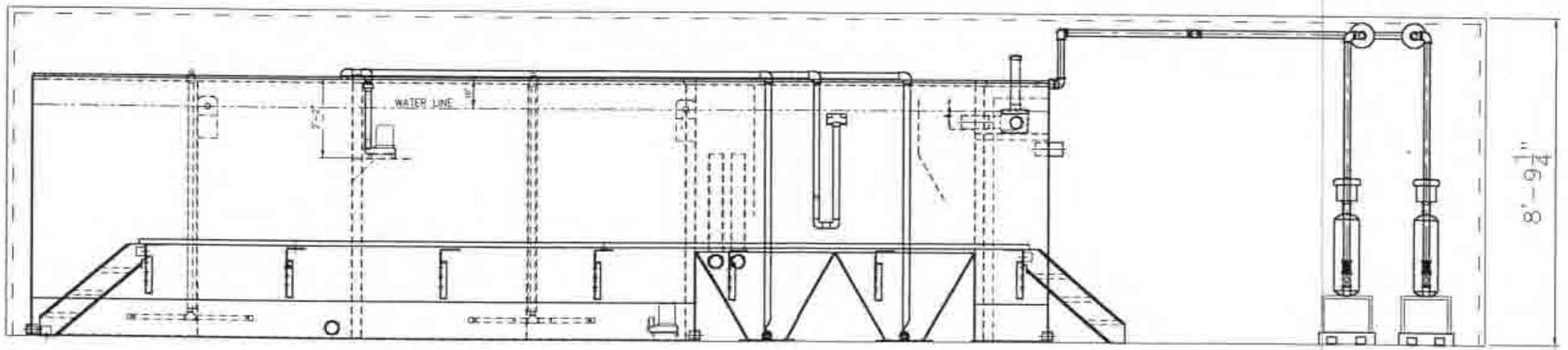
TANK2 PLAN

SANITHERM ENGINEERING LIMITED

TITLE	PACKAGE SEWAGE TREATMENT PLANT GA
CLIENT	SHELL CANADA LTD.
PROJECT	CAMP FAREWELL 120 MAN STP
DRAWN BY	SC
CHECKED BY	DMS
DRAWING NO.	A2565
DATE	10-JUN-2002
SCALE	N.T.S.
SHEET	1 OF 3
PAPER SIZE	17" X 11"
DRG. NO.	SA-36-002



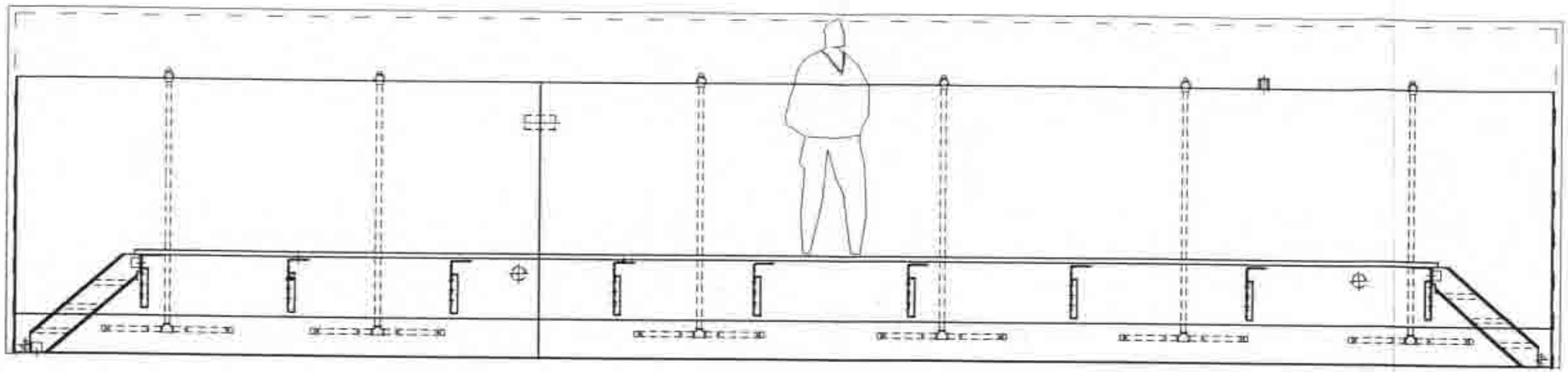
SECTION A
NTS



SECTION B
NTS

SANITHERM ENGINEERING LIMITED

TITLE	PACKAGE SEWAGE TREATMENT PLANT GA
CLIENT	SHELL CANADA LTD
PROJECT	CAMP FAREWELL 120 MAN STP
SC	A2501
DMB	10-JUN-2002
N.T.S.	17"X11"
2 OF 3	SA-38-002



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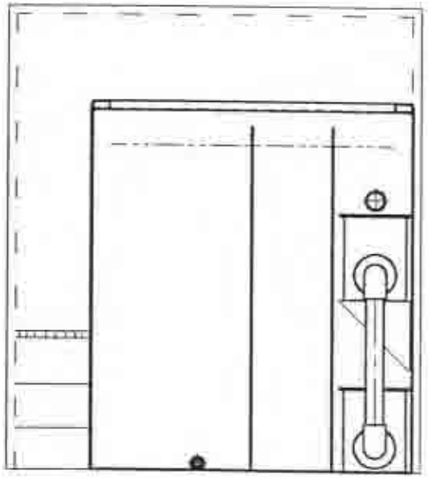

SECTION C
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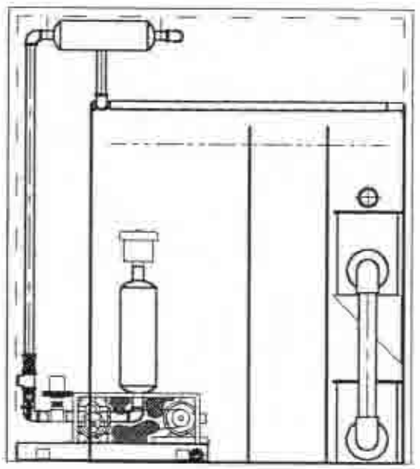

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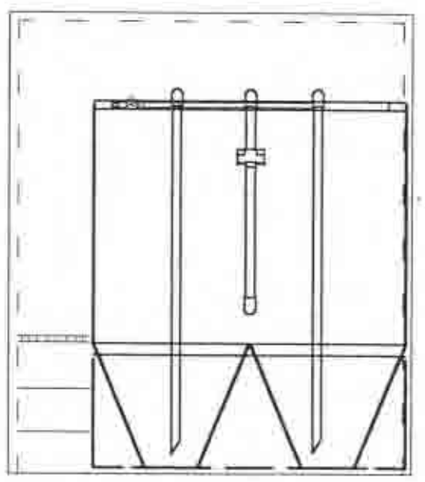

SECTION G
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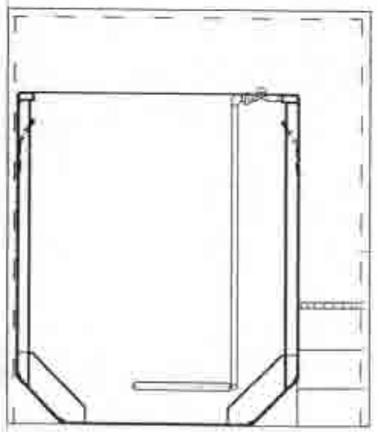
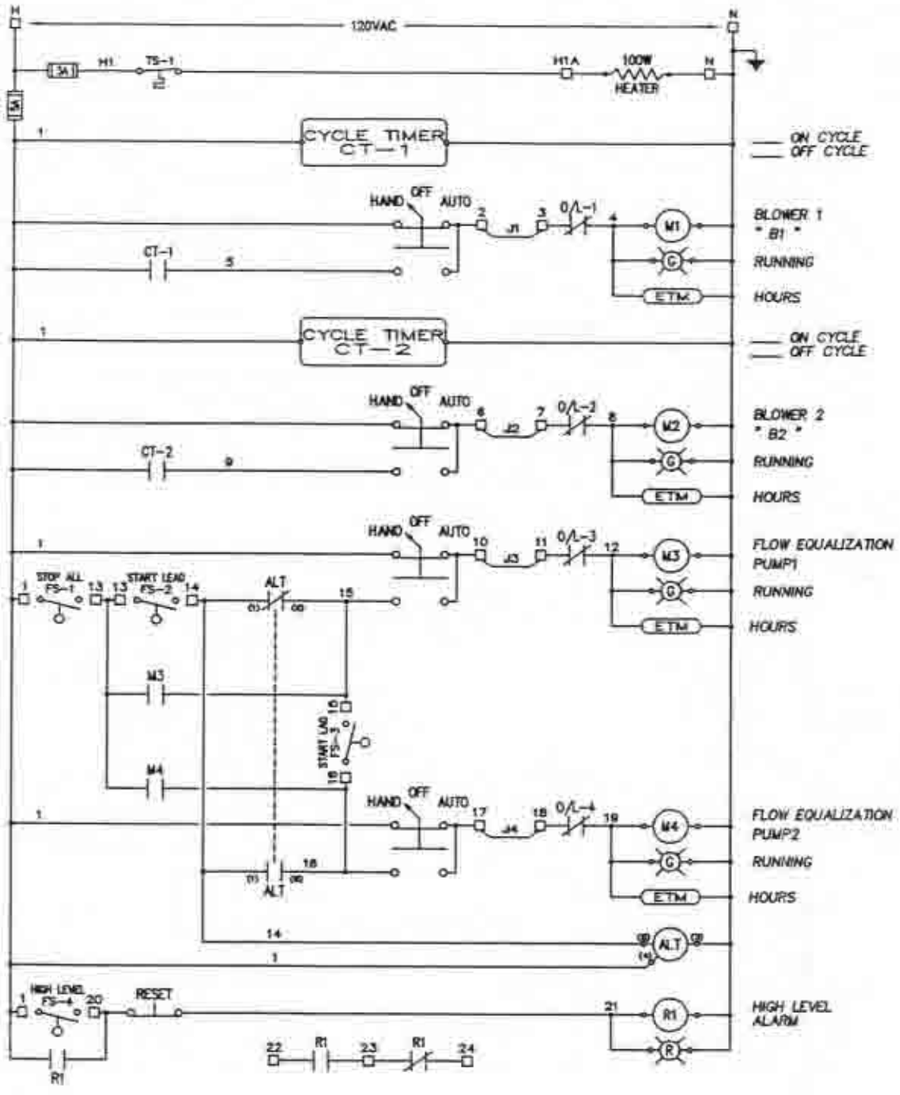


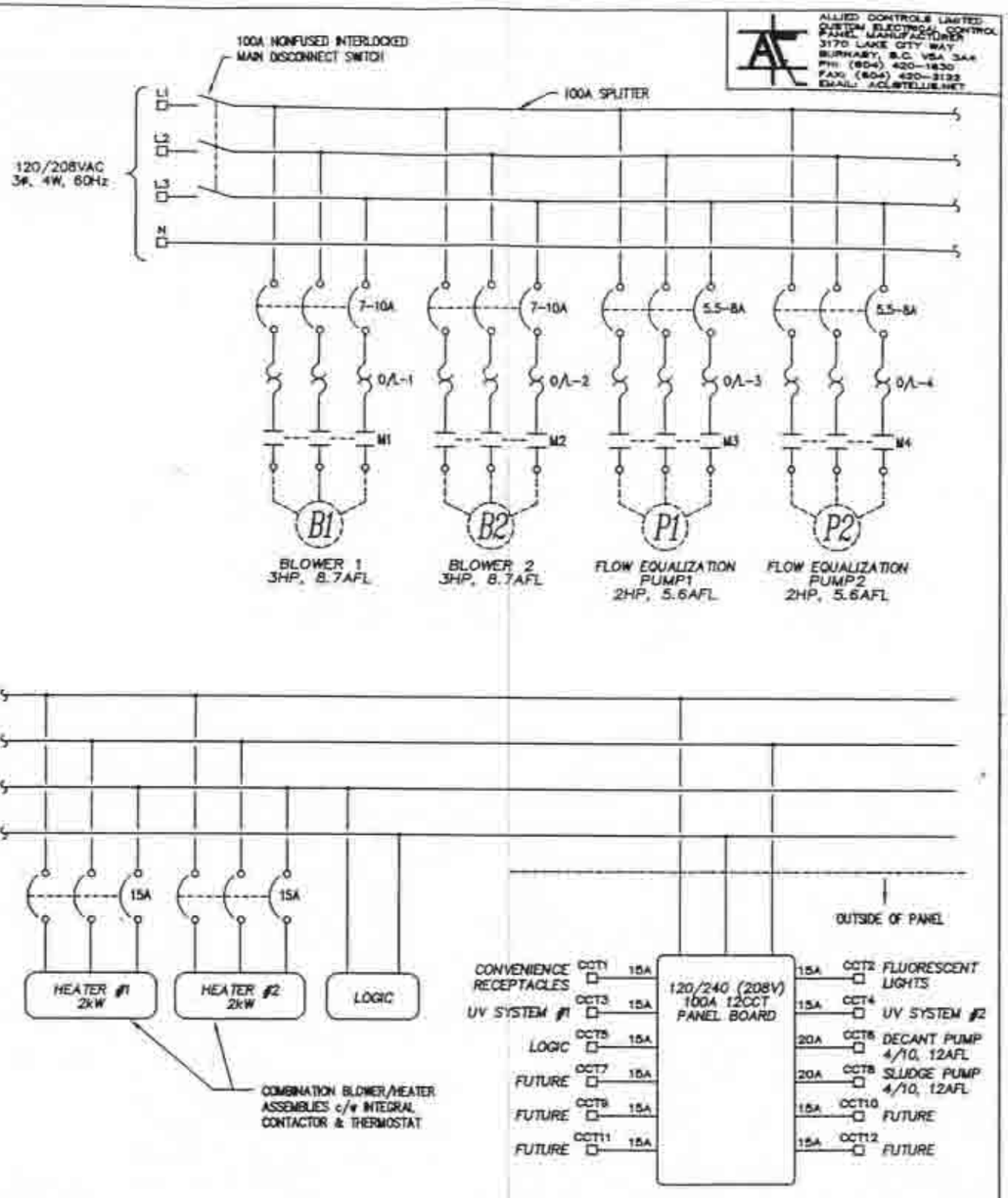
SECTION F
NTS

SANITHERM ENGINEERING LIMITED

TITLE	PACKAGE SEWAGE TREATMENT PLANT GA
CLIENT	SHELL CANADA LTD
PROJECT	CAMP FAREWELL 120 MAN STP

DRAWN BY	SC	DRAWING NO.	A2565	SCALE	N.T.S
CHECKED BY	DMB	DATE	10-JUN-2002	SHEET	2 OF 2
				DWG SIZE	17" X 11"
					SA-38-002

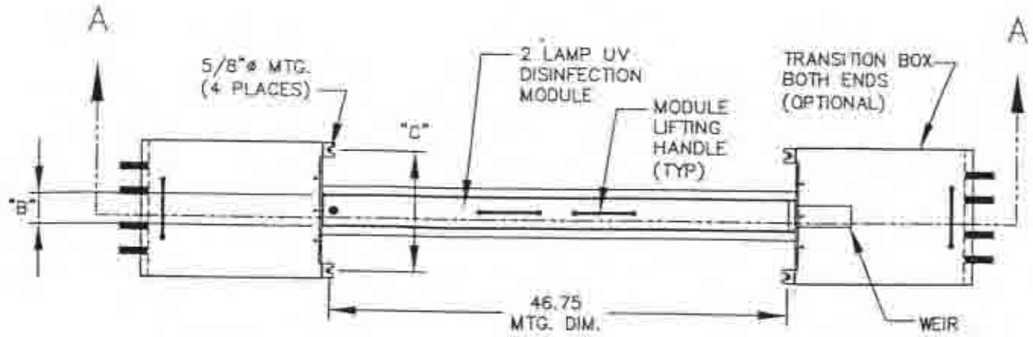




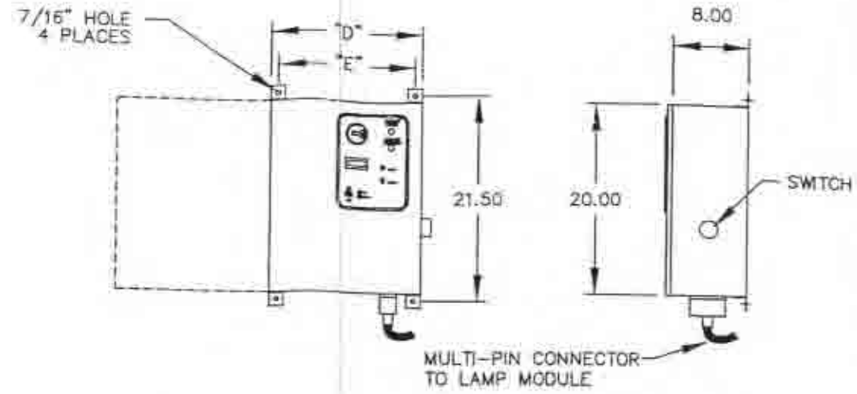
NOTES:

1) THE PANEL IS TO BE EEMAC 12.
2) THE MAIN DISCONNECT IS INTERLOCKED WITH THE DOOR.
3) FS-1 TO FS-4 CLOSE ON RISING LEVEL.
4) JUMPERS J1 TO J4 ARE FOR FUTURE SHUTDOWN CIRCUITS.
5) CT1 AND CT2 ARE LOCATED ON THE BACK PAN
6) THE PANELBOARD IS TO BE SUPPLIED LOOSE.

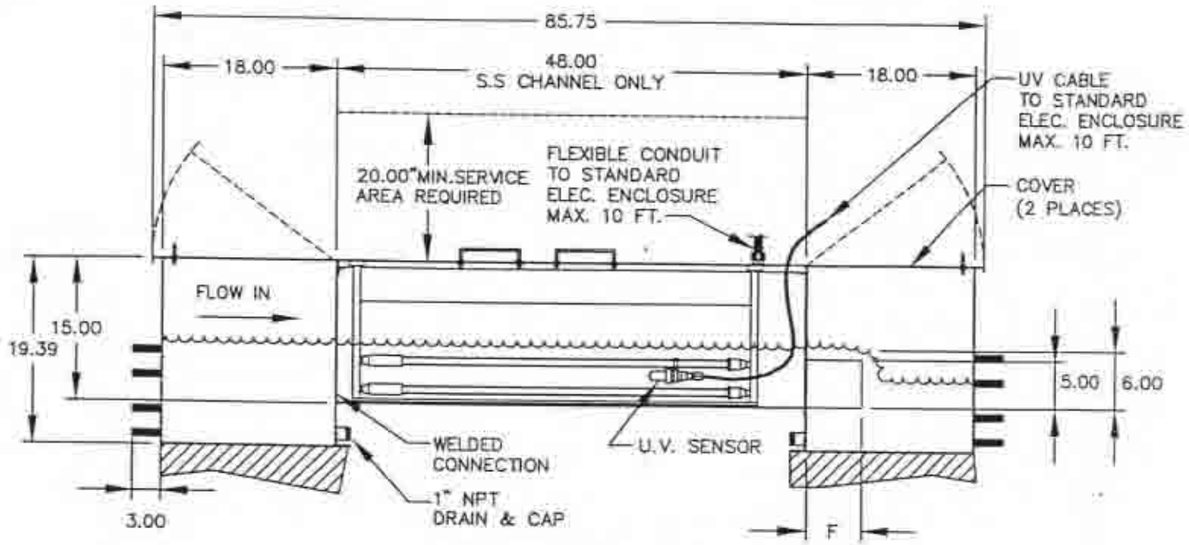
ALLIED CONTROLS LIMITED			
DATE DRAWN: 06/2002	APPROVED BY: G.A.V.	DRAWN BY: T.N.	
DRAWING SCALE: N.T.S.	WORK ORDER NUMBER: 3413	REV. NUM: 0	REV. DATE: —
SHELL RESOURCES/CAMP FAREWELL TUKTOYAKTUK, N.W.T. WASTE WATER TREATMENT PLANT POWER & SCHEMATIC DIAGRAM			
CUSTOMER: SANITHERM ENGINEERING		DRAWING NUMBER: 02413-C1140	



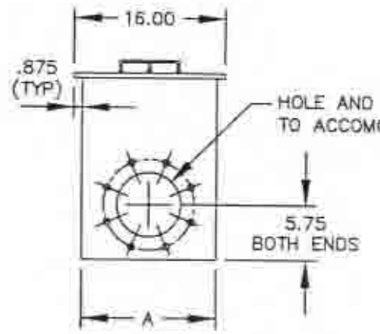
PLAN



SYSTEM CONTROL ENCLOSURE



SECTION A-A



NOTES:

1. ALL DIMENSIONS ARE IN INCHES & TOLERANCES AS PER WEDECO IDEAL HORIZONS' ENGINEERING STANDARDS
2. MODEL ICH-2X1-S SHOWN

SPECIFICATIONS :

1. WETTED PARTS, DISINFECTION CHANNEL MAT'L-304 SS 11 GAGE MATERIAL
2. ELECTRICAL : 120V AC/60 HZ SINGLE PHASE
   OPTIONAL : 220V AC/50 HZ SINGLE PHASE
3. ELECTRICAL ENCLOSURE : 304 SS NEMA 4X MODIFIED

MODEL	# OF LAMPS	# OF RACKS	"A"	"B"	"C"	"D"	"E"	"F"
ICH-2X1-S	2	1	14.00	3.125	12.50	16.00	14.50	2
ICH-2X2-S	4	2	14.00	6.125	12.50	20.00	18.50	4
ICH-2X3-S	6	3	14.00	9.125	12.50	20.00	18.50	6

LTR	DESCRIPTION	DATE	APPROVAL
	REVISIONS		

FOR DISCUSSION PURPOSES ONLY
NOT FOR CONSTRUCTION

PROJECT
LOCATION
ENGINEER

Drawn by	VOV	11/08/01
Checked by		
Approved by		
Proj. Engr.		

WEDECO
Ideal Horizons

WEDECO-Ideal Horizons, Inc.
212 Ideal Way
Poultney, VT 05764 USA
(802) 287-4488
Fax (802) 287-4486
www.wedecouv.com

MODEL: ICH-S

UV DISINFECTION SYSTEM ICH-S SERIES

Size	Drawing #	Rev.
B	ICH-S SERIES	
Scale NTS	WT:	Sheet

Sewage Treatment Plant – GOLDEN RULES

This module contains Safe Work Procedure to assist you in safely performing various tasks based on recognized hazards. Although a lot of thought has gone into the development of the SWP, they only serve as a guideline to put you in the right frame of mind prior to conducting a task. It is also realized that some tasks are more critical than others and as such require more stringent procedures.

The following list contains SWP from this module which Shell considers non-negotiable. **Failure to comply to these procedures may result in immediate dismissal.**

- Any persons that enter the sewage treatment area must first use an air monitor to ensure the proper air quality is available. Anything below an acceptable level must not be entered unless proper steps are taken to ensure acceptable entry.
- Persons who are designated to work in the area must have immunization shots (i.e., Tetanus, Diphtheria and Hepatitis A & B.
- Workers must properly wash was once leaving the contaminated area (hands, face, etc.)
- Any persons with exposed wounds are not permitted in the sewage area.
- Only designated tools are to be used in the sewage area. Those tools are not to be removed and are only used in this area.
- Proper PPE must be worn. Eye glasses, rubber gloves, face masks, disposable or area designated clothing.
- At no time is anyone who has entered the sewage treatment center allowed into the eating area unless properly washed and wearing clean clothing.
- Contaminated clothing is to be immediately removed and washed in the designated washing area.
- UV light is to be managed following the manufacture recommendations.

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

TABLE OF CONTENTS

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

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).

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

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:

    a. Energize the Control Panel.

    b. Check rotation of all three phase powered equipment within the plant. Energize all circuits within the breaker panel.

    c. 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.

4. 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.

5. 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 be 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.

6. 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.

7. 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 l00%.

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

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.

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

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

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

Problem	***Cause***	***Possible Remedy***
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 blower.	Blockage at intake line.	Remove and clean breather.
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

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

Problem	***Cause***	***Possible Remedy***
	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 obtaining sample	Follow proper sampling 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 0-ring and tighten compression nut.

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

Problem	*Cause*	*Possible Remedy*
	0-ring is damaged	Replace 0-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 the lamp out condition. Turn **OFF** the lamp rack assembly that has the lamp out. Replace the defective lamp and turn the module **ON**.
	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 **OFF** power to the module. Check point to point from the lamp to its corresponding ballast, looking for an **OPEN** circuit. If the circuit is open, reseat the connection and retest the circuit. Turn **ON** module power.
	Lamp Status Board Failure	Locate the suspect lamp status board Turn **OFF** the corresponding module. Disconnect the **LED** array connector from the board and remove the board. Replace the suspect lamp status board with a known operational board and turn **ON** the module. It the problem persists (**LED's** will not light), follow the

Problem	*Cause*	*Possible Remedy*
		procedure outlined in **LAMP WIRING**.
	Defective Wiring	Obtain a mutimeter and set to the Ohm scale. Turn the **GFI** to **OFF**. Check point to point from the **GFI** to the power **ON** relay socket pin in the **Ballast Power Enclosure**. If a circuit is **OPEN**, reconnect the wire. If the problem persists, check the **ON/OFF/AUTO** switch.
	On/off/auto switch	Turn **OFF** the power to the suspect module at the **GFI's** in the control box. Module switch needs to be in the **ON** 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 **OPEN**, replace the switch.
	Ultraviolet meter circuit board failure	Turn **OFF** the power to the bank. Remove the suspect board, and replace it with a known operational board. Turn **ON** 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.
	Lamp bank failure	If there is a lamp bank failure, or partial bank fail check the following five (4) areas: GFI breaker- SIB ON. Multi- pin connectors should be plugged in Wiring (see previous defective

Problem	***Cause***	***Possible Remedy***
		wiring) **ON 0FF/AUTO** switch-select proper setting
		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.

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

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.

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

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.

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

- Check oil level daily. Add fresh oil as required
- Drain oil from gearbox and replace every 1500 hours (about 2 months)
- 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.

Shell Farewell – License N7L1-1762

Proposed

Wastewater Treatment Plant Modifications

Mod. 2002-1

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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.

NORTHWEST TERRITORIES WATER BOARD

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

P.O. Box 1500, Yellowknife, NT, X1A 2R3, 2nd Floor Goga Cho Building
Phone: (867) 669-2772 Fax: (867) 669-2719

QUALITY ASSURANCE AND QUALITY CONTROL PLAN

FOR

SURVEILLANCE NETWORK PROGRAM
LICENCE NUMBER: N7L1-1762 RENEWAL

Prepared for:

Shell Canada Ltd.
400 – 4th Avenue SW
Calgary, AB
T2P 2H5

Prepared by:

IEG Environmental
Suite 1100, 550 11th Ave. SW
Calgary, Alberta
T2R 1M7

December 2005

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Tables

Appendix

1.0 INTRODUCTION

This proposed QA/QC Plan is a requirement of Clause B.5 of Northwest Territories Water Board Class B License N7L1-1762 issued to Shell Canada on November 1, 2005. The Plan describes: the types of sampling required; the location of sample collection; the frequency of sampling; sample handling methods and documentation; and the analytical parameters for laboratory analysis. This License is for Camp Farewell in the Mackenzie River Delta, located at Latitude 69^{o} 12'30" N and Longitude 135^{o} 06'04" W in the Northwest Territories.

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.

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_5	(black dot) Polyethylene	500 or 750	Refrigerate 4 ^{o}C	24 Hours	Biweekly – Station # 1762-1
Total Suspended Solids	(black dot) Polyethylene	500 or 750	Refrigerate 4 ^{o}C	28 Days	Biweekly – Station # 1762-1
Faecal Coliforms	(Sterile) Polyethylene	250 or 500	Sodium Thiosulphate (in bottle) Refrigerate 4 ^{o}C	24 Hours	Biweekly – Station # 1762-1
Ammonia	(black dot) Polyethylene	500 or 750	Refrigerate 4 ^{o} C	28 Days	Biweekly – Station # 1762-1
Oil and Grease	(yellow dot) Wide mouth Brown Glass	1000	4 ml 1:1 H_2SO_4 – Refrigerate 4 ^{o}C	N/A	Biweekly – Station # 1762-1
pH	(green dot) Polyethylene	500 or 750	Refrigerate 4 ^{o}C	24 Hours	Biweekly – Station # 1762-1
Phosphorus	(black dot) Polyethylene	500 or 750	Refrigerate 4 ^{o} C	28 Days	Biweekly – Station # 1762-1
Total Residual Chlorine	(black dot) Polyethylene	500 or 750	Refrigerate 4 ^{o} C	28 Days	Biweekly – Station # 1762-1

Note: BOD_5 – 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 typically on 10 percent of the samples to confirm the laboratory results. Therefore, QC samples (blind duplicates) should collected every three months.

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^{th} 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".
- 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 ~4 ^{o}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. Refer to Table 1 for a summary of parameters to be analyzed, container size, preservation methods, and holding times.

Blind duplicate samples (when collected) will be compared to laboratory results for the normal 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, the effluent must be sampled again and another blind duplicate collected. 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.

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) and the addition of chemicals (acids, other preservatives, etc).

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[1]	DETECTION LIMIT
BIWEEKLY SAMPLING			
BOD_5	BOD	APHA 5210-B 5 Day incubation - O_2 electrode	2 mg/L
Total Suspended Solids	Solids-TOTSUS	APHA 2540-D Gravimetric	3 mg/L
Faecal Coliforms	FC (sewage)	APHA 9222-D Faecal Coliforms Membrane Filter Procedure	1 colony/100 ml
Ammonia	NH3-N	APHA 4500-NH3:G Automated Phenate	0.005 mg/L
Oil and Grease	O&G	APHA 5520:B Partition/Gravimetric	0.2 mg/L
Phosphorus	DP	APHA 4500-P:B Automated Stannous Chloride Reduction	0.004 mg/L
Residual Chlorine	Cl2	APHA4500-Cl:G DPD Colourimetric Method	0.01 mg/L
pH	pH	APHA 4500-H:B Electrometric	0.05 pH units

[1]Standard Methods for the Examination of Water and Wastewater, 20th 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 location and direction of flow of all Waste discharged to the Water;
- The results of sampling carried out under the Surveillance Network Program;
- 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;
- Details on the restoration of any sumps;
- Any revisions to the approved Contingency Plan; 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

ACLAE

CAEAL

Canadian Association for Environmental Analytical Laboratories Inc.

Certificate of Accreditation

Taiga Environmental Laboratory
Indian and Northern Affairs Canada
4601 - 52nd Avenue
P.O. Box 1500
Yellowknife, Northwest Territories

having met the requirements of ISO/IEC 17025 - 1999 (*General Requirements for the Competence of Testing and Calibration Laboratories*) and any additional program requirements, is deemed competent and hereby accredited for specific tests listed in the scope of accreditation approved by CAEAL.

Accreditation No. *A2635* Accreditation Date *January 3, 2005*

Issued on *January 3, 2005* Expiry Date *January 3, 2008*

President

APPENDIX C

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

CAMP FAREWELL EMERGENCY RESPONSE PLAN

December 2000

AMENDED OCTOBER, 2002
AMENDED MAY, 2003
AMENDED JULY, 2003
Amended January 2006

Copy # _____

FAREWELL EMERGENCY RESPONSE PLAN

This is a controlled document.

This general emergency response plan includes spill contingency plans for liquid, sewage and solid materials. It is effective from November 1, 2005 to October 31, 2008 or until an amendment is issued whichever is sooner. 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 Tununik Point at Longitude 69^{o}-12'-30" and Latitude 135^{o}-06'-04".

License number from Northwest Territories Water Board is N7L1-1762 License type B

Controlled Document Distribution

Copy 1	DAR/Construction Manager - Shell	
Copy 2	Site Supervisor	
Copy 3	Camp Supervisor	
Copy 4	NWT Water Board	
Copy 5	NWT Water Board Inspector	
Copy 6	HSE Team Leader - Shell	
Copy 7a-7d	Oil Pollution Emergency Plan	Transport Canada – Marine Safety

For additional copies of this Controlled Document Contact

Randall Warren
Shell Canada Limited
P.O. Box 100, Station M
400 4th Ave. SW
Calgary, Alberta
T2P 0J4

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APPENDICES 57

1.0 PURPOSE

The following document is intended to serve as a template for use in the development of Site-Specific General Emergency Response Plans (ERP's) within the Wells, Approvals and Seismic Operations (WA&SO) Department within Shell Canada Limited E&P.

ERP's are to be continually revised and updated to include relevant site-specific emergency response information. Revisions / updates to the ERP will be completed prior to initiating any phase of a program (i.e. Construction, Drilling, Well Services, Seismic Operations, etc).

2.0 SCOPE

All emergencies other than H_2S gas (sour gas) related emergencies are addressed in this ERP template. For projects where sour gas has been determined as a potential threat (see 3.0 Hazard Assessment) the ERP for this specific threat shall be covered in separate Site-Specific Sour Gas Drilling, Completions, Testing ERP.

WA&SO's Site-Specific General ERP is to be used in conjunction with the E&P Model ERP. The E&P Model ERP contains supporting information and forms that can be used in conjunction with this document.

3.0 HAZARD ASSESSMENT

Prior to developing a Site-Specific General ERP, a hazard assessment shall be conducted to determine potential emergency scenarios (hazards / threats). There are several activities within WA&SO that can provide information regarding potential emergency scenarios. Determine which activities are applicable to the project that will aid in determining potential emergency scenarios.

- ☒ HSE&SD Process
- ☐ DWOP
- ☐ CWOP
- ☒ Planning Meeting
- ☐ Pre-Spud Meeting
- ☐ _____
- ☐ _____

Section 11.0 shall be revised to reflect the emergency scenarios identified in the hazard assessment.

4.0 PUBLIC CONSULTATION AND COMMITMENTS

WA&SO conducts an extensive public consultation program as part of the licensing and approval process for all projects. Information regarding to public commitments related to emergencies and special resident needs shall be included in the WA&SO Site-Specific General ERP. New information shall be captured in the space provided below.

4.1 Public Consultation and Commitments	**Note:** Public data shall be kept strictly confidential. Access to this information is on a need to know basis only. _____ _____ _____ _____ _____

5.0 GENERAL EMERGENCY RESPONSE EQUIPMENT

Emergency Response Equipment requirements shall be identified based on the realistic potential emergency scenarios identified in the Hazard Assessments. It is important to ensure that the equipment provided meet the requirements to effectively manage an emergency.

5.1 Emergency Response Equipment	☒ first aid kit Level / Type-***determine based on # personnel on site*****.** ☒ first aid room ☐ resuscitator ☒ stretcher ☐ high angle rescue equipment ☒ emergency conveyance vehicle ☒ fire extinguishers ☒ burn kit ☒ eye wash stations ☒ shower facilities ☐ flares / flare gun ☒ communication equipment ☐ _____ ☐ _____

6.0 MEDICAL INFORMATION

All workers should provide personal medical information to be used in the event of a medical emergency. All workers, upon arrival onsite, will fill out the medical information form (Appendix II) to be submitted to the Medic. If a Medic is not available, the Onsite Shell Representative shall keep the sensitive information in a sealed envelope. Medical information is to be kept strictly confidential and will be destroyed at the end of each project. By signing the form, the worker is authorizing this information to be released to the Medic or other medical personnel during a medical emergency. For further information, refer to Shell's Privacy Policy.

7.0 TRAINING

Emergency Response training requirements shall be fulfilled prior to work to ensure an effective response to potential emergency scenarios. Training will include the use of/and maintenance of emergency response equipment, contact information, roles and responsibilities, communication equipment, etc. Each person's qualifications shall be verified.

7.1 Training	☒ emergency first aid ☐ standard first aid ☒ EMT-P ☒ Incident Command System ☒ fire fighting (dry chem.) ☐ confined space ☒ spill response ☐ _____ ☐ _____	Name: _____ Name: _____ Name: _____ Name: _____ Name: _____ Name: _____ Name: _____ Name: _____ Name: _____

8.0 TRAVEL INSTRUCTIONS

Directions to the worksite need to be documented and posted throughout the worksite to ensure the safe and timely arrival of emergency support equipment and personnel (i.e. ambulance, fire-fighting equipment, etc.). The Emergency Contact Information Sheet (Section 9) will have an area designated for directions. The directions shall be clear and concise.

Contact information shall be specific to the working area of the project. Specific numbers shall be verified to ensure the proper response can be asserted.

9.0 EMERGENCY CONTACT INFORMATION SHEET

PROJECT: **Farewell Camp & Stockpile**
LOCATION : **110 kms NW of Inuvik, NWT**

LAT : **69º 12' 35.09"**
LONG : **135º 06' 17.29"**

DIRECTIONS : **By Air 110kms NW of Inuvik or by Ice/Water using East & Middle Channels of the Mackenzie River. Turn left at Bar C.**

RADIO FREQUENCIES : **Receive Transmit**
AIR TO GROUND: **130.275 MHz**
NOTE: FAREWELL IS CURRENTLY SHUT DOWN AND NOT OCCUPIED- THEREFORE NO LOCAL PHONE NUMBERS.

WORKSITE CONTACTS	NAME	PHONE	FAX
On Site Shell Supervisor 1		867 777-	867 777-
On Site Shell Supervisor 2		867 777-	867 777-
Camp Supervisor		867 777-	867 777-
Yard Supervisor		867 777-	867 777-
MEDIC		867 777-	867 777-

PRIMARY OFFICE CONTACTS		PHONE	FAX
Shell Canada Limited		1 800 661-7378	
Shell Office Based Supervisor	Cellular Residence	403 [b] 403 [c] 403 [r]	403 269-7948 403 269-7895
DAR/Construction Manager	Randall Warren Cellular Residence	403 691-2521[b] 403 813-0408[c] 403 230-2662[r]	403 269-7948 403 269-7895
HSE Team Leader	Roger Leadbeater Cellular Residence	403 691-3295[b] 403 519-4138[c] 403 285-1923[r]	403 269-7948 403 269-7895
FOR OTHER WA&SO NUMBERS, SEE WA&SO PHONE LIST			

FAREWELL EMERGENCY RESPONSE PLAN

HOSPITAL			
INUVIK	867 777-8161 Emergency Room	867 777-8000 Switchboard	867 777-8062 Fax
RCMP			
INUVIK	867 777-1111		
FIRE			
INUVIK	867 777-2222		
AMBULANCE			
INUVIK	867 777-4444		
AIRCRAFT SUPPORT			
Canadian Helicopters	Inuvik	867 777-2424 or 867 678-0091	867 777-3448[f]
Aklak Air	Inuvik 24hr Office Hours	867 777-3555 or 867 777-3777	867 777-3388[f]
INFORMATION SERVICES			
Alberta Poison Center		1 800 332-1414	
CANUTEC		1 613 996-6666 Emergency	1 613 992-4624 Information

WORKPLACE HEALTH AND SAFETY			
NWT WCB	24hr	1 800 661-0792 1 867 920-3888	1 866 277-3677[f] 1 867 873-4596[f]
ENVIRONMENTAL REPORTING			
NWT Spill Reporting	24hr	867 920-8130	867 873-6924[f]
EMERGENCY MANAGEMENT			
INDIAN & NORTHERN AFFAIRS			
Inuvik Office		867 777-3361[b]	867 777-2090[f]
ENVIRONMENT CANADA			
Spill Response - Canadian Wildlife Service	24hr Pager	867 920-5131 Leave message	
ENVIRONMENT AND NATURAL RESOURCES - NWT			
Environmental Protection Division	General	867 873-7654	867 873-0221[f]
Wildlife Division - Inuvik	Manager – Wildlife & Fisheries	867 777-7230[b] 867 777-1185[c] 24hr	867 777-7321[f]

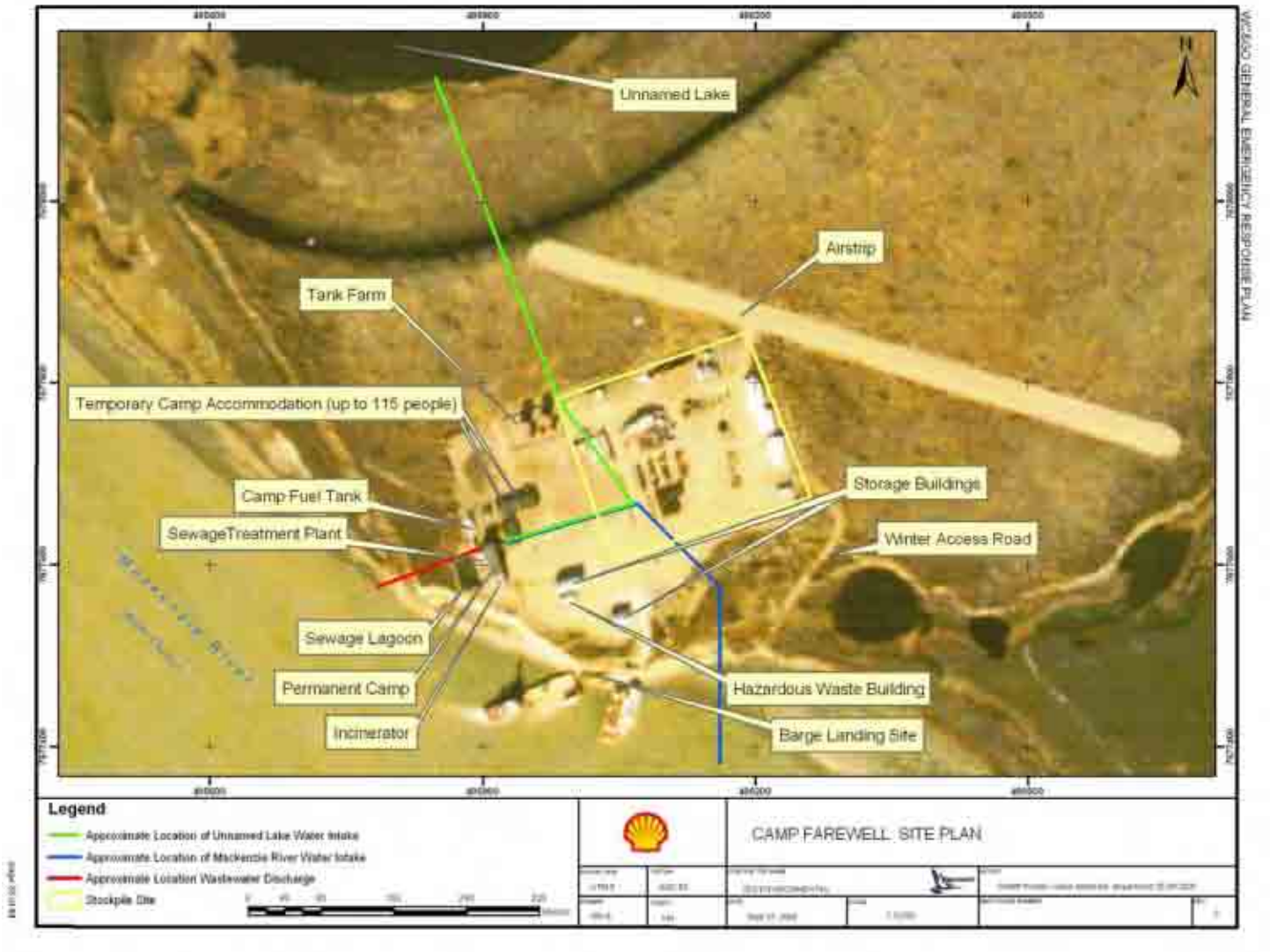
FAREWELL EMERGENCY RESPONSE PLAN

TRANSPORTATION SAFETY BOARD / NATIONAL ENERGY BOARD			
Transportation Safety Board	THE TSB WILL NOTIFY NEB OR OTHER APPLICABLE DEPT.	1 819-997-7887	
NEB General Inquiries		1 800 899-1265	
FISHERIES & OCEANS CANADA			
CCG Regional Operations Center (ROC)		1 800 265-0237 24HR	

SHELL CRISIS MANAGEMENT TEAM (CMT)			
E&P Crisis Manager	1 888 361-8055 [Pager #44204]		
E&P Core CMT (Crisis Management Team)	1 888 361-8055 [Pager #44298]		
SHELL OPERATIONS TECHNICAL ADVISORY CENTRE			
Shell Centre, Calgary, Room 902		403-691-3104 [b]	
WA&SO HEAD OFFICE CALGARY			
Manager, WA&SO David Todd	403-691-2700 [b]	403-660-6900[c]	1-888-361-8055 [PAGER #44202[
PUBLIC AFFAIRS			
Adrienne Lamb	403-691-4978 [b] 403-606-4205 [C]	1-888-361-8055 [PAGER #44262[	403-269-8031[f]
Laurieanne Lynne	403-691-3892 [b] 403-680-2654 [C]	1-888-361-8055 [PAGER #44290]	403-269-8031[f]

SHELL EMERGENCY COMMUNICATIONS TRAILER			
CUSTODIAN : C&V – Trailer Yard, Calgary	Doug Delorme	403-620-0442 24hr	403-279-7451 Message
COMMUNICATIONS			
OPERATOR:	Clearing lines or line interruption	0	
Shell Contact :	Ian Lucas	403-691-4049 [b] 403-542-4755 [c]	403-691-3985 [f]
NewNorth Networks	Tom Zubko	867 777-2111 [b] 867 777-6190 [c]	867 777-3412 [f]
SPILL SERVICES			
Mackenzie Delta Spill Response Corp. (MDSRC)	Spill Response Advisor (Linda Manka)	403 296-4014	403 296-5147[f]
Western Canada Spill Services (WCSS)	Equipment Coordinator Mark Miller	403 250-0897 403 803-6065	403 291-9408[f]
OILFIELD FIRE SERVICES			
HSE Integrated	Calgary	1-888-346-8260 24hr	
Firemaster Oilfield Services Inc.	Red Deer	403-342-7500 24hr	

10.0 FAREWELL SITE PLAN



11.0 EMERGENCY RESPONSE PROCEDURES

Below are templates designed to assist in the development of detailed procedures for Site-Specific emergency response scenarios. Note that each of these steps could require modification during any phase of the project. Refer to Section 404 of the E&P Model ERP

11.1 INJURY INCIDENTS

11.1.1 Emergency Response Procedures (Injury Incidents)	**Procedure:** 1. Ensure personal safety. Consider the following prior to responding: • evacuate area • determine safe approach • no approach • determine what happened • don personal protective equipment 2. Isolate the area and restrict / deny entry as required to prevent additional injuries: • establish a parameter • isolate / shut off energy sources, stabilize (high pressure, electrical, unstable objects, ignition sources etc.) 3. Notify appropriate personnel: • supervisor • rescue team • bystanders 4. Muster in designated area: 5. Determine individual roles and responsibilities: • assign incident command system roles as resources become available • add to the ICS chart provided • do not rush into anything 6. Provide medical attention as required: • remove victim from danger or danger from victim • provide medical attention as required 7. Transport victim for advanced medical treatment as required. Consider to following:

	• medical conveyance via ground • air medivac 8. Conduct incident “De-brief" 9. Serious and dangerous occurrences shall be reported to the WCB’s 24-hour Accident Reporting Line. See Emergency Contact List. Complete Worker’s Report of Accident and Employer’s Report of Accident.

11.2 ILLNESS

11.2.1 Emergency Response Procedure (Illness Incident)	**Procedure:** 1. Provide onsite medical / first aid treatment 2. Notify the patient's supervisor and medic (if available) immediately • the onsite supervisor/medic will consult the patients medical information form for medical information purposes 3. Contact medical care facility for instructions regarding treatment options and transportation 4. Stabilize patient for transport to medical care facility as required

11.3 WEATHER RELATED EMERGENCIES

11.3.1 Emergency Response Procedures (Weather Related Emergency)	**Procedure:** 1. Notify all personnel of the weather related emergency • contact internal and external parties 2. Secure equipment from the effects of the wind / snow build-up, etc. 3. Suspend operations as deemed necessary • consider a travel ban until weather improves maintain communications with remotely located operations (i.e. seismic workers, surveyors, etc.) 4. Muster in designated area

11.4 FIRES AND EXPLOSIONS

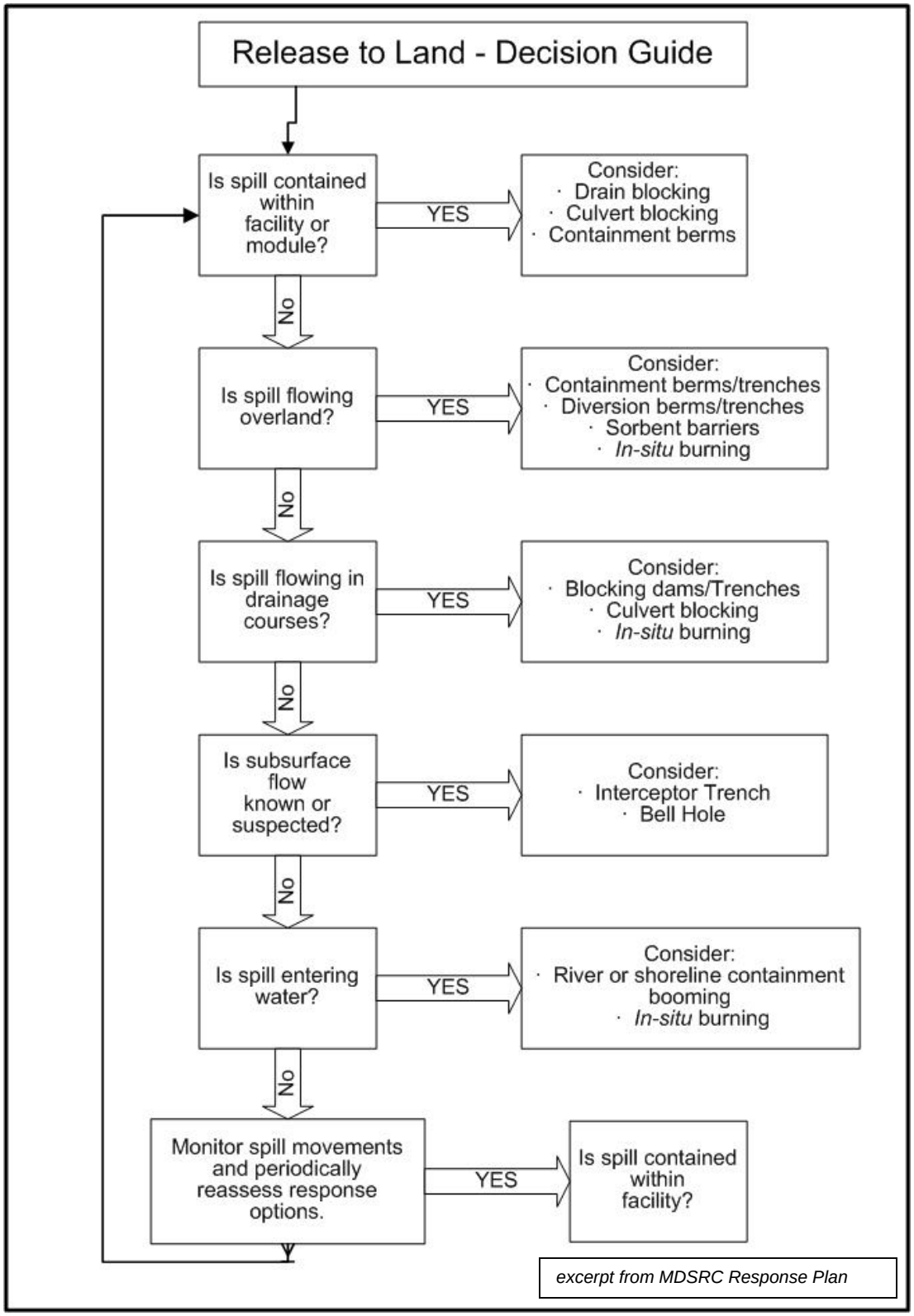
11.4.1 Emergency Response Procedure (Generic Fire & Explosion) Refer to E&P Model ERP Section 403 for additional fire response strategies.	**Procedure:** 1. Ensure personal safety. Consider the following prior to responding • evacuate • don personal protective equipment 2. Isolate the area and restrict / deny entry as required to prevent injuries • establish a safe parameter 3. Notify appropriate personnel • sound the alarm • supervisor • rescue team 4. Muster in designated area 5. Determine individual response roles and responsibilities • assign incident command system roles as resources become available 6. Assess the hazard. Determine whether or not to fight the fire. Is there a need to fight the fire? Consider: • identify / isolate fuel sources if safe to do so • the type of fire and the equipment available to fight the fire. • are personnel trained to fight the fire 7. Utilize appropriate protective equipment • fire retardant clothing • call for backup equipment 8. Establish / adjust control perimeters (hot, warm, cold) • identify additional hazards and assess the risks

11.5 CAMP FIRES

11.5.1 Emergency Response Procedure (Camp Fire) **MUSTER AREA: SHOP BUILDING**	**Procedure:** 1. Ensure personal safety. Consider the following prior to responding: • 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 • Notify the incident commander immediately • Evacuate and remain at the muster area until instructed to do otherwise by incident commander 2. Incident Commander • Take a radio for communication. • Ensure that the fire alarm has been sounded throughout the camp. • Quickly go to the fire scene to assume command • Meet with the Emergency Response Team to assess action already taken and further action required. 3. Medic (on site rep if not medic) • Evacuate to the muster area with your first aid pack • Take a radio for communication • Treat any burns or other related injuries • If required, transport patient(s) to hospital via ECV or helicopter, depending on nature of injury 4. Emergency Response Team Members Shell Onsite Rep: _____ Camp Supervisor: _____ Medic: _____ _____ • Ensure that each member has a radio for communication • As first line of defense, shut the breaker 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 • If it is safe to do so, extinguish the fire • Take a head count of camp personnel • If required and safe to do so, locate missing personnel

11.6 SPILLS

11.6.1 Release to Land - Decision Guide



11.6.2 Sewage Spill Emergency Response Plan

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
- To take into account changes in environmental factors and in facility characteristics and policy
- During any onsite 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.

The prioritized response goals are:

- Protect Human Life (yours, fellow worker, & public)
- Protect The Environment
- Minimize Asset Loss
- Regain Steady State Operations to minimize business impact (consider both revenue & reputation)

The objectives of a spill response are:

- Safety of People, Environment, and Facilities
- Source Control
- Containment of released materials
- Recovery and Storage of released materials.

Procedure

1. SAFETY

Ensure personal safety

- Ensure your own personal safety from existing and potential hazards and fellow worker safety.
- If the spill is within the treatment plant area, follow Sewage Treatment Golden Rules.

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

4. COMMAND / MANAGEMENT

Order depends on specific factors

- Assign Incident Command System roles as resources become available.
- Initiate response to incident, taking existing conditions into account.
- 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 Nos.).
- 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 or soil-sewage mixture into containers or sewage lagoon.
- 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 / fibreglass tanks.

7. DECONTAMINATION AND CLEANUP

Collect, cleanup, and sample

- Priority is to high environmentally sensitive areas (municipality water sources, waterfowl staging areas, domestic fishing areas).
- Decontaminate personnel as required if exposed to the spill. Wash hands and face with soap after clean up.

- Contaminated clothing shall be immediately removed and washed in designated washing area.
- Store the spilled material in proper containers for disposal;
- Implement remediation program for the area as required;
- Monitor the progress of remediation as required.

8. DISPOSAL

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

- Incinerate sorbents – check Product MSDS for incineration suitability.
- Small quantities of snow-sewage or soil sewage can be disposed in the sewage lagoon.
- Warm up containers of snow and sewage mixture to room temperature in treatment plant 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 micro organisms or ship containers to Inuvik Sewage Treatment Plant for disposal.
- Larger quantities of sewage contaminated soils may have to be treated in a contained area. Obtain remediation expertise. Note: contaminated runoff water in the treatment cell must also be contained.

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.

11.6.3 Bulk Material Emergency Response Plan

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
- To take into account changes in environmental factors and in facility characteristics and policy
- During any onsite 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.

Prioritized Response Goals

The prioritized response goals are:

- Protect Human Life (yours, fellow worker, & public)
- Protect The Environment
- Minimize Asset Loss
- Regain Steady State Operations to minimize business impact (consider both revenue & reputation)

The objectives of a spill response are:

- Safety of People, Environment, and Facilities
- Source Control
- Containment of released materials
- Recovery and Storage of released materials.

Procedure

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 - requirements as per protocol in Appendix IV
- NEB - requirements as per protocol in Appendix IV 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 Nos.).
- 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 / fibreglass 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.

11.6.4 Fuel/Spill Emergency Response Plan (Water)/Coast Guard Oil Pollution Emergency Plan

Camp Farewell is located between a small lake and the Middle Channel of the Mackenzie River. Camp Farewell is 50 km downstream from Tununik Point at Longitude 69°-12'-30" and Latitude 135°-06'-04". All fuel on site is stored in tanks within secondary containment. A spill could occur during unloading fuel from barges. To minimize the severity of such an event, spill control equipment will be deployed during the unloading. The deployment of the barge booms will also be requested as a precautionary measure to immediately contain any spill that may occur at the barge. If a land spill did occur it would be contained quickly and therefore minimize the potential for contamination of the waterway

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 1) reviewed & 2) updated:

- As changes to applicable environmental legislation come into effect
- Annually, to take into account changes in environmental factors and in facility characteristics and policy
- After every oil pollution incident and exercise.

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[1]. All incident responses are modeled after the Disciplined Approach. See Section 917 of Shell's Emergency Response Plan Model for detailed guidance on the Disciplined Approach and Prioritized Response Goals.

Prioritized Response Goals

The prioritized response goals are:

- Protect Human Life (yours, fellow worker, & public)
- Protect The Environment
- Minimize Asset Loss

[1] ICS system description plus Roles & Responsibilities of all organizational positions are described in Shell's Emergency Response Manual - Model

- Regain Steady State Operations to minimize business impact (consider both revenue & reputation)

The objectives of a spill response are:

- Safety of People, Environment, and Facilities
- Source Control
- Containment of released materials
- Recovery and Storage of released materials.

PROCEDURE

1. SAFETY

Ensure personal safety

- Ensure your own personal safety from existing and potential hazards and your fellow workers' safety.

2. ISOLATE AND DENY ENTRY

Isolate the area and deny / restrict entry

- Establish / adjust control perimeters.
- Eliminate ignition sources.

3. NOTIFICATIONS

Notify the following immediately.

- Shell's onsite supervisor
- Barge Captain

Notify the following as soon as practical.

- Shell's DAR/Construction Manager
- Northwest Territory Emergency Spill Response Line
- Regional Operations Center (ROC)
- Indian Northern Affairs Canada - requirements as per protocol in Appendix IV
- NEB - requirements as per protocol in Appendix IV 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.
- Initiate response to incident, taking existing conditions into account.
- 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 (colors, 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, as identified in plan. (Control Point at Camp Farewell and Farewell Downstream Control Point #1). 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.
- Place all resources/materials on standby that are available within close proximity, i.e. crawler tractor, loaders, bobcats, vacuum trucks, fuel bladders/fibreglass 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 within the Kendall Island Migratory Bird Sanctuary)
- Store the spilled material in proper containers for disposal
- Implement remediation program for the area as required
- 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.

11. CONTINGENCY PLAN

Acknowledge role of federal, territorial and other bodies as identified in the National Contingency Plan

- Lead Agency for pollution incident (ship to shore) is the Canadian Coast Guard

- Resource Agency is considered to be the Canadian Coast Guard, who will request resources as required where available.
- Environment Canada services provided by REET (Regional Environmental Emergencies Team)

♦ 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. The scenario assumption is for a Level 1, category of Oil Handling Facility with a 150m^3/h maximum oil transfer rate and a Level 1 category of Oil Handling Facility with a minimum spill size of 1m^3. The maximum oil transfer rate at time of unloading will be 85m^3/h and therefore falls within Level 1 category.

➢ **Nature and amount of oil**

Shell will be unloading approximately 2,000,000 litres 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.

➢ **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.

➢ **Tides and currents**

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

➢ **Meteorological conditions**

Unloading of fuel will take place late fall at above or near freezing conditions. Some winds may be encountered (prevailing winds are from the northwest)

➢ **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. Wildlife monitor is onsite at all times and is equipped with a firearm that can be discharged to scare away any waterfowl in vicinity if it is deemed necessary. Any requirement for long-term bird hazing will be accomplished by setting up automatic bird scare cannons as well as having the wildlife monitor patrol the channel with a boat to assist in scaring away any waterfowl.
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.

➢ **Measures to minimize spill**

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

- Five on site, supervisory people have received the two-day “Oil Spill Containment and Recovery Training (Open Water) “course and the two-day “*Response to Oil Spills in Ice conditions”* course. Any new Supervisors will also receive the training if not already done so.

- 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 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 personnel at each shut-off valve. All personnel will be equipped with radios. In the event of a line break, the valves will be shut off immediately to minimize the spill.

➢ **Training**

The two-day **"Oil Spill Containment and Recovery Training (Open Water)"** course held in 2002 at Farewell, included classroom instruction, dry land equipment deployments and a Conventional and BoomVane deployment in the Mackenzie River. *Note: Fuel has not been unloaded at Farewell since 2002.*

- Day 1
  - ➢ Formal classroom training using a PowerPoint presentation and covering strategies and tactics of oil spill response
  - ➢ Description of Response Management System used by Shell Canada, Camp Farewell
  - ➢ Description and illustration of equipment usage.
  - ➢ Safety briefing
  - ➢ Dry Land deployment of equipment which gave participants hands-on experience as to how the components fitted together and operated.
- Day 2
  - ▪ Briefings
    - Safety
    - Communications
    - Commander's (describing "spill" and deployments to be effected during the field deployment exercise
  - ▪ Organizational Structure to be used in the field
    - Assignment to crews
    - Crew responsibilities
  - ▪ Field Deployment
    - Conventional deployment of 400 feet of river boom
    - BoomVane deployment of 400 feet of river boom
  - ▪ Debriefing

The two-day training courses **"Oil Spill Containment and Recovery Training (Open Water)"** and **"Response to Oil Spills in Ice Condition"** are normally held annually and

sponsored by the Mackenzie Delta Spill Response Corporation (MDSRC) and the Aurora College.

- Training attended by various staff from the MDSRC participants, local Contractors, Inuvik Fire Department and individuals from the General Public. *Shell last participated in the open water session in 2005.*
- The sessions include components on cold weather safety, material properties in cold climates, strategies and tactics for spill containment and recovery in winter conditions and waste management requirements.
- Day1
    - Safety
    - Material Properties
    - Environmental Awareness
    - Regulatory Requirements
    - Strategies, Tactics & Equipment Waste Management Considerations.
- Day 2
    - Introductions of Commander
    - Description of “Problem”
    - Safety Briefing
    - Communications Briefing
    - Assignment of Crews & duties
    - Deployment Briefing
    - Field Deployment
    - Debriefing.

➢ Training and Exercises

- Additional training and exercises are being planned by the MDSRC for subsequent years. Activity in the Mackenzie Delta will determine frequency of training required.
- Shell staff at the field location will support the trained supervisory staff in areas of labour, equipment operation and administrative duties in the event of an oil spill.
- If required, the trained MDSRC member companies and contractor staff will supplement Shell staff in a supervisory or other capacity when and where required.
- All personnel will be required to attend a Safety Briefing and Orientation prior to commencement of any activities associated with an oil spill response.

- Prior to unloading of fuel barges, a meeting will be held to review the Oil Pollution Emergency Plan.

➢ 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 Mackenzie Delta Spill Response Corporation.
- Based on 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 the Shell "Site Supervisor".

➢ Response Time Clean up

An onsite spill control boat will commence clean up operations as soon as the spill is controlled and contained. If additional resources are required they will be obtained from the trained MDSRC member companies. This group will have equipment, material and trained staff to assist in the event of any spills. Current participation in the Mackenzie Delta Spill Response Corporation includes, but is not limited to, Anadarko, BP Canada Energy, Chevron Canada Resources, ConocoPhillips Canada, Devon Canada Corporation, EnCana, Petro-Canada and Shell Canada Ltd. If necessary, the trained contractor community will be requested to respond as well. Unless and until MDSRC is fully ready to respond to large operational spills, the Coast Guard is the default responder to be contacted in case of such a spill.

- **Scenario Details**

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

Time	Description	Person responsible
Pre Transfer	• Barge booms deployed • Spill Equipment readied • Product, hazards & controls identified • Prejob safety meeting held	Barge Captain Incident Commander Incident Commander Incident Commander
Zero	Spill occurs & discovered • Shut down pumps on barge • Radio order to shut valves on hoses	Barge Captain Incident commander
5 minutes	• Closing of valves on line	Source Control (Personnel located at each valve)
15 minutes	• Primary boom will be deployed. • First Aid (if required)	Spill Group Supervisor Medic
45 minutes	• If necessary, secondary boom will be deployed	Spill Group Supervisor
60 minutes	• Oil spill boat will start cleaning up spill • Land group will start cleaning up spill • Notifications	Spill Group Supervisor Spill Group Supervisor Incident Commander
Post Recovery	• Follow-up notifications • Decon. & Cleanup • Disposal • Incident Debrief • Documentation	Incident Commander

➢ Response Authorization

Response will be in accordance with Shell's Emergency Response plan for Camp Farewell. The onsite *Incident Commander* will be the senior Shell Onsite Representative (or alternate) with backup as required from Calgary. The onsite Spill Group Supervisor will be selected from the trained personnel available.

➢ 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.

➢ Oil Handling Facility Exercise Program

- The Shell Farewell Facility consists of a small camp, maintenance shop, airstrip, tank farm with a capacity of two million litres and a designated area for storage of drilling equipment and products. All fuel is stored in tanks within secondary containment. The bulk of the fuel is received by barge and transferred via pipeline from shore to the tank farm.
- Current plans include transfer of fuel from shore to tank farm on a per annum basis providing facility is in operation, and therefore any onsite training and exercise programs will only be conducted on an annual basis prior to receiving any vessels for the purpose of fuel transfer.
- Standard operating practices are to pre-boom all vessels delivering product prior to commencing transfer. Each boom deployment activity is considered an operational drill for the purpose of this exercise program.
- The Shell Farewell Facility is not open on a continuous basis. Staff may be temporarily assigned to other operating areas until such time as Camp Farewell commences operation again. Shell Canada will make every effort to ensure personnel familiar with the facility and who have participated in the training and onsite exercises are reassigned to their previous positions.
- Training will be comprised of a management tabletop session onsite on an annual basis with the second day being devoted to an operational drill and training exercise.
- An Internal Notification Exercise will be completed during the 1st Q after start up of the Camp Farewell Facility and on an annual basis thereafter.
- An External Notification Exercise will be done on an annual basis.
- Exercises with vessels delivering fuel to the Camp Farewell Facility are an integral part of this plan and are reflected in the exercise program matrix. The Canadian Coast Guard and other outside agencies will be invited to participate.
- All exercises will be evaluated and reported on a critique facilitation and incident assessment ICS Form # 115. All discrepancies will be noted and assigned as action items. Post-exercise critiques will be filed and available for audit if so required.
- This plan will be updated with amendments reflecting changes noted during exercises.

- Actual responses to spills of a product will be evaluated and reported, and will be considered as part of this program.
- The Oil Handling Facility Exercise Program will be conducted over a three-year period commencing on the date of compliance.
- Prior to unloading of any fuel barges, the Oil Pollution Emergency Plan will be reviewed.

➢ Exercise Program Matrix

Activity Description	Year 1	Year 2	Year 3
Internal Notification Exercise	During 1st Q after start-up of facility	Annually*	Annually*
External Notification Exercise	Annually*	Annually*	Annually*
Operational Drill with Vessels and Contractors	Annually*	Annually*	Annually*
Management and Supervisory Table Top	Annually*	Annually*	Annually*
Full Scale Functional Exercise		One, over the three-year cycle	

*When the site is operational.

FAREWELL EMERGENCY RESPONSE PLAN

Control Point Identifier:	Control Point Name:	Issued: DRAFT #5 Lat. 69° 12.451 N Long. 135° 05.932' W
	Farewell (Shell Canada Camp)	

Location: On the East bank of Richards Island on the middle channel of the Mackenzie River. Site is operated by Shell Canada Limited.

Land Owner/Tenant Contact: Crown/Shell Canada Limited

Distance to Confluence: 9.5 km* **Waterbody:** Mackenzie Bay, Beaufort Sea

- In this case, interpreted to be at the downstream Control Point

Next Downstream Control Point: Farewell Downstream Control Point #1 (9.5 km)

Waterway Details:

Width: 0.5 km

Bed Description: Sand and gravel

Bank Height/Slope: Steep bluffs behind beach. Vehicle ramp to camp plateau from Control Point beach.

Work Space Details:

Size & Location: Size will vary depending on river height. There will normally be sufficient workspace at most times of the year. August 2002 an area 10 m wide and 120 m long was available.

Helicopter Pad: Helicopter pad on camp plateau above site. Helicopter fuel is normally available at this site.

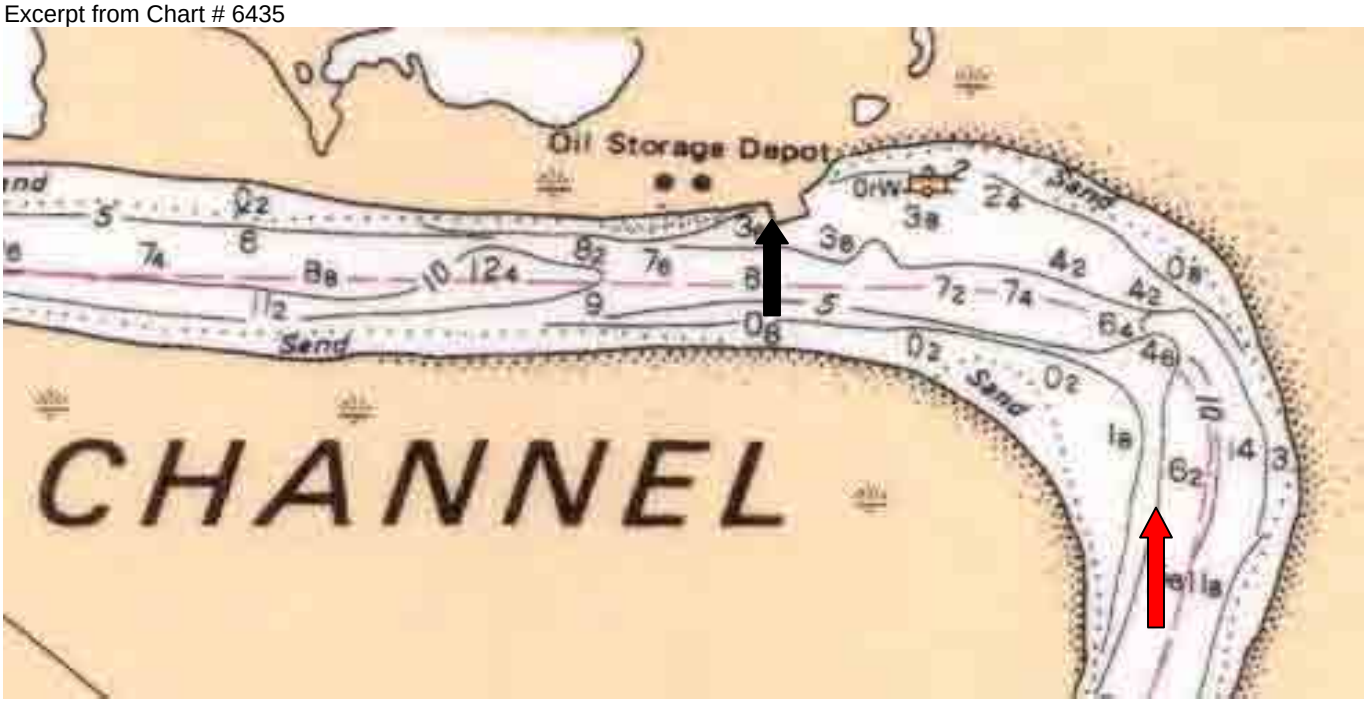
Recommended Deployment Strategy/Equipment Requirement: Boom to contain and recover at the downstream portion of the Control Point beach. 500' of boom can be deployed at most stages of river level. Deflection booms in a cascade can be deployed upstream of the site, if required. Permanent shore anchors are located at various points along the beach at this Control Point.

Other Comments: The river flow at the site is affected by tidal influences. There is a well maintained 700m gravel airstrip at this site. Survey conducted August 2002.

FAREWELL EMERGENCY RESPONSE PLAN

Control Point Identifier:	Control Point Name:	Issued: DRAFT #5 Lat. 69° 12.451 N Long. 135° 05.932' W
	Farewell (Shell Canada Camp)	

Excerpt from Chart # 6435



Red arrow indicates flow.
Black arrow indicates position and direction of photograph (August 2002).
Photograph below shows orange river boom on the beach at the Control Point and ramp to camp plateau.

FAREWELL EMERGENCY RESPONSE PLAN

Control Point Identifier:	Control Point Name:	Issued: DRAFT #4 Lat. 69° 16.138' N Long. 135° 12.331 W
	Farewell Downstream Control Point #1	

Location: On a prominent point on the east bank of Richards Island on the middle channel of the Mackenzie River where the river widens as it flows into Mackenzie Bay.

Land Owner/Tenant Contact: Crown/ILA

Distance to Confluence: 0*

Waterbody: Mackenzie Bay, Beaufort Sea
This Control Point is interpreted to be at the confluence.

Next Downstream Control Point: None. Open water containment and recovery or treatment would be required downstream of this location.

Waterway Details:

Width: 1 km

Bed Description: Sand and Gravel

Bank Height/Slope: Pebble and cobble beach with dense brush behind on a gently rising slope.

Work Space Details:

Size & Location: Size will vary depending on river height. There will normally be sufficient workspace at most times of the year. During August 2002 an area 10 m wide and 120 m long was available.

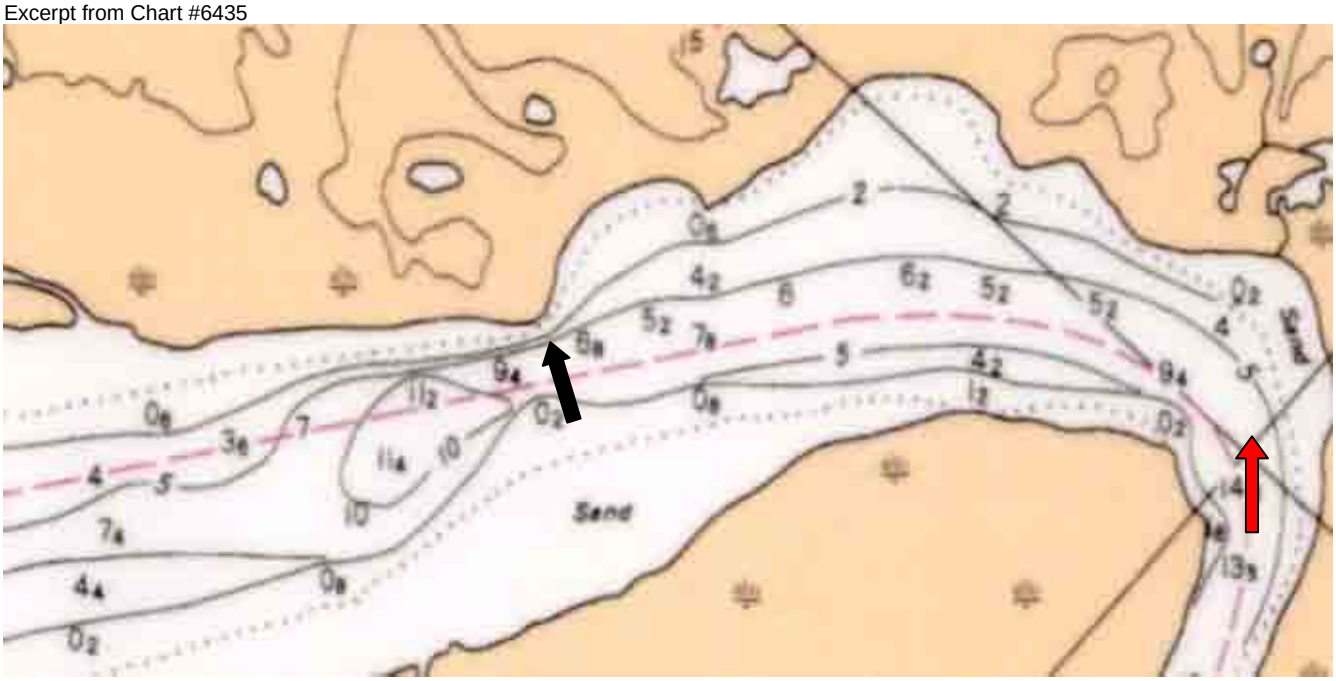
Helicopter Pad: A helicopter could operate from the beach, if required.

Recommended Deployment Strategy/Equipment Requirement: Boom to contain and recover spill at the point as it is swept round the upstream bay. A cascade of deflection booms could be placed to divert a spill from the main channel, if required. 500' containment boom will be required to guide spill from anchor point to beach for recovery.

Other Comments: This site is affected by tidal influences and is exposed to winds. The point on which the Control Point stands is difficult to differentiate from the one immediately upstream. This one has a 0.3 meter square white blank sign on a metal post in the bush at the back of the beach. It can be seen in the center of the photograph. This Control Point is 9.5 km downstream of Farewell, computed at river centerline. Survey conducted August 2002.

Control Point Identifier:	Control Point Name:	Issued: DRAFT #4 Lat. 69° 16.138' N Long. 135° 12.331' W
	Farewell Downstream Control Point #1	

Excerpt from Chart #6435



Red arrow indicates flow.
Black arrow indicates position and direction of photograph (August 2002)
This Control Point is 9.5 km downstream of Farewell computed on the river's centerline.

11.6.5 Fuel Spill Emergency Response Plan (Land)

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 immediately.

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 1) reviewed & 2) updated:

- As changes to applicable environmental legislation come into effect
- Annually, to take into account changes in environmental factors and in facility characteristics and policy
- After every oil pollution incident and exercise.

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[2]. All incident responses are modeled after the Disciplined Approach. See Section 917 of Shell's Emergency Response Plan Model for detailed guidance on the Disciplined Approach and Prioritized Response Goals.

Prioritized Response Goals

The prioritized response goals are:

- Protect Human Life (yours, fellow worker, & public)
- Protect The Environment
- Minimize Asset Loss
- Regain Steady State Operations to minimize business impact (consider both revenue & reputation)

The objectives of a spill response are:

- Safety of People, Environment, and Facilities
- Source Control
- Containment of released materials
- Recovery and Storage of released materials.

[2] ICS system description plus Roles & Responsibilities of all organizational positions are described in Shell's Emergency Response Manual - Model

FAREWELL EMERGENCY RESPONSE PLAN

PROCEDURE

1. SAFETY

Ensure personal safety

- Ensure your own personal 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
- Indian Northern Affairs Canada - requirements as per protocol in Appendix IV
- NEB - requirements as per protocol in Appendix IV 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.
- Initiate the response to incident, taking existing conditions into account.
- 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 Nos.).
- MSDS (Material Safety Data Sheets – Chemical).
- Placards and labels (colors, 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 onsite 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.
- Place all resources/materials on standby that are available within close proximity, i.e. crawler tractor, loaders, bobcats, vacuum trucks, fuel bladders/fibreglass 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;
- Implement remediation program for the area, as required
- Collect and analyze soil samples from the remaining spill area, if required
- 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.

11.6.6 Fuel/Oil Spill Emergency Response Plan (Ice)

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.). Spills on or under ice are most likely to occur during transport or due to vehicle or equipment falling through the ice.

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 1) reviewed & 2) updated:

- As changes to applicable environmental legislation come into effect
- Annually, to take into account changes in environmental factors and in facility characteristics and policy
- After every oil pollution incident and exercise.

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[3]. All incident responses are modeled after the Disciplined Approach. See Section 917 of Shell's Emergency Response Plan Model for detailed guidance on the Disciplined Approach and Prioritized Response Goals.

Prioritized Response Goals

The prioritized response goals are:

- Protect Human Life (yours, fellow worker, & public)
- Protect The Environment
- Minimize Asset Loss
- Regain Steady State Operations to minimize business impact (consider both revenue & reputation)

The objectives of a spill response are:

- Safety of People, Environment, and Facilities
- Source Control
- Containment of released materials
- Recovery and Storage of released materials.

[3] ICS system description plus Roles & Responsibilities of all organizational positions are described in Shell's Emergency Response Manual - Model

FAREWELL EMERGENCY RESPONSE PLAN

PROCEDURE

1. SAFETY

Ensure personal safety

- Ensure your own personal 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 - requirements as per protocol in Appendix IV
- NEB - requirements as per protocol in Appendix IV 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.
- Initiate the response to incident, taking existing conditions into account.
- 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 Nos.).
- MSDS (Material Safety Data Sheets – Chemical).
- Placards and labels (colors, 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 snow/ice dikes dams 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).
- Pump as much liquid product as possible into vacuum trucks, empty drums or tanks for disposal.
- Deploy absorbent pads, socks as required.
- Recover oiled sorbents and place them in steel drums for disposal or burning in onsite incinerator. Sorbents should be incinerated as soon as possible to avoid spontaneous combustion.
- Scrape up all contaminated ice.
- Notify and request assistance, if required, from external NWT Emergency Response Line.
- Place all resources/materials on standby that are available within close proximity, i.e. crawler tractor, loaders, bobcats, vacuum trucks, fuel bladders/fibreglass 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;
- Collect and analyze soil samples from the remaining spill area, if required
- 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.

Spills in Broken Ice

Like all spill response, this very much depends on the conditions at the time of the event.

Consideration should be given to in-situ burning. It is a severe risk to personnel safety risk attempting to contain and recover a spill in what can be a very dangerous environment. Regulatory approval will be required for in-situ burning.

Prior to ignition, conduct a thorough review of what resources could be at risk from a resulting fire. Position emergency personnel and equipment to respond to protect those resources.

If operating from shore or a secure location on the ice, a skimmer may be used to recover the spill.

Spills Under Ice

Oil under ice will attempt to follow the fastest river flows, which occur in the deepest sections of the river. Reference to a navigation chart for the river downstream of the spill site will show the location of the deep channel.

The fastest way to determine the progress of the oil under the ice is to auger holes and look for a sheen rising.

Note that as soon as the ice is penetrated this will also permit gases to escape from the oil.

The aim is to get sufficiently ahead of the oil that equipment can be staged at the site, an ice slot can be dug and, if necessary, wooden deflector walls installed prior to the arrival of the spill.

The ice slot creates an area for the spill to rise to the water surface and be retained there for recovery or, in some cases, ignition. The deflector walls are usually made of plywood sheets that stick down into the river through the ice and deflect the oil towards the slot for recovery. They serve the same purpose under the ice as deflection booms do in open water deployments.

The slot will be placed at an angle across the channel or part of the channel that the spill is expected to run through. 30° to the current flow is an optimum angle. The slot length will usually be that of the distance across the deep channel. The slot width may vary but is usually dictated by the width of the skimmer to be inserted at the downstream end. The surfaced oil will be carried to the downstream end of the slot by the water flow.

Oil Recovery

Oil may be recovered in several ways or a combination of methods. If conditions permit, a vacuum truck can skim the surfaced oil.

In good quality ice of 1 meter thickness there should be no difficulty cutting the slot wide enough to accommodate the MDSRC Canadyne Model 1230 /1 Multi Skimmer (1.22m) at the downstream end. This skimmer has a recovery capacity in excess of 20 cubic meters of oil per hour.

The MDSRC Aquaguard Model 40D rope mop skimmer is capable of recovering up to 4.5 cubic meters and hour. The rope mop can be placed to operate in long arm of the slot.

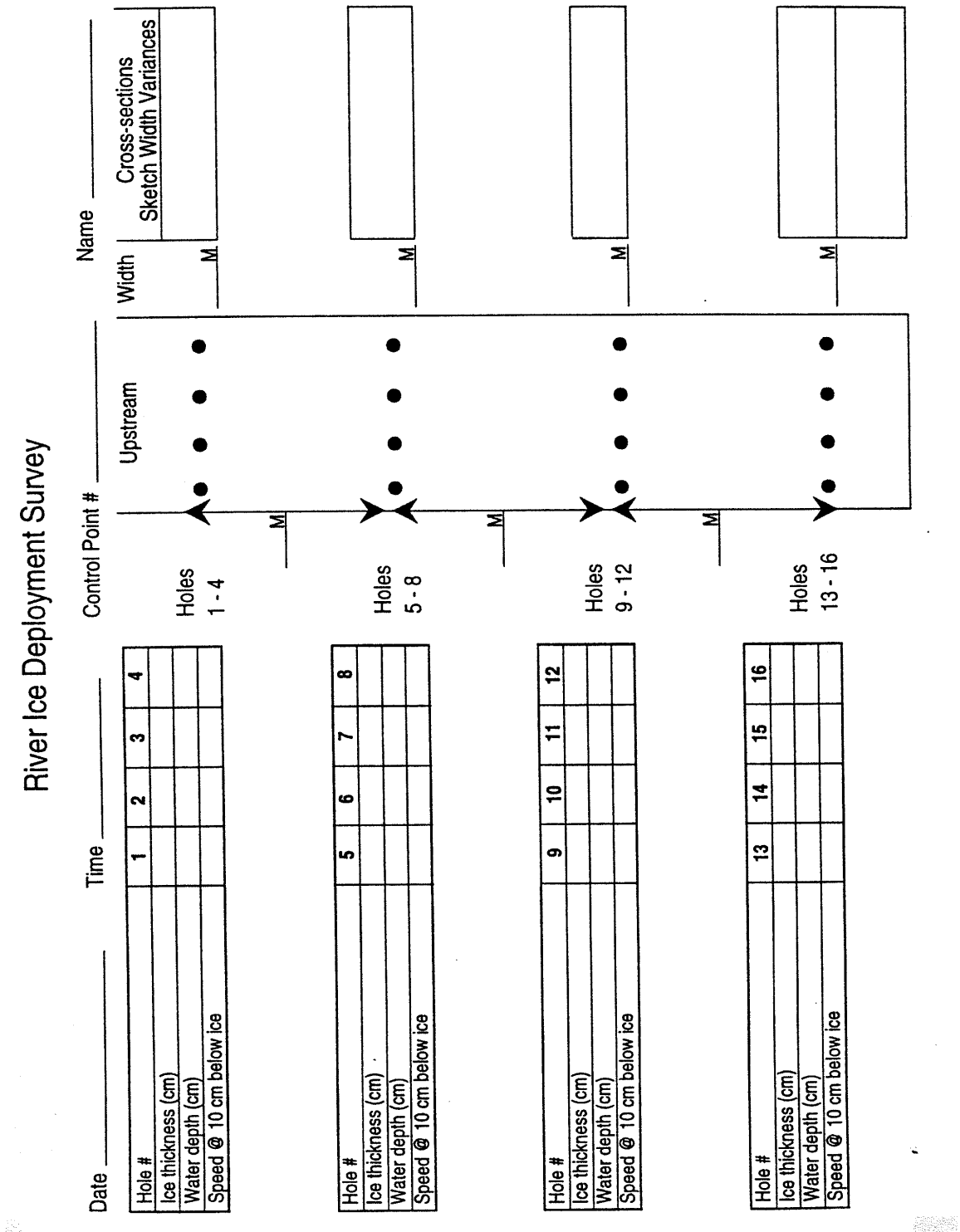
The MDSRC Morris MI-30 disc skimmer can also be utilized. It has a maximum recovery capacity of 30 cubic meters per hour. It may be placed at the funnel mouth end of the slot.

The following steps are taken to result in an ice deployment:

- Perform Ice Safety Assessment
- Deploy ice rescue crew/package
- Perform Ice Deployment Survey (Use Form shown in this Chapter) Ice auger and stream speed meter will be required
- Determine location, angle, length and width of slot
- Mark slot outline on ice
- Compute required size of ice blocks to be pulled from slot
- Mark block outlines on ice in the slot
- Auger a hole through the centre of each block to the water below the ice
- Cut slot outline
- Cut each block
- Pull blocks from slot using “T” bar and chain, starting at downstream end of slot. Spread withdrawn blocks if on ice storage area to prevent stressing ice.
- A skimmer may be installed at the downstream slot end as soon as space is available. This speed the commencement of recovery operations
- Determine the location, angle & length of deflector walls
- Install deflector walls

Tips

- Plywood may be used to cover the length of the slot in extremely cold weather that causes the slot to refreeze.
- Recovery hoses should be held above the ice surface by blocks of wood as this helps prevent the liquid in the hoses from freezing
- All equipment fuelling should be performed at a designated fuelling station prepared to prevent and capture any spill or leak.



11.6.7 Mackenzie Delta Spill Response Corporation (MDSRC)

The Mackenzie Delta Spill Response Corporation is a non-profit organization operating within the Mackenzie Delta to protect the environment by providing spill preparedness and safe, effective response services to Member Companies.

For more detailed response tactics and execution techniques, consult the MDSRC Spill Response Plan (in development at time of writing).

11.7 TRANSPORTATION RELATED EMERGENCIES

11.7.1 Emergency Response Procedure (Transportation Related Emergency) **Automotive**	**Procedure:** 1. Ensure personal safety 2. Call for help • use others involved • warn oncoming traffic 3. Notifications • ambulance if required • local police (if damage over $1,000.00) • supervisor 4. Fill out the shell automotive accident report form carried in all shell vehicles 5. Do not • admit fault or accept liability • make settlements • argue about the accident
11.7.2 **Aircraft**	**Procedure:** 1. Consider an aircraft overdue when reported as such by Air Traffic Control (ATC) or the affected Shell destination when no information is received from it or about it. • 30 minutes after its last notified estimated time of arrival (ETA) • 15 minutes after the estimated time of landing, after having received landing clearance or landing information • 15 minutes after takeoff 2. There can be two phases of response to an overdue aircraft • uncertainty - attempt to make contact or to find • alert - missing aircraft 3. An aircraft is considered missing when its position is unknown and with the supply of fuel carried, it can no longer be airborne.

11.8 EXTERNAL / CIVIL DISTRUBANCES

11.8.1 Emergency Response Procedure (External / Civil Disturbance)	**Note:** Activities or hazards outside of your area of influence could result in an emergency situation requiring response. Examples include • nearby industry • transportation accident with spill or fire • sabotage • non work related accident of injury • civil disturbances / actions **Procedure:** 1. Ensure personnel safety 2. Confirm situation and location 3. Isolate and deny entry to site 4. Notifications • supervisor • police • onsite personnel 5. Initiate incident command system (ICS) • develop an action plan • shutdown equipment as deemed necessary in an organized safe manor • evacuate to a safe muster area, ensure everyone is accounted for • monitor and assist • resume operation when it is safe to do so

12.0 CLASSIFICATION OF AN INCIDENT

12.1 Purpose

Classifying an incident provides a common understanding by Company, Industry and Government Agencies as to the severity of the incident and its potential impact on People, Property, Environment and Reputation. It is important that the Incident Commander (IC) determine the Level of Incident and its potential Level if it escalates. The Levels need to be adjusted depending on the emergency situation/status.

When the On site Shell Representative is unsure of the situation, then communication should take place with the Office Based Superintendent / Supervisor to determine the Level of Incident.

12.2 Classification Matrix

	INCIDENTS			
RISK	**ALERT**	**LEVEL 1: LOW**	**LEVEL 2: MEDIUM**	**LEVEL 3: HIGH**
IMPACT				
Worker Safety	Near Miss	People Actual severity consequence 2 on the RAM	Multiple worker injury an/or life threatening worker injury People Actual severity consequence 3 on the RAM	Worker fatality - Actual severity consequence 4 to 5 on the RAM
Public Safety	Onsite event only. No risk to public but public has a perception that they are at risk.	Onsite, with possible impact off-site Reputation Actual or Potential severity consequence 2 on the RAM	Onsite, with possible impact off-site Reputation Actual or Potential severity consequence 3 on the RAM	Potential for public safety to be jeopardized Reputation Actual or Potential severity consequence 4 to 5 on the RAM
Environmental	Onsite event only	Onsite, with possible impact off-site Environmental Actual severity consequence 2 on the RAM	Onsite, with possible impact off-site Environmental Actual severity consequence 3 on the RAM	Onsite, with significant off-site Environmental Actual severity consequence 4 to 5 on the RAM / Long term
TYPES OF INCIDENTS				
Fire / Explosion	Small gas leak or fuel spill that can be immediately contained.	Gas or fuel leak with some risk of fire.	Contained equipment fire (i.e., camp, trailers or rig equipment), no risk to life.	Major equipment / rig fire and or explosion.
Camp Fire	Potential of camp fire, false fire alarms, electrical problems in	Refuse, fuel, dry vegetation or other material out of control	Contained camp fire	Major camp fire or explosion

	the fire system	around the camp		
Hazardous Spill (chemicals, hydrocarbons or produced water)	Spill but within a containment system No hazard of fire	Onsite spill but outside containment system	Spill migrates off-site and or potential of fire and or explosion	Off-site sensitive environment (ie. wildlife wet lands, river or water body)
Transportation of Dangerous Goods (TDG)	TDG violation warning (no ticket issued)	TDG violation / accident, no damage to container and no product release	Accident with damage to container with potential of failure and/or fuel spill to sensitive area	Accident with fire and/or significant loss of product in sensitive area
Natural Event				
Severe Weather	Severe weather warning of area.	Travel becomes hazardous / potential for worker injury.	Restriction on travel / potential for worker injury.	No visibility, roads are impassable, significant build up of ice in equipment
External Events				
Sabotage	Targeting industry in the area.	Unconfirmed.	Onsite damage.	Sever damage that disrupts the safety of the operations.
Bomb Threat	Targeting industry in the area.	Unsubstantiated threat.	Credible threats.	Explosive located onsite and/or has detonated.

12.3 Action Plan Checklist

	LEVEL 1: LOW	LEVEL 2: MEDIUM	LEVEL 3: HIGH
Incident Commander (IC) Onsite Shell Representative	❑ Activate Site Specific ERP ❑ Alert the Office Based Superintendent/Supervisor or Operations Manager who will: • Consider proceeding to the worksite • Mobilize Sr. Construction Foreman (if not on site) and HSE Team Leader • Alert the Manager WA&SO and E&P Crisis Manager as needed. ❑ Establish an Incident Command Post ❑ Establish initial Staging Area ❑ Notify local regulators (INAC, WCB, etc) ❑ Alert / Stand by: • Aircraft Support • Fire Services • MDSRC if required • Emergency Medical Services	❑ Relocate Incident Command Post if req'd. ❑ Establish / relocate Staging Area ❑ Mobilize to rescue and or treat injured personnel • Dispatch medic • Establish triage area ❑ Order additional communication equipment if req'd ❑ Mobilize resources to the Staging Area: • Additional personnel from local contractors • Fire services (if required) • Spill equipment (if required) • Emergency Medical Services (EMS – if required) ❑ Dispatch manpower and equipment from Staging Area ❑ Up-date • Discuss if fan-out is required to other government / local agencies • INAC • ROC • WCB • INAC • DFO • RCMP • Environment Canada • E&P Crisis Manager	❑ Establish road blocks ❑ Notify public (as required) ❑ Activate Corporate EOC (if required) ❑ Up-date • INAC • ROC • WCB • INAC • DFO • RCMP • Environment Canada • E&P Crisis Manager

APPENDICES

SITE-SPECIFIC GENERAL EMERGENCY RESPONSE PLAN

Appendix I ***TRANSPORTATION & MEDIVAC PLAN***

EMERGENCY NUMBERS	Preferred hospital: **Inuvik Hospital** Number: (**867) 777- 8161 Emergency** **(867) 777-8000 Switchboard** Preferred Ambulance: **Inuvik Ambulance Emergency** Number: (**867) 777-4444** Preferred Police: **RCMP** Number: (**867) 777-1111** Preferred Air :Evacuation **Canadian Helicopters** Number **867 777-2424** **867 678-0091** Alternate Air: **Aklak Air** Number **867 777-3777 Office Hours** **867 777-3555 24hr**
GENERAL INFORMATION **Note-** If travel distance to Health care facility is: **CLOSE** (< 20 min.) or **DISTANT** (20 min to 40 min) You may rely on ambulance service from that Health care facility, HOWEVER, if the travel distance of the worksite is greater then 40 min, then it is deemed: **ISOLATED (>40 min)** Therefore, you shall have transportation that meets the following criteria: • Clean • Protects from weather • Equipped with communication • Accommodate a 200 cm stretcher **HELICOPTER RESPONSE TIME WILL QUALIFY**	Type of accident likely to occur: Lacerations, Slips/Trips/Falls Number of workers at site: 15 - 35 Distance from a Health Care Facility: greater than 40 min Availability of Ambulance Service: Air evacuation Ambulance emergency response time: Approximately 40min Time of day work is in progress: Day-time Type of transportation needed to get to the worksite: Helicopter or fixed wing Route to site: Flying 110km Northwest of Inuvik **Lat: 69 12 35.09 Long: 135 06 17.286** Does change in weather effect type of travel? Explain. Increase time by: Depends upon weather. Could be next day.
CONTACTS: ***LOCATION OF PHONES AND RADIOS***	• phones located in offices • hallway • radios on specific personnel • radios in office • specific personnel have cell phones
EMERGENCY CALL RESPONSIBILITY	Primary responsibility: Medic Secondary responsibility: Shell Site Supervisor Site phone number: **867 777-** **867 777-** Radio Frequency: **Receive:** _____ **Transmit:** _____ Air to Ground Frequency: **130.275 MHz**
INFORMATION YOU NEED TO	**CALL AIR EVACUATION CHARTER**

SITE-SPECIFIC GENERAL EMERGENCY RESPONSE PLAN

HAVE	**Tell them** • Medivac required • Your location –Camp Farewell **Lat: 69 12 35.09** **Long: 135 06 17.286** • Landing (airstrip) condition include lighting, wind speed, wind direction and local weather conditions • Any obstructions or hazards to be aware of in landing • Phone numbers of camp • Radio frequencies of camp • Upon contact to charter, medical contact is mandatory to ensure that proper facilities and attention is given to patient(s). • Number of injured: • Extent of injuries: • What is being done (patient talking, seated, no response, etc): • Obtain confidential medical file to accompany patient **CALL TO HOSPITAL AND AMBULANCE** If available and possible, medic shall call the local hospital and ambulance **Tell them** • Medivac in progress and that evacuation charter has been notified • Number of injured: • Extent of injuries: • What is being done (patient talking, seated, no response, etc) • Age, sex of patient • Brief description of accident • Description of injuries or illness • Medic position and qualifications • Type of medical aid already administered • Site phone number • Estimated time of arrival:
EXPECTATIONS	What the paramedic should expect when he arrives on site: _____ _____ OR What you can expect when the conveyance vehicle arrives: _____ _____
COMMUNICATION OF PLAN	**FIRST AIDERS ON SITE** _____ _____ _____ **All workers on site as part of orientation**

SITE-SPECIFIC GENERAL EMERGENCY RESPONSE PLAN

Appendix II PERSONAL MEDICAL INFORMATION SHEET

THE INFORMATION BELOW IS CONFIDENTIAL - TO BE VEIWED BY MEDICAL PERSONNEL ONLY

EMPLOYER:_____ POSITION:_____

NAME:_____ DATE:_____

ADDRESS:_____

PHONE NO.: ( ) _____ OR ( ) _____

BIRTHDATE:_____ AGE_____ HEIGHT:_____ WEIGHT:_____

HEALTH CARE NUMBER:_____ PROVINCE:_____

FAMILY DOCTOR:_____ CITY:_____

MEDICAL HISTORY

ARE YOU TAKING MEDICATION FOR THE FOLLOWING?

❑ Diabetes ❑ Asthma ❑ Epilepsy ❑ High Blood Pressure
❑ Angina ❑ Thyroid ❑ Heart Disease

Allergies to Penicillin? ❑ Yes ❑ No ❑ Other Drugs _____

Do you suffer from allergies ❑ Yes ❑ No If so, explain _____

Do you have other medical problems not listed above?_____

_____

Have you had a tetanus shot in the past five years? ❑ Yes ❑ No

Do you wear Glasses? ❑ Yes ❑ No **Contact Lenses?** ❑ Yes ❑ No **Dentures?** ❑ Yes ❑ No

Do you have any medical problems, disabilities or previous injuries that may affect your ability to conduct your job in a safe efficient manner? ❑ Yes ❑ No

If Yes please explain:_____

_____

EMERGENCY CONTACT NUMBERS

Name:_____ Relationship:_____

Address:_____

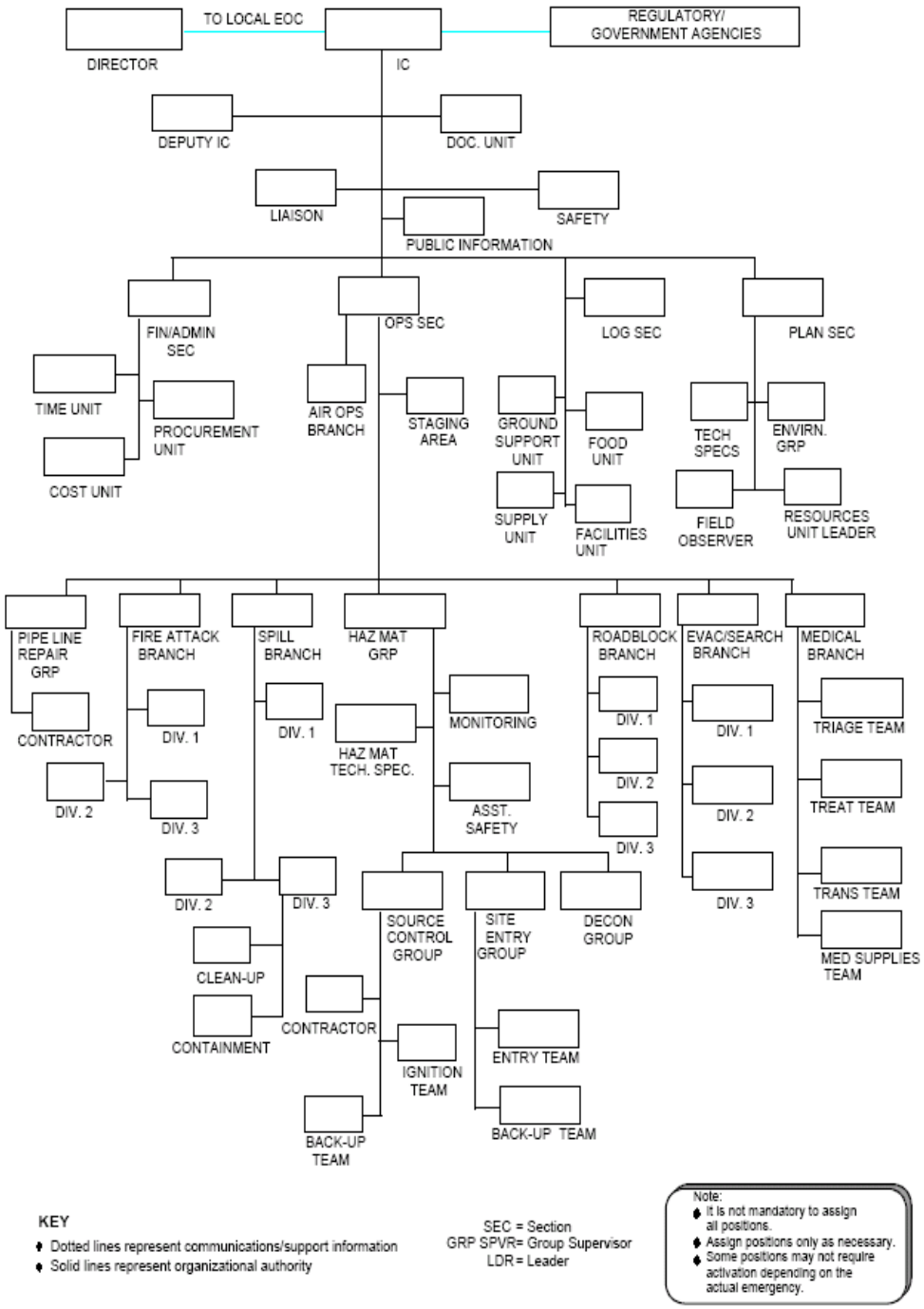
Phone Number: ( ) _____ Cell Number: ( ) _____

_____ Employee Signature	This form is to be used only in an emergency. By signing you are authorizing this information to be released to medical personnel.

SITE-SPECIFIC GENERAL EMERGENCY RESPONSE PLAN

Appendix III FIELD BASED INCIDENT COMMAND POST

COMPOSITE ORGANIZATION CHART - INCIDENT COMMAND POST (ICP)



Appendix IV NWT SPILL REPORT FORM & PROTOCOLS

See .pdf version for full size form

NWT SPILL REPORT (Oil, Gas, Hazardous Chemicals or other Materials)

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

A Report Date and time	B Date and time of Spill (if known)	C ☐ Original Report ☐ Update No	Spill Number
D Location and map coordinates (if known) and direction (if moving)			
E Party Responsible for Spill			
F Product(s) spilled and estimated quantities (Provide metric volumes/weights if possible)			
G Cause of Spill			
H Is spill terminated? ☐ yes ☐ no	I If spill is continuing, give estimated rate	J Is further spillage possible ☐ yes ☐ no	K Extent of contaminated area (in sq. m if possible)
L Factors affecting spill or recovery (weather conditions, terrain, snow cover, etc.)		M Containment (natural depression, dyke, etc.)	
N Action, if any, taken or proposed to contain, recover, clean up or dispose of product(s) and contaminated materials			
O Do you require assistance? ☐ no ☐ yes describe*	P Possible hazards to persons, property, or environment: eg. fire, drinking water, fish or wildlife*		
Q Comments and/or recommendations.*:		FOR SPILL LINE USE ONLY Lead Agency Spill significance Lead Agency contact and time Is this file now closed? ☐ yes ☐ no	
Reported by:	Position, Employer, Location:	Telephone No:	
Reported to:	Position, Employer, Location:	Telephone No:	

*Put additional comments on next page (Please type in the B-no letter you are referring to in your comments)

Indian and Northern Affairs Canada
www.inac.gc.ca

Affaires indiennes et du Nord Canada
www.ainc.gc.ca

Your file - Votre référence

Our file - Notre référence

December 17, 2003

Oil and Gas Exploration and Production Companies
Operating in the Northwest Territories and Nunavut

INAC Spill Reporting Protocol for Upstream Oil and Gas Operations

The Northwest Territories/Nunavut Spills working Agreement (revised 2003) does not specify what quantity of a substance would trigger a requirement to report a spill, largely because there are seven signatories to the Agreement who have different spill reporting requirements.

Recently, the National Energy Board (NEB) developed a Spill Reporting Protocol for NEB lead spills in the NWT/Nunavut (see attached letter). The purpose of the revised upstream oil and gas spill reporting protocol is to:

- more closely align spill reporting requirements with reporting requirements of other jurisdictions such as the territorial governments;
- focus spill notification and follow-up on spills that have potential to be a threat to the environment; and
- minimize the number of spill reports of low volume and areal extent that can be immediately and adequately dealt with by the operator and have minimal or no potential to be a threat to the environment.

The NEB spill reporting protocol came into effect on 15 July 2003 for well drilling and production operations where the NEB is the lead agency for that spill. At that time, Indian and Northern Affairs Canada had adopted the NEB protocol for INAC lead spills for oil and gas operations including well drilling where the NEB is not the lead agency and seismic operations. The conditions outlined in Appendix A of the NEB protocol must be met prior to the operator being permitted to use this protocol.

Effective immediately, the following conditions are added to the Appendix A of the protocol for INAC lead spills:

- An on-site record shall be kept of all minor spills and immediately reportable spills and be readily available to INAC Inspectors or officials upon request;
- Monthly reporting of all minor spills shall be reported to the District INAC Inspector(s) in the condensed form attached;
- All spills requiring assistance by the operator (i.e. not cleaned up immediately and assistance is required for cleanup), continuing spills, or in situations where further spillage is possible are to be reported immediately;

- All spills, irregardless of size (areal extent), amount, and product, remain the liability of the proponent and must be cleaned up immediately. All INAC lead spills must be cleaned up to the satisfaction of the INAC Inspector.

Please review the attached and if you wish to take advantage of this protocol, please contact Robert Jenkins at (867) 669-2574.

Sincerely,

David Milburn
Manager, Water Resources Division
Indian and Northern Affairs Canada

cc. Annette McRobert, Operations Directorate
Bob Wooley, Mackenzie Valley Land and Water Board
George Govier, Sahtu Land and Water Board
Gordon Wray, Northwest Territories Water Board
Robert Alexie, Gwich'in Land and Water Board
Rudy Cockney, North Mackenzie District
Ed Hornby, South Mackenzie District
Norman Wells Sub-District
Fort Simpson Sub-District
Fort Smith Sub-District
Hay River Sub-District
John Korec, National Energy Board
Harvey Gaukel, Government of the Northwest Territories
Terry Cook, DFO
Ed Collins, Environment Canada
James Thorbourne, Inuvialuit Land Admintistration
Gordon Mackay, Government of Nunavut

INAC Monthly Spill Reporting Form

Company Responsible:
Project Name and Water Licence #:
Month:

Date of Spill (d/m/y)	Product Spilled	Amount	Extent of Contaminated Area (m^2)	Location (latitude and longitude)

DIAND District Fax Numbers
North Mackenzie District (Inuvik): (867) 777-2090
Norman Wells Sub-District: (867) 587-2928
South Mackenzie District (Yellowknife) (867) 669-2720
Hay River Sub-District: (867) 874-2460
Fort Smith Sub-District: (867) 872-3472
Fort Simpson Sub-District: (867) 695-2615
Nunavut District: (867) 979-6445

National Energy Board

Office national de l'énergie

File 9720-A000-7-2
14 July 2003

Oil and Gas Exploration and Production Companies
Operating in Northwest Territories and Nunavut

Spill Reporting Protocol for Upstream Oil and Gas Operations in the Northwest Territories and Nunavut Regulated by the National Energy Board

Protocol Purpose and Effective Date

A revised upstream oil and gas spill reporting protocol (Protocol) is intended:

1) to more closely align spill reporting requirements with reporting requirements of other jurisdictions such as the territorial governments;
2) to focus spill notification and follow-up on spills that have potential to be an imminent threat to the environment; and
3) to minimize the number of spill reports of low volume and areal extent that can be immediately and adequately dealt with by the operator and have minimal or no potential to be a threat to the environment.

Effective 15 July 2003, the new Spill Reporting Protocol for Upstream Oil and Gas Operations in the Northwest Territories and Nunavut will apply to exploratory and development oil and gas drilling and production operations[2].

Protocol Highlights

The Upstream Oil and Gas Spill Reporting Protocol will:

- Apply to companies authorized to carry on drilling or production activities in the Northwest Territories and Nunavut and who meet the conditions set out in the Protocol;
- Apply to spills where either the NEB or Indian and Northern Affairs Canada (INAC) would be designated as lead agency as per the NWT Spills Working Agreement[3];

...2

[2] Existing reporting protocols, such as for Imperial Oil Resources Ltd.'s Norman Wells facility and operations, would not be affected by this new protocol.
[3] See attached Table 1A of the Northwest Territories/Nunavut Spills Working Agreement.

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

- Establish that the triggers for immediately reportable spills meet *the Canada Oil and Gas Operations Act* (COGOA) and *Regulations* and, be consistent with the reporting triggers in the Nunavut and Northwest Territories *Spill Contingency Planning and Reporting Regulations*[4]; and
- Require that each operator have, and implement, an approved spill contingency plan.

Immediately Reportable Spills

For the purpose of the Protocol, an "immediately reportable spill" is defined as a release of a substance that is likely to be an imminent environmental or human health hazard or meets or exceeds the volumes in Schedule 1.

Minor Spills

All other releases, for which there is no loss of control, are not considered immediately reportable spills and can be handled as part of ongoing operations and maintenance, i.e., immediately cleaned up. However, an on-site record shall be maintained for all releases, whether or not reported.

Please review the attached and if you wish to take advantage of this protocol, please contact me at (403) 292-6614.

John Korec

John Korec, P.Geol.
Environmental Assessment Officer

c.c. Terry Baker, NEB
Gregory Lever, NEB
Rick Turner, NEB
Rick Fisher, NEB
Mieke Vander Valk, NEB

[4] The Territories reference *Transportation of Dangerous Goods* (TDG) *Act* and Regulations for reportable quantities. The same quantities are intended for the Spill Reporting Protocol for those releases not addressed by the TDG or Regulations.

APPENDIX A

Terms and Conditions For Implementing the Spill Reporting Protocol For Upstream Oil and Gas Operations

1.	Applies only to upstream projects in a single geographic area, i.e., well drilling programs or production operations including flowlines and pipelines. The Protocol does not apply to upstream geological or geophysical operations.	UPSTREAM WELL DRILLING OR PRODUCTION OPERATIONS
2.	Applies to spills for which the National Energy Board (NEB) or Indian and Northern Affairs Canada (INAC) would be designated as the Lead Agency under the Northwest Territories/Nunavut Spills Working Agreement.	LEAD AGENCY
3.	This Spill Reporting Protocol **does not apply** to spills for which the Government of the Northwest Territories (GNWT), Government of Nunavut (GNU), Environment Canada Environmental Protection Branch (EPB), Canadian Coast Guard (CCG), or Inuvialuit Land Administration would be designated as the Lead Agency under the Northwest Territories/Nunavut Spills Working Agreement.	NON-APPLICABLE SPILLS
4.	Immediately reportable spills include releases as per **Schedule 1**, and releases of substances of lesser volumes that are likely to be an imminent environmental or human health hazard or where an operator is uncertain if a release is reportable.	IMMEDIATELY REPORTABLE SPILLS
5.	An on-site record shall be kept of all minor spills and immediately reportable spills and be available for inspectors upon request, including the INAC Inspector prior to Land Use Permit closure.	ON-SITE RECORD OF ALL SPILLS
6.	Operator, i.e., the company or individual who holds an authorization for the project, must have a spill contingency plan approved by the NEB or INAC, i.e., signatories to the Northwest Territories/Nunavut Spills Agreement.	SPILL CONTINGENCY PLAN
7.	Spill contingency plan must meet the appropriate regulatory requirements and/or spill contingency planning guidelines, including procedures to clean up minor spills and ensure environmental protection.	
8.	Appropriate field spill kits, as indicated in the spill contingency plan, must accompany each crew and/or mobile equipment and/or vehicle.	
9.	Contractors and sub contractors for the Operator must abide by the Protocol and the spill contingency plan. All spills or releases, whether by the Operator, contractors or sub-contractors, remain the liability of the Proponent or Operator.	LIABILITY

Schedule 1 – Immediately Reportable Quantities

TDG Class	Substance	Immediately Reportable Quantities for NWT/NU 24-Hour Spill Reports
1 2.3 2.4 6.2 7 None	Explosives Compressed gas (toxic) Compressed gas (corrosive) Infectious substances Radioactive Unknown substance	Any amount
2.1 2.2	Compressed gas (flammable) Compressed gas (non-corrosive, non-flammable)	Any amount of gas from containers with a capacity greater than 100 L
3.1 3.2 3.3	Flammable liquid	≥ 100 L
4.1 4.2 4.3	Flammable solid Spontaneously combustible solids Water reactant	≥ 25 kg
5.1 9.1	Oxidizing substances Miscellaneous products or substances excluding PCB mixtures	≥ 50 L or 50 kg
5.2 9.2	Organic peroxides Environmentally hazardous	≥ 1 L or 1 kg
6.1 8 9.3	Poisonous substances Corrosive substances Dangerous wastes	≥ 5 L or 5 kg
9.1	PCB mixtures of 5 or more parts per million	≥ 0.5 L or 0.5 kg
None	Other contaminants, e.g., crude oil, drilling fluid, produced water, waste or spent chemicals, used or waste oil, vehicle fluids, wastewater, etc.)	≥ 100 L or 100 kg
None	Sour natural gas (i.e., contains H_2S) Sweet natural gas	Uncontrolled release or sustained flow of 10 minutes or more

As well, all releases of harmful substances, regardless of quantity, are immediately reportable where the release:

- is near or into a water body;
- is near or into a designated sensitive environment or sensitive wildlife habitat;
- poses an imminent threat to human health or safety; or
- poses an imminent threat to a listed species at risk or its critical habitat.

Example Scenarios:

1. NEB Lead Agency (assumes spills are under control)

Activity	Spill Location	Quantity & Product Spilled	Spill Reporting
Drilling operation	Drilling lease on Crown land	200 L gel-chem mud	Immediately reportable to the NWT 24-hour Spill Report Line
Drilling operation	Drilling lease on Crown land	2 m^3 sour gas	Immediately reportable to the NWT 24-hour Spill Report Line
Water injection line operation	Pipeline right-of-way on Crown land	150 L produced water from valve	Immediately reportable to the NWT 24-hour Spill Report Line
Drilling operation	Drilling lease on Crown land and into near-by creek	75 L of crude oil	Spill has entered a water body - immediately reportable to the NWT 24-hour Spill Report Line
Drilling operation	Drilling lease on Crown land	50 L oil-based mud	On-site record of spill & clean up.
Drilling operation	Drilling on Crown land	0.5 m^3 sweet gas	On-site record of spill & clean up.
Water injection line operation	Pipeline right-of-way on Crown land	80 L produced water from valve	On-site record of spill & clean up.
Drilling operation	Inside shed for the diesel-generator	100 L of diesel leaks into fully-contained generator shed	Not a spill – diesel did not get into or threaten the environment or human health – no report necessary. However, as an operational upset, the leak would be cleaned up and included on the daily tour sheet.

2. INAC Lead Agency (assumes spills are under control)

Activity	Spill Location	Quantity & Product Spilled	Spill Reporting
Fuel tank refilling	Bermed storage tank area on drilling lease on Crown Land	100 L gasoline	Immediately reportable to the NWT 24-hour Spill Report Line
Truck refuelling	Drilling lease on Crown land	2 L of diesel	On-site record of spill & clean up.
Camp operations	Camp on Crown land	75 L of grey water overflows camp sump	On-site record of spill & clean up.
Vibroseis operation	Seismic line on Crown land	50 ml of hydraulic fluid on snow, immediately scooped up and placed in disposal container	Protocol does not apply for a seismic operation – however, this is not a spill as the hydraulic fluid did not enter the environment.
Truck refuelling	Seismic line on Crown land	2 L of diesel	Protocol does not apply for a seismic operation – spill is immediately reportable to the NWT 24-hour Spill Report Line

3. Other Lead Agencies (assumes spills are under control unless otherwise stated)

Activity	Spill Location	Lead Agency	Quantity & Product Spilled	Spill Reporting
Drilling operation	Drilling lease on ILA land	ILA	50 L gel-chem mud	Protocol does not apply – spill is immediately reportable to the NWT 24-hour Spill Report Line
Refilling tanks from fuel barge	River next to drilling base camp	CCG	10 L diesel fuel	Protocol does not apply – spill is immediately reportable to the NWT 24-hour Spill Report Line
Fuel re-supply	Truck overturn on a territorial road (would also apply to spills within a community)	GNWT or GNU	50 L of diesel fuel	Refer to GNWT or GNU *Spill Contingency Planning and Reporting Regulations*

Table 1A
Designation of Lead Agency for spills in the NWT and NU
(From the Northwest Territories/Nunavut Spills Working Agreement)

	SPILL INCIDENT	LEAD AGENCY
1.	**Spills on Commissioner's Land in NWT**[1,2] (i.e., Territorial Highways[3], communities)	GNWT
	Except:	
	a) At facilities authorized under Federal Legislation.	INAC
	b) At Federal Facilities[4] not authorized under Federal or Territorial legislation	EPB
	c) At oil and gas exploration and production facilities[5]	NEB
	d) Those sections of Territorial Highways on ice surfaces.	INAC
2.	**Spills on Commissioner's Land in NU**[6,7] (i.e., Territorial Roads[8], communities)	GN
	Except:	
	a) At facilities authorized under Federal Legislation.	INAC
	b) At Federal Facilities[4] not authorized under Federal or Territorial legislation	EPB
	c) At oil and gas exploration and production facilities[5]	NEB

Table 1A cont'd

3.	**Spills on Territorial Land in NWT[3,2] and NU[9,7]**	INAC
	Except:	
	a) At Federal Facilities[4] not authorized under Federal or Territorial legislation	EPB
	b) At oil and gas exploration and production facilities[5]	NEB
	c) In National Parks.	EPB
4.	**Spills on Water in NWT[10] and NU[10]**	INAC
	Except:	
	a) From ships and barges (i.e., ship source pollution incidents, including refuelling shore-based tanks from ships)	CCG
	b) At oil and gas exploration and production facilities[5]	NEB
5.	**Spills on Land in the NWT set aside under the Inuvialuit Land Claim.** (i.e., on private 7-1-a, b lands under the claim, excluding spills on water bodies)	ILA

FOOTNOTES:

1 **Commissioner's Land** means land in the NWT transferred by Order in Council to the GNWT and is, generally, land within a community, town or city.

2 See Table 1B for Jurisdiction Designation of **Airports** in the NWT.

3 **Territorial Highways** are described in the GNWT *Public Highways Act* Schedules A, B and C (attached as Table 1D).

4 **Federal Facilities** means any facility owned by the Government of Canada, such as DEW Line Stations, North Warning System Stations, High Arctic Weather Stations including airports, docks and wharves, and Research Centres, operated directly or indirectly by the following agents of the Crown:

- Department of Industry
- Department of Fisheries and Oceans
- Indian and Northern Affairs Canada
- Environment Canada
- Natural Resources Canada
- Health Canada
- Department of National Defence
- Transport Canada
- Department of Public Works and Government Services (PWGSC)
- Department of Justice
- Royal Canadian Mounted Police (RCMP)

Crown Corporations such as:

- Canadian National (Railway)
- Canadian Broadcasting Corporation (CBC)
- Canadian Mortgage and Housing Corporation (CMHC)
- Federal Business Development Bank (FBDB)
- Canada Post Corporation
- Freshwater Fish Marketing Corp.

This designation does not include private dwellings owned or leased by PWGSC; or office and other complexes leased by PWGSC; or Petro-Canada facilities located within communities or on Commissioner's Land.

5 This designation includes pipelines, gas plants and refineries.

6 **Commissioner's Land** means land in NU which is described in the *Commissioner's Land Act*, R.S.N.W.T. 1988,c-11 as amended for NU pursuant to the *Nunavut Act* and is, generally, land within a community or town.

7 See Table 1C for jurisdictional designation of Airports in NU.

8 **Territorial Roads** are described in the GNWT *Public Highways Act* Schedules A, B and C (attached as Table 1E), and in the *Public Highways Act*, R.S.N.W.T. 1988, c.P-13, as amended for NU pursuant to the *Nunavut Act*.

9 **Territorial Land** means lands in NWT and NU that are vested in the Crown or for which the Government of Canada has power to dispose.

10 **Water** means both inland and Arctic waters as defined in the *Northwest Territories Waters Act* and *Arctic Waters Pollution Prevention Act*. Where a spill on land enters surface or ground water, the lead agency is the agency responsible for the spill on land.

Appendix V MDSRC SPILL EQUIPMENT LISTING

Revised: September 2005 Sept. 18 edition

		*	*	*	*	*	*	*	*	*	*	*	*	
ANCHORS, BRIDLES BUOYS & FLOATS														***Located @ IT&SC, Inuvik Airport (YEV) N 68° 18' 28.4" W 138° 28' 40.7"**
ANCHORS	Danforth 25 lb. c/w chain & caribiner at chain end and on crown plate						6							21 K. ea
	Danforth 40 lb c/w chain & caribiner at chain end.						4							
	Danforth 43 lb c/w chain & caribiner at chain end and on crown plate						2							31 K ea
	75 lb. Danforth, chain, 100' rope & shackle. Quick-link on crown plate										1	2		59 K ea
ANCHOR PINS	Drive- in , 4'						12							6 K ea
	Drive-in, Delta wing						12							14 K ea
	Screw- in 5'						2							
BRIDLES	Shoreline, c/w snaps						12							2 Kg.
	Tow, Double						4							3 K ea
	Tow, Single						8							2 Kg.
	Tow, Single, c/w 50' rope						1							5 kg
BUOYS	A-1 (small)						3							2 K
	C-M3, Ring Top & Bottom						10							6 K ea
	A-6 (Large) c/w Wire Loops						4							17 K ea. Not yet inflated
PARAVANES	Boom tow, c/w Dble Tow Bridle										1	1		11 K

M.D.S.R.C. BOAT		
20' Aqua-Dek Hull	1	Need Decals (MDSRC)
175hp Mercury Jet Outboards	2	Engine Hours Jul '05
c/w manual		P = 43.0hrs S = 43.5hrs
Trailer	1	
Air Horn	1	
Allen Key set	1	
Anchor, 10 lb. c/w line	1	
Bailer	1	
Bilge Pump, Manual	1	
Boat Cover	1	
Boat Pole, Telescopic	1	
Bungee - 8"	1	
Circuit Tester, Electrical	2	
Compass/Depth Sounder/GPS	1	Lowrance Model X15MT
c/w operation manual, CD & comp. interface equipment		
Davit, Removable c/w cable & manual	1	
Drain Plugs	2	
Engine Fuel System Spares	1	
Engine Oil 4L	1	
Exacto Knife c/w spare blades	1	
Fenders	4	
Fire Extinguisher	1	Serviced July '05
First Aid Kit (Marine)	1	
Flare Kit (Marine)	1	Flares expire June 05. Kit expires 2006 **replace** - Orion marine signal kit (Ian)

Flat File	1	
Funnel	1	
Fuses 20 Amp	4	
Fuses 30 Amp	4	
Gas, Jerry cans- 5 gall.	3	**Refilled July '05 Boat spare gasoline stored in #6 (outdoors) due to hangar insurance policy**
Gear Lube Pump	1	
Grease Gun	1	
Hacksaw c/w spare blades	1	
Hammer	1	
Heaving Line, c/w bag	2	
Impeller (Spare)	2	
In-Line Fuel Filter (Spare)	1	
Impeller Removal Socket	1	
Insect Repellent, Aerosol	6	
Jackknife c/w holster	1	
Knife, Utility	1	
Lantern c/w 6 v battery	1	
Life Vests	5	others in Container #6 & Floater Coats
Manual Package	1	
Oar	1	
Oil Filter Housing c/w filter (Spare)	1	
Paddle	1	
Pads, Sorbents	Y	
Penlight	1	Batteries Not Included
Pliers	2	
Pliers, Needlenose	1	
Quick Links	11	
VHF Marine Radio c/w manual	1	Model ICM502
Icom - Former Petrocan Radio c/w manual	1	Model ICF310

Ropes, various lengths			3
Screwdriver, Multi tip			1
Shackles, Assorted			Y
Socket Set 1/4" & 3/8"			1
Spare Tire (Trailer)		1	
Spare Tire Bracket			1
Spark Plugs			11
Spark Plug Gap Gauge			1
Spotlamp, Handheld			1
Stern Light Post, Removable			1
Stirrup Belt (Swimmer Rescue Tool)			1
Tire Gauge			1
Tool Box			1
Tow Hitch, Triple Ball			1
Tow Hitch, 2"			1
Tow Post, Removable, c/w 2 brackets			1
Water Separator/Filter (spare)			1
Wire, Copper (roll)			1
Wire Cutters			1
Worklight lamp, spare			1
Wrench, Adjustable 6"			1
Wrench, Adjustable 12"			1
Wrench Set, 1 x 10 Piece Combination			1
Wrench, Crescent - Various sizes			7
BOOMS, BOOMVANE CABLES & CHAINS			

BOOMS	6" x 6" River Boom in 50' sections			10	10	120 lb per 50' section
	Boom Connector Pin, Spares	Y				
	ShoreSaver Boom in 50' sections		2			38 K ea
	ShoreSaver Air/Water Loading Adapter c/w hose & camlock		1			
	ShoreSaver Inflation Blower (gas) c/w Shore Saver load unload boom valve		1			Ser. 256976111
	ShoreSaver Loading Hoses		2			
	ShoreSaver Water Loading Strainer		1			
BOOM BOX	c/w canvass cover			1	1	
BOOMVANE	Shallow Water Version c/w 150 m x 12 mm mooring line on reel	1				
BOOMVANE RUDDER LOCKS		1				Install to allow open water sweeping. Remove for river deployments.
CHAIN	Galv. 1/2" x 10' c/w caribiner	2				Chains are installed on each anchor
ELECTRICAL EQUIPMENT						

& GENERATORS										
EXTENSION CORDS	50'	2	2	3	3	2		2		
	100'	3	4	1	1	1		2		6 K ea
GENERATORS	Kodiak Gas Model SGB5500HX	1								C.1 Ser. C007858 90K
	c/w Operation M annual		1							C.2 Ser. C008127 90K
								1		C.8 Ser. C008175 90K
LIGHT STAND	Portable, c/w light	3	3					4		
LIGHTS, HAND	Portable, 500W Halogen							2		
	Spare 500W Halogen bulbs	5	5	5	5	5		5		
FUEL, GAS, OIL, LUBES & ADDITIVES										
ANTI - FREEZE	Gas Line 150 ml	2	2					2		
DIESEL	5 gall. Jerry Can	1	1				2			#9 filled Aug. '04, rest filling date unknown #9 diesel stored in #6 container, due hangar insurance policy
GASOLINE	5 gall. Jerry Can	1	1				6		Y	All Refilled July '05 Y = See boat
										#8 & #9 gasoline and diesel stored in #6 container (outdoors), due hangar insurance policy

OIL/GAS MIX	4L Jerry Can			1		
	2 gall Jerry Can	1	1			
OIL	2 cycle, 1L			12		12K Tot.
	2 cycle 4L				7	
	Chain, 4L			1		4 K ea. Plus a second container with 10% in it
	Engine, 4L Synthetic 0W-30			4	1	4 K ea.
	Gear (Boat) 1 Quart.				2	
	W5-30 1Qu.	1	1		10	1K ea
HELICOPTER EQUIPMENT						
						Under Consideration
HOSES & RELATED EQUIPMENT						
DISCHARGE HOSE	2" x 25' c/w Camlock				8	9 Kg.
	2" x 50' c/w Camlock				6	18 K.
	1 1/2" x 50' canvas c/w Camlock				1	
FIRE NOZZLE	c/w 1 1/2" to 2" Swedge c/w Camlock				2	

FOOT VALVES	2" c/w Camlock		3	
HOSE CAPS	2"			**Partial order of new caps and plugs in one box awaiting balance of order that includes plug/cap chains. Box in #9**
HOSE PLUGS	2"			
KAMLOCK LOCKING PINS (spare)			4	
KAMLOCKS & ADAPTERS				
	female adapter 2"		1	
	female external thread 2"		2	
	female / female adapter 2"		1	
	female internal thread 4"		1	
	hose cap 2"		1	
	male external thread 2"		4	
	male internal thread 2"		1	
	female internal thread 4"		1	
	male internal thread 4"		1	
	male / male adapter 2"		4	
SEALS, KAMLOCK	2" Rubber, Spares		6	
SUCTION HOSES	2" x 25' c/w Camlock		6	
	2" x 50' c/w Camlock		2	
SUCTION SCREEN	2" c/w Camlock		3	
SWEDGES	2" - 3" c/w Camlock		2	

	2" - 4" c/w Camlock		2	
THREE WAY MANIFOLD	2"		2	
VALVES	2" Ball, c/w camlocks		2	
ICE EQUIPMENT				
For Clothing (Chain Saw Chaps, Winter Boots etc see "Safety Equipment, Personnel." or "Miscellaneous"				
AUGER - ICE	Gasoline Powered, Stihl 31cc Mod. BT120 c/w 10" bit and 2' extension		1	17 K 2Stroke Engine, needs premix
AUGER - ICE	6" Bit		1	
AUGER/CHAIN SAW TOOL KIT	Includes chain file etc.		1	11 K
CHAIN SAW	Gasoline Powered Stihl 92cc Model 066 c/w 36" bar & chain. Mounted on Sleigh.		1	Marked 8815 . 106 K with sleigh #2
CHAIN SAW	Gasoline Powered Stihl 92cc Model 066 c/w 52" bar & chain. Mounted on Sleigh.		1	Marked 8816 . 136 K with sleigh #1
CHAIN SAW BAR	48" Spare		1	2 K
CHAIN SAW CHAIN	48" Spare		1	1 K
ICE BLOCK LIFTER CHAINS	c/w "T" Bar		2	15 K Tot

LADLES									2		
SAW SLEIGH									2		Saw sleigh ski-doo skis (4) are in #8 awaiting replacing present sleigh runners.
SHOVELS, SCOOP											See Also Miscellaneous Equipment
WATER VELOCITY METER	(Stream Speed Meter) c/w plastic pelican case								1		Requires 357 Ever-Ready Battery, 4 Purchased March '05 New battery & spare purchased July '05
MISCELLANEOUS											
ALLEN KEY	Set	1	1	1	1	1				1	
AWL						1					
AXES	Fire, Long Handled	2	2	2	2	2	2				
BATTERIES											
BRUSH	Floor, Long Handled	1	1	1	1	2	1	1	1	1	3 K. ea
BUNGY CORDS											TBA
CAMERA	Disposable	1	1	1		1					
CARIBINERS							6				All others attached to anchor chains

CHAINSAW	See also Ice Equipment	1									C.1 DCS400 Ser. 9875294 6K
			1								C.2 DCS400 Ser. 9875469 6K
							1				C.6 DCS400 Ser.9875409 6K
CHAIN SAW CHAPS		1	1				1		1		
CHALKLINE									2		
CHALKLINE REFILLS									6		
CLIPBOARD		2	2	2	2	2				2	
CONES, TRAFFIC		12	5	9	6	5			12		
CONTAINER, RUBBERMAID										2	
CORD	Sash on reel 1/8" x 250'						1				2 K
	Sash on Reel 1/4" x 250'						1				
DECON	Brushes							6			Tote 19
	Detergent - 20L Pail							2			Tote 19
	Trays c/w lids							4			Tote 19
DOCUMENT SUPPLY & LOGS	See Field Desk										
DRILL BITS	1/8TH "							4			Used when replacing boom connector pins
DRUM, 45 gall, steel	45 Gall. c/w removable lid	5		5	11						
DRUM, 45 gall, plastic	45 Gall. c/w removable lid	2	12	6		12					

SITE-SPECIFIC GENERAL EMERGENCY RESPONSE PLAN

EMERGENCY RESPONSE GUIDE 2004								1			
FENCE	Snow, Orange								4		28 K. Tot
FIELD DESK	Rubbermaid, c/w log book, pencils & document supply						1		1	1	
FILES	Chainsaw	1	1	1	1					1	
	Flat	1	1	1	1	1				1	
FUNNELS	Large	1	1	1	1	1				1	
	Small								1	1	
GARBAGE BAGS	Box	1					1	1	1		8 K
HACKSAW	c/w spare blades	1	1	1	1	1				1	
HAMMER	Ball Peen 24 oz.	1	1	1	1	1				1	
	Claw	1	1	1	1	1				1	
	Sledge 8 lb.			1	1	1	1	1	1	1	
	Sledge 10 lb.	1	1								
	Sledge 14 lb	1	1	1	1	1					
HEATER	"Reddy", Diesel	1									C1. Ser. 95377757 46 K
			1								C2. Ser. 5986877 46K
									1		C.8 Ser. 5986876 46 K
HOSE CLAMPS										3	
KNIFE	Utility, c/w spare blades	1	1	1	1	1			1	1	
LADDER	Step 6'							1			

LANTERNS	Hand		6	6	6	6	6			9		
LANTERN 6V BATTS.			8	10	6	10	9			12		Stock date unknown
LIFTING CABLES	c/w shackles										4	
MEGAPHONE	c/w Siren							1		1		1 K. Needs 6 "C" cell Batteries
NAILS	Assorted, In One Gallon Paint can		1	1	1	1	1					
NWT SPILL REPORT FORM									1			
PADLOCKS	Combination type, Programmable		2	2	2	2	2	1	2	1	2	C.6 & C.8 have no man door
	Combination type, Programmable, Spare								5			
PAILS	Galv. 2.5 gall, aluminium				1	1	1	1			1	1 K.
	Plastic, 20L c/w lid		3	3								
PAINT	Aerosol	Orange	1	1	1	3	1			6		5 K. Tot.
PAINT STICKS	For marking tools								3			
PICK			1	1								
PITCH FORKS			1	2	2	2	2					
PLASTIC, SHEETING	20ft x 100ft 6mm	Roll						1				
PLIERS	Regular		1	1	1	1	1				1	
	Needlenose		1	1	1	1					1	

PLYWOOD	3/4" x 4'x 6'					3			1		
	3/4 x 4' x 8'					3					
POP RIVETER	c/w Rivets										For boom connector pin replacement
PROPANE BOTTLES	20lb					4					**Filled July '05 # 8 Propane Bottles (2) Stored in # 6 Container (outside) due Hangar Insurance Policy**
PROPANE TORCH KIT	c/w storage case, spark lighter, spare flints, flame spreader, utility flame tip, propane cylinder						1				
PRY BAR	5'	2	2	2	2	2					
QUICK LINKS, spares	See Caribiners										
RAGS (BOX)									1		
RAKES	LONG HANDLE	2	2	2	2	2	3				9 K Tot
RANGEFINDER	Laser, in Black Pelican Case						1				Includes spare 9V battery. New July '05
SCRAPER	Ice	2	2	2	1	1			2		
SCREWDRIVER	Flat Blade, Large	1	1	1	1					1	
	Multi tip	1	1	1	1	1				1	
SHACKLES	1/4"										

	3/8"									
	1/2"									
	Miscellaneous, in sack						1			
SHOVELS	Long Handled	2	2	2	2	2				
	Scoop, Aluminium	4	4	4	4	4	4		4	2 K ea
	Snow	1	2	2	1	2			2	5 K ea
SIGNS	Caution								1	
	Restricted Area								2	24 K. ea
"SMART ASH" BURNER	c/w 45 gall drum & oil injector pump c/w manual	1		1						65 kg ea. Awaiting new unit for #8
"SMART ASH" BURNER BASE		1								122 Kg ea. 2 new bases to be constructed
"SMART ASH" OPERATING MANUALS (spare)								2		
"SMART ASH" Filters		5							5	1 K
SMART ASH HEAD	Spare (used)							1		
SOCKET SET	20 piece 3/8" c/w plastic case	1	1	1	1					
	10 piece combination	1								
	57 piece combination - 3/8" c/w plastic case					1				
STRAPS, TIEDOWN	1" x 15'									TBA
	2" x 15'									TBA
SQUEEGEE	Long Handled	2	2	2	2	2			2	

SITE-SPECIFIC GENERAL EMERGENCY RESPONSE PLAN

TAPE	CAUTION	1	1	1	1	1	1					
	DANGER	1	1	1	1	1	1					
	DUCT	1	1	1	1	2	4	1	3		1	
	ELECTRICAL (ROLLS)	1	1	1	1	1			1	1		
	FLAGGING (ROLLS)											
	TEFLON (ROLLS) - pipe tape									5		in wooden Camlock box
TAPE MEASURE	25'					1						
	50 meter					1						
	50'	1										
	100'		1						1			
TARPAULINS		1	1	1	1	1	2	1	2			54 K Tot.
TIES, CABLE, NYLON	23"							12				
TIN SNIPS		3	3	2	3	1	3			1		
TOOL BOX	"Greenlees", fixed in container. Contents listed separately in this inventory	2	1	1	1	1						
TOOL BOX	Portable	1	1	1	1	1				1		
TIGER TORCH	c/w regulator and hoses - Propane						1		1			
WD - 40	lubricant, aerosol									1		
WIRE	Mechanics (roll)	1	1	1	1	1				1		
WIRE CUTTERS			1	1	1	1				1		
WIRE FLAGS	Bundles								2			

WRENCH	Crescent 8"		1	1	1			1	
	10"	1	1	1	1			1	
	12"	1							
	PIPE - 12"		1	1	1			1	
	18"	1	1	1	1		1	1	
	24"	1	1	1	1		1	1	
	36"						1	1	
	Combination Open End Box End Set 11, imperial					1			
	Combination Open End Box End Set 11, metric					1			
	Sparkplug							1	
ZIPLOC PLASTIC BAGS	Box							1	
PUMPS									
See also under "Skimmers"									
DIESEL									
GASOLINE	2" Honda Trash Model WT20X							1	Ser GCO2-8480904 50K
	2" Honda Trash Model WT20X							1	Ser. GCO2-8480921 50K
	2" Honda Centrif. Mod. WN 20							1	Ser. GCAJ-1246059 22K
	2" Honda Peristalt. Mod. GX200							1	Ser.GCAE-1848726 60K
	2" Honda Peristalt. Mod. GX200							1	Ser. GCACT-1105034 69K B ig cage
ROPES & ROPE REELS									

SITE-SPECIFIC GENERAL EMERGENCY RESPONSE PLAN

ROPE	1/2" x 25', floating, loop & hook					6					15K Tot. On Metal Reel
	1/2" x 25', floating, loop & hook Yellow					7					15K Tot. On Metal Reel
	1/2" x 50' ,floating, loop & hook					6					20K Tot. On Metal Reel
	1/2" x 100' ,floating, loop & hook					4					22 K Tot. on Metal Reel
	5/8" yellow x 175'					1					11 K Tot. On Wood Reel (red)
	1/2" x 50' thimble one end					1					4 K
	1/2" x 25' thimble both ends					1					2K
REEL	Rope, Metal					4					
REEL	Rope, Wood					1					
SAFETY EQUIPMENT GENERAL											
Air HORN		1	1	1	1	1					
AIR HORN REFILL		1	1	1	1	1					
EMERGENCY KIT	Roadside	1	1	1	1	1			2		9 K ea
EYE WASH STATION	c/w irrigating liquid, pads, cold packs etc							1			Tote 20
FIRST AID KIT	10 man #3	1	1	1	1	1					
	BC Level 3						1	1	1	1	Added July '05

	NWT #1 (loaner required by journey management)							1			
FIRE EXTINGUISHER	20 lb ABC	2	2	2	2	2					Serviced/Replenished June '04
	20lb ABC N2 Refillable						2	2	2	2	New July '05
	2 1/2 lb ABC (loaner required by journey management)							1			New Apr. '05
	20 lb ABC (loaner required by journey management rules)							1			
NITROGEN CARTRIDGES	Fire Extinguishers Spares						2	2	2	2	
POWDER, FIRE EXTINGUISHER	Purple K - 50lb Pails						1	1	1	1	
HOSE SEAL KIT, FIRE EXTINGUISHER SPARES								8			
WINDSOCK	Sock						1		1		2 K ea
	Extension Pole, c/w drill bit						1		1		14 K ea
SAFETY EQUIPMENT PERSONNEL											
BLANKETS		4	3	3	3	3					
BOOTS	Rubber, c/w steel toe & shank Size 10						3				
	Rubber, c/w steel toe & shank Size 11						3				

BOOTS, WINTER	Baffin -Size 9	1	1	1	1	1	1					
	Baffin -Size 10	1	1	1	1	1	2					
	Baffin -Size 11	1	1	1	1	1	2					
CHIN STRAPS	For Hardhats							10				T20
COVERALLS, DISPOSABLE, TYVEK	Size XL						50	38				5 K Tot. in 2 boxes
COVERALLS, INSULATED	Size XL	4	5	4	4	5						
EARPLUGS	Box									1		
FACESHIELDS												
FLOATER COATS	Size XL						7					In Small Black Tote
GOGGLES	Chemical											
GLOVES	Chemical resistant "Barrier", pr.						12	17				
	Latex 12"	4	4	4	4	4						
	Monkey Grip	12	12	12	12	12	12	12	12			
	Neoprene							20	12			
HARDHATS								4				T20
INSECT REPELLANT	"Deep Woods Off", Aerosol							2				
LIFEVESTS	Large											
	Extra Large						6		5			In Small Black Tote
RAINWEAR	Jacket & Pants set											
	Medium							1				

	Large							5		
	Extra Large							8		
	Extra Large							4		
RESPIRATORS	Half Mask c/w 2 org.vap. carts.							4		
	Full Face c/w 2 org.vap.carts.							2		
RESPIRATOR CARTRIDGES	Organic Vapour. Fits both of above type respirators							16		Each respirator includes 2 cartridges - comes in respirator box
SAFETY HARNESS	Parachute Type c/w 6' shock absorber safety lines							4		
SUNSCREEN	Tubes							4		
VESTS	Road, c/w reflective tape	5	5	5	5	4	5	2	5	
	Incident Commander							1		Tote 20
	Safety Representative							1		Tote 20
WADERS	Chest, c/w steel toes and shanks									
	Size 10						1			4 K.
	Size 11						1			4 K.
SAMPLING EQUIPMENT										
Cooler, 102 quart, white								1		
Cooler, 60 quart, red/white								1		
Packing tape, roll								1		
Ice Packs								6		
Pen								2		
Pencil								2		

Rite in Rain Notebook, small	1
Rite in Rain Notebook, large	1
Permanent marker pens	2
Trowel, Aluminium	1
Spoon, Stainless steel	1
Scrub Brush	1
Distilled Water	4L
Bucket, steel 9L	1
Liquid detergent, bottle	1
Paper towels, roll	1
Amber Glass Bottles 1L	12
Amber Bottles 250 ml	12
Plastic Bottles 250 ml	12
Purge and Trap Vials	36
Soil Sample Jars 250 ml	12
Mason Jars 1L	12
Ziploc Storage Bags, in box	1
Bottle & Jar Labels	90
Sample Preservatives, nitric acid vials	12
Chain of Custody Forms	10
Tape Measure	1
Latex Gloves	30
Summary of Typical Parameters, Hold Times & Bottle Requirements	2
Sampling Kit Inventory	2

SKIMMERS

Disc	MI-30 disk skimmer head	1	Requires addition of Landlocked discharge hose
	MI-30 skimmer, Yanmar diesel powerpack	1	No battery on unit. Use hand crank to start
Multi - Head	Canadyne Model 1230D	1	Powerpack & Hoses 275K
	Yanmar 10 hp diesel powerpack	1	
	S2T2 Hydratech discharge pump	1	
	Disc Insert for Multi-Head	1	Skimmer head, drum & pump 80K. In wooden box
	Drum Insert for Multi-Head	1	Discs in crate 68K
	Skimmer disc. hose 25'	2	5K
	Skimmer suction hose 25' (green)	1	8K
Rope Mop	Aquaguard Model 40D c/w Yanmar diesel Powerpack	1	
	Air Filters	2	Ser. 2443 100Kg
	Fuel Filters	2	
	Mop return, float & rope	1	15 K
	Oil Strainers	2	
	Recoil Spring	1	
	Starter Ropes	2	
	Spare mop for 40D	1	8K

Skim Pak									1	9K
	Extension suction tubes c/w Camlock								3	12K
SORBENTS										
BOOMS (Socks)	Sorbents, Bags of 4	4	5	4	3	4	1	2		
FLOOR DRY	Granular	2	13	15	14	16				
GRANULAR	Other than Floor Dry	3	2	2	2	1				
PADS		7	20	11	26	20	8	4	1	7 K. ea bale
RAGS	Box								1	
ROLLS	Sorbents	1	2	2	2	2	1	2		
SAWDUST	Bags	9	12	9	11	10				
TANKS AND RELATED EQUIPMENT										
TERRA-TANK	Pillow type 1500 Imp. Gall						2			36 K ea
TERRA TANK FITTINGS	In Sacks						2			6 K ea
TERRA REPAIR KIT							2			5 K ea
TOTE TANKS c/w Lids										
#11										
#12			1							

SITE-SPECIFIC GENERAL EMERGENCY RESPONSE PLAN

#13				1									
#14					1								
#15						1							
#16							1						
#17								1					Empty
#18													
#19								1					Decon. Equip.
#20								1					Additional PPE
Revised Dates		9'05	9'05	9,05	9'05	9'05	9'05	9,05	9,05	7'05	7'05	7'05	7'05	

Container Purposes

#1- #5 Inclusive	Small "nuisance" type spills
#6	River boom support equipment
#7	General - Extra PPE, Decon. equip.
#8	Winter spill, ice response equip.
#9	Pumps, skimmers, hoses etc.

NORTHWEST TERRITORIES WATER BOARD
NUNAPPA SIVUNIUKPAIT IMMAKUN

WATER REGISTER: N7L1-1762

November 1, 2005

Mr. Randall Warren
Shell Canada Ltd.
400 - 4 Avenue S.W.
P.O. Box 100, Station M
CALBARY, AB T2P 0J4

Dear Mr. Warren:

ISSUANCE OF A "B" TYPE LICENCE - CAMP FAREWELL

Attached is a duplicate of Licence No. N7L1-1762 granted to Shell Canada Ltd. 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 Ltd. is anticipated.

Sincerely,

Gordon Wray
Chairman
N.W.T. Water Board

Attach.

P.O. Box 1326, Yellowknife, NT X1A 2N9, 2nd Floor Goga Cho Building
Phone: (867) 765-0106 Fax: (867) 765-0114

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 Office.

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.

.....2

[BANK ADDRESS]

IRREVOCABLE LETTER OF CREDIT
[The term "Documentary Credit" may also be used instead of "Letter of Credit"]

DATE OF ISSUE: [date] **OUR REFERENCE NUMBER:** [Bank's Reference Number]
AMOUNT: CAD$#########.00
MAXIMUM: #########.00
CANADIAN DOLLARS ONLY

APPLICANT
["Customer" can be used instead of "Applicant"]
[Company's Name]
[Company's Address]

BENEFICIARY:
RECEIVER GENERAL FOR CANADA
ON BEHALF OF THE MINISTER OF
INDIAN AFFAIRS AND NORTHERN DEVELOPMENT
4914 - 50 Street, 3rd Floor
P.O. Box 1500
YELLOWKNIFE, NT X1A 2R3

ATTENTION: REGIONAL DIRECTOR GENERAL
DIAND - NT REGION

RE: SECURITY PURSUANT TO [the Water Licence Type and Number]

AT THE REQUEST AND FOR THE ACCOUNT OF [Company's Name] (THE "APPLICANT"), WE, [Bank's Name], HEREBY ESTABLISH IN YOUR FAVOUR OUR IRREVOCABLE LETTER OF CREDIT NO. [Bank's Reference Number] ("CREDIT") FOR SUMS NOT EXCEEDING IN THE AGGREGATE [Amount of Security required stated in Canadian Dollars].

THIS CREDIT IS AVAILABLE WITH US FOR DRAWING AT SIGHT, WITHOUT ENQUIRY AS TO WHETHER YOU HAVE A RIGHT AS BETWEEN YOURSELF AND THE APPLICANT TO MAKE SUCH DEMAND AND WITHOUT RECOGNIZING ANY CLAIM OF THE APPLICANT, AGAINST PRESENTATION TO US, BY YOU OR YOUR DULY AUTHORIZED REPRESENTATIVE OR AGENT, OF THE FOLLOWING DOCUMENTS:

1. A SIGHT DRAFT DRAWN ON [Bank's Name and Address of the Branch that the security can be drawn at, usually one of the Bank's larger commercial banking centres]; AND

2. THE ORIGINAL OF THIS IRREVOCABLE LETTER OF CREDIT NO. [Bank's Reference Number] FOR ENDORSEMENT OF PAYMENT THEREON; AND

3. A STATEMENT SIGNED BY AN OFFICIAL OF THE DEPARTMENT OF INDIAN AFFAIRS AND NORTHERN DEVELOPMENT CERTIFYING

   A) THAT THE SIGNATORY IS AN OFFICIAL OF THE DEPARTMENT OF INDIAN AFFAIRS AND NORTHERN DEVELOPMENT AND HAS THE AUTHORITY TO SIGN THE STATEMENT ON BEHALF OF THE MINISTER OF INDIAN AFFAIRS AND NORTHERN DEVELOPMENT (THE "MINISTER"), AND

   B) EITHER
      I. THAT THE MINISTER IS ENTITLED TO APPLY THE AMOUNT DRAWN, BEING ALL OR PART OF THE SECURITY POSTED AND MAINTAINED PURSUANT TO [the Water Licence Type and Number] ISSUED BY THE NORTHWEST TERRITORIES WATER BOARD, WHETHER AS ORIGINALLY ISSUED OR AS AMENDED OR RENEWED FROM TIME TO TIME, OR

      II. THAT THIS CREDIT IS DUE TO EXPIRE IN THIRTY (30) DAYS OR LESS AND THAT THE APPLICANT HAS NOT REPLACED THIS CREDIT BY POSTING WITH THE MINISTER OTHER SECURITY SATISFACTORY TO THE MINISTER.

PARTIAL DRAWING ARE PERMITTED.

.../2

THIS CREDIT IS EFFECTIVE FROM [time] A.M. ON [effective date as required by Water Licence] AND SHALL EXPIRE AT OUR COUNTERS AT [time] P.M. [expiry date] (THE "INITIAL EXPIRATION DATE"). THIS CREDIT SHALL BE RENEWED AUTOMATICALLY FOR AN ADDITIONAL ONE-YEAR PERIOD FROM THE INITIAL EXPIRATION DATE, AND FOR AN ADDITIONAL ONE-YEAR PERIOD FROM EACH FUTURE EXPIRATION DATE, UNLESS AT LEAST NINETY (90) DAYS PRIOR TO THE OPERATIVE EXPIRATION DATE WE NOTIFY YOU IN WRITING BY REGISTERED MAIL OR COURIER THAT WE ELECT NOT TO CONSIDER THIS CREDIT RENEWED FOR SUCH ADDITIONAL PERIOD.

WE HEREBY AGREE THAT ALL DRAFTS DRAWN UNDER AND IN COMPLIANCE WITH THE TERMS OF THIS CREDIT SHALL BE DULY HONOURED BY US IF PRESENTED FOR PAYMENT ON OR BEFORE THE OPERATIVE EXPIRATION DATE.

EXCEPT SO FAR AS IS OTHERWISE EXPRESSLY STATED HEREIN, THIS CREDIT IS SUBJECT TO THE UNIFORM CUSTOMS AND PRACTICE FOR DOCUMENTARY CREDITS (1993 REVISION), INTERNATIONAL CHAMBER OF COMMERCE, PUBLICATION NO. 500. NOTWITHSTANDING ARTICLE 17 OF SAID PUBLICATION, IF THIS CREDIT EXPIRES DURING AN INTERRUPTION OF BUSINESS AS DESCRIBED IN ARTICLE 17, WE AGREE TO EFFECT PAYMENT IF THIS CREDIT IS DRAWN ON US WITHIN FIFTEEN (15) DAYS AFTER THE RESUMPTION OF BUSINESS.

[Bank's Name]

_____
[Official's Name and Position]

_____
[Official's Name and Position]

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 1326
YELLOWKNIFE, NT X1A 2N9
Phone No: (867) 765-0106
Fax No: (867) 765-0114

ANALYST:
Analyst
Water Laboratory
Department of Indian Affairs
and Northern Development
P.O. Box 1500, 4601 - 52nd Avenue
YELLOWKNIFE, NT X1A 2R3
Phone No: (867) 669-2780
Fax No: (867) 669-2718

INSPECTOR:
Inspector
North Mackenzie-Inuvik District Office
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

7. Your Licence requires a security deposit be submitted. Should the security deposit be submitted in the form of a "letter of credit", recommended wording is outlined below. It is advised that a "draft" letter of credit be forwarded to Water Resources Division for review. The contact person, address, phone and fax number of the individual administering security deposits is:

Office Administrator
Water Resources Division
Indian and Northern Affairs Canada
P.O. Box 1500
YELLOWKNIFE, NT X1A 2R3
Phone No: (867) 669-2651
Fax No: (867) 669-2716

...3

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 LIMITED
(Licensee)

of 400 - 4 Avenue S.W.
P.O. Box 100, Station M
CALGARY, ALBERTA T2P 0J4
(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 RENEWAL
Licence Type	"B"
Water Management Area	NORTHWEST TERRITORIES 07
Location	"Camp Farewell" Latitude 69°12'30" North Longitude 135°06'04" West MACKENZIE RIVER DELTA, N.W.T.
Purpose	TO USE WATER AND DISPOSE OF WASTE FOR MUNICPAL UNDERTAKINGS AND ASSOCIATED USES
Description	OIL AND GAS EXPLORATION
Quantity of Water Not to be Exceeded	150 CUBIC METRES DAILY
Effective Date of Licence	NOVEMBER 1, 2005
Expiry Date of Licence	OCTOBER 31, 2010

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

NORTHWEST TERRITORIES WATER BOARD

Witness **Chairman**

PART A: SCOPE AND DEFINITIONS

1. Scope

a) This Licence entitles Shell Canada Limited to use Water and dispose of Waste for municipal undertakings associated with oil and gas exploration and development in the Mackenzie Delta at Farewell Camp and Stockpile Site (Camp Farewell) located at Latitude 69°12'30" North, and Longitude 135°06'04" West, 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;*

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

"Average Concentration For Faecal Coliform" means the geometric mean of any four consecutive analytical results submitted to the Board in accordance with the sampling and analysis requirements specified in the "Surveillance Network Program";

"Board" means the Northwest Territories Water Board established under Section 10 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;

"Greywater" means all liquid Wastes from showers, baths, sinks, kitchens and domestic washing facilities, but does not include toilet Wastes;

"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 running average of any four (4) consecutive analytical results, or if less than four analytical results collected, and submitted to the Inspector in accordance with the sampling and analysis requirements specified in the "Surveillance Network Program";

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

"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 include an expansion;

"Permeability" means the capacity to transmit water through a medium;

"Sewage" means all toilet Waste and greywater;

"Toilet Wastes" mean all human excreta and associated products, but does not include greywater;

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

"Sewage Treatment Facilities" comprises the area and engineered structures designed to contain sewage as identified in the Project Description 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;

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

"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 31st of the year following the calendar year reported which shall contain the following information:

   a) the total quantity in cubic metres of fresh Water obtained from all sources;

   b) the total quantities in cubic metres of each and all Waste discharged;

   c) the location and direction of flow of all Waste discharged to the Water;

   d) the results of sampling carried out under the Surveillance Network Program;

   e) a summary of any modifications carried out on the Water supply and Sewage Treatment Facilities, including all associated structures;

   f) a list of spills and unauthorized discharges;

   g) details on the restoration of any sumps;

   h) any revisions to the approved Contingency Plan; and,

   i) 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. The Licensee shall, within thirty (30) days of the issuance of the 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.

5. 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.

6. All monitoring data shall be submitted in printed form and electronically in spreadsheet format on a diskette or other electronic forms acceptable to the Board.

7. All reports shall be submitted to the Board in printed format accompanied by an electronic copy in a common word processing format on diskette or other electronic forms acceptable to the Board.

8. Within thirty (30) days of issuance of this Licence, 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 Million ($2,000,000.00) Dollars in a form suitable to the Minister.

9. The Licensee shall ensure a copy of this Licence is maintained at the site of operation at all times.

PART C: CONDITIONS APPLYING TO WATER USE

1. The Licensee shall obtain Water from the Middle Channel of the Mackenzie River in winter or the unnamed lake north of the camp in summer as described in the project description, or as otherwise approved by an Inspector.

2. For lakes used as a Water source, a representative dissolved oxygen/temperature profile must be obtained prior to the initial Water withdrawal and prior to demobilization of the project for the year.

3. The Licensee is not permitted to remove more than five (5%) percent of the available under ice Water volume per lake as calculated using a maximum expected ice thickness of two (2) meters during a single winter season.

4. The daily quantity of Water used for all purposes shall not exceed 150 cubic metres.

5. The Water intake hose used on the Water pumps shall be equipped with a screen with a mesh size sufficient to ensure no entrainment of fish (2.54 mm).

PART D: CONDITIONS APPLYING TO WASTE DISPOSAL

1. The Licensee shall within thirty (30) days of the issuance of this Licence, submit to the Board for approval an updated Operation and Maintenance 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. All Sewage shall be directed to the onsite Sewage Treatment Facilities as approved by an Inspector.

3. The Sewage Treatment Facilities shall be maintained and operated in such a manner as to prevent structural failure to the satisfaction of the Inspector.

4. All Waste discharged from the onsite Sewage Treatment Facilities shall be directed to the channel of the Mackenzie River at a location approved by an Inspector.

5. There shall be no discharge of floating solids, garbage, grease, free oil or foam.

6. 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:

Sample Parameter	Maximum Average Concentration
Biological Oxygen Demand (BOD_5)	70.0 mg/L
Total Suspended Solids (TSS)	70.0 mg/L
Faecal Coliforms	10E4 CFU/dL
Oil and Grease	5.0 mg/L
Total Residual Chlorine (TRC)	0.1 mg/L

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

7. Introduction of Water to Waste for the purpose of achieving effluent quality requirements in Part D, Item 5 is prohibited.

8. The Licensee shall dispose of all solid Wastes in a manner acceptable to the Inspector.

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

10. The Licensee may commence decanting upon receipt of an Inspector's approval.

11. 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 E: CONDITIONS APPLYING TO MODIFICATIONS

1. The Licensee may, without written approval from the Board, carry out Modifications to the planned undertakings provided that such Modifications are consistent with the terms of this Licence and the following requirements are met:

   a) the Licensee has notified an Inspector in writing of such proposed Modifications at least five (5) days prior to beginning the Modifications;

   b) such Modifications do not place the Licensee in contravention of either this Licence or the *Act;*

   c) an Inspector has not, during the five (5) days following notification of the proposed Modifications, informed the Licensee that review of the proposal will require more than five (5) days; and

   d) an Inspector has not rejected the proposed Modifications.

2. Modifications for which all of the conditions referred to in Part E, Item 1 have not been met may be carried out only with written approval from an Inspector.

3. The Licensee shall provide to the Board as-built plans and drawings of the Modifications referred to in this Licence within ninety (90) days of completion of the Modifications.

PART F: CONDITIONS APPLYING TO CONTINGENCY PLANNING

1. The Licensee shall submit to the Board for approval within thirty (30) days of the issuance of this Licence an updated Emergency Response & Spill Contingency Plan.

2. The Licensee will maintain a copy of the approved Emergency Response & Spill Contingency Plan onsite in a readily available location, to the satisfaction of an Inspector.

3. The Licensee shall ensure that petroleum products, hazardous material and other Wastes associated with the project do not enter any Waters.

4. The Licensee shall ensure that all containment berms are constructed of an impermeable material, to the satisfaction of an Inspector.

5. The Licensee shall ensure that fuel stored in each tank within the tank farm be no greater than 85% of the tank's capacity to allow for expansion and avoid overflows.

6. If, during the period of this Licence, an unauthorized discharge of Waste occurs, or if such a discharge is foreseeable, the Licensee shall:

   a) report the incident immediately via the 24 Hour Spill Reporting Line (867) 920-8130; and

   b) submit to an Inspector a detailed report on each occurrence not later than thirty (30) days after initially reporting the event.

PART G: CONDITIONS APPLYING TO ABANDONMENT AND RESTORATION

1. The Licensee shall submit to the Board for approval within one (1) year of issuance of this Licence, an updated Interim Abandonment and Restoration Plan including a complete Phase II Environmental Assessment of Camp Farewell. This assessment will include the full delineation of contamination (soil and Water) associated with Camp Farewell operations, located both on and off the gravel base pad. The Licensee shall implement this Plan as and when approved by the Board.

2. The Licensee shall review the Interim Abandonment and Restoration Plan every two (2) years and shall modify the Plan as necessary to reflect changes in operations and technology. All proposed modifications to the Plan shall be submitted to the Board for approval.

NORTHWEST TERRITORIES WATER BOARD

Witness

Chairman

NORTHWEST TERRITORIES WATER BOARD

LICENSEE: Shell Canada Limited

LICENCE NUMBER: N7L1-1762

EFFECTIVE DATE OF LICENCE: November 1, 2005

EFFECTIVE DATE OF SURVEILLANCE NETWORK PROGRAM: November 1, 2005

SURVEILLANCE NETWORK PROGRAM

A. **Location of Sampling Stations**

Station Number	Description
1762-1	Treated Sewage at the Point of Discharge

B. **Sampling and Analysis Requirements**

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

BOD_5	Total Suspended Solids
Oil and Grease	Faecal Coliforms
Ammonia	pH
Phosphorous	Total Residual Chlorine

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 analyses shall be performed in a laboratory approved by an Analyst.

5. The Licensee shall, by December 31st, 2005, 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**

-----Original Message-----
From: Kevin Glowa [mailto:glowak@inac-ainc.gc.ca]
Sent: March 2, 2005 11:06 AM

Subject: **Water License MAC Calculations (Arithmetic mean vs. Geometric mean)**

As per various Water Licenses (in this case industrial) your Maximum Allowable Concentrations (MAC's) is and/or may be defined as:
"The running average of any four consecutive analytical results, or if less than four analytical results collected, and submitted to the Inspector in accordance with the sampling and analysis requirements specified in the SNP".

It has recently brought to my attention that MAC calculations are to be, with the exception of Fecal Coliforms, calculated using the arithmetic method [(A1+A2+....+AN)/N] or what is commonly known as the "average". Fecal coliform MAC's are to be calculated using the geometric method (geometric mean)[(A1xA2x.....xAN)1/N)] and is elucidated in the "Guidelines for the Discharge of Treated Municipal Wastewater in the NWT", page 17, section 4.3. In our case the formula will be with four sample results (CFU/dL) and therefore [(A1xA2xA3xA4) to the fourth root)]. The fourth root is the same if you hit the second root (square root) button twice.....There is also a formula in excel.

For further clarification/info I have included some additional technical information below that many may prove useful.

Calculating the MAC using the geometric method is useful for parameters that generally fit a logistic/exponential growth curve. In a nut shell the geometric mean is less affected by extreme values than is the arithmetic mean. Everyone knows what I am talking about if they have had to deal with wastewater discharge and "meeting permit requirements"....It has been an, as you say, "up and down" hill battle.

Theoretically the geometric method is ALWAYS <= the arithmetic method. If sample results indicate higher "precision" (i.e. your results show less variability) your likely hood that either method will give the same result increases (i.e. arithmetic = geometric).

For "less than" (<##) values. There is no doubt that the geometric method does not make sense if any one value is zero so what do we do if our sample result indicates the "Method Detection Limit" (MDL)? For Fecal coliforms it is usually <10 CFU/dL or in increments of but depends on the "accuracy" of the method. Obviously for estimations (MPN/dL) your MDL is going to be generally higher.

For direct counts (CFU/dL), of which all licenses are based on, I understand that the MDL is <10 CFU/dL or could even be as low as one (depends on the dilution of the method). In this case if the sample result comes back at <10 then use "1". It is my understanding that current general southern policies gives permittees the benefit of doubt all the way to the lowest levels when performing calculations using such "less than" values. Therefore, when calculating an arithmetic mean, you may consider a "less than" value as equal to zero (0). As indicated above, for the calculation of a geometric mean, a "less than" value may be considered to be equal to one (1). Remember, this procedure pertains only to the calculation of an average/mean. You must report individual data values (Minimum Detection Limits for a specific Method) on any reports exactly as reported to you by your laboratory.

For "greater than" values (>######). Such values are only expected (infrequently) in the reporting of Fecal Coliform and (even less frequently) BOD. It is a general "no no" to report a Fecal Coliform value of "Too Numerous To Count" (TNTC). For fecal coliform, "greater than" (> ##,###) values denote at least one, and possibly all volumes of the evaluated sample yielded results outside the method range for accurate counting of the colonies of bacteria (or TNTC). Laboratories should perform enough dilutions to the sample to produce a discreet number as the result of testing. If this is not conducted then the result using the specific method is simply not "accuarate". If a "greater than" value is reported, the numeric portion of the value should be sufficiently high so as to make the facility aware of the extent of any problems with disinfection (in many case UV or chlorination/de-chlorination systems).

For both fecal coliform and BOD, the generation of a "greater than" value usually occurs when characteristics of the effluent differ from what is normally produced/discharged. If laboratories "set up" the test procedures based upon normal conditions, they may not have the capacity to get an accurate measurement of higher fecal coliform or BOD concentrations, hence the reported "greater than" value. If you are suspicious or aware of conditions at your plant that cause you to believe effluent pollutant concentrations are beyond their normal levels, you should inform your laboratory of your concern so modifications to testing procedures can be made.

For calculation purposes only, when you report a "greater than" value, the numeric portion of the value should be used to calculate the average (arithmetic or geometric mean).

In summary, I will be enforcing fecal coliforms using the geometric mean and all others using the arithmetic for both Industrial and Municipal undertakings. If, in the past you have used the arithmetic you are still ok as this, in essence, is a more conservative calculation for fecals.

For convenience I have attached a link. I have also attached a .pdf document that I found on the net that seems to be ok.

http://www.math.toronto.edu/mathnet/questionCorner/geomean.html

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VIA FAX

September 16, 2005

Dr. Kathleen Racher
Northwest Territories Water Board
P.O. Box 1326
Yellowknife, NT
X1A 2N9

Dear Dr. Racher

Subject: Shell Canada Limited Camp Farewell Type B Water License Renewal Application – Information Request No. 1

In response to your like captioned letter of September 2, 2005, Shell Canada Limited offers the following information:

1. **Section 5.2 Camp Overview**
   Re: Does this area include all features of the Farewell Camp and Stockpile Site, including the storage area, gravel airstrip and barge-landing site?
   The 12.4 hectares includes the camp, storage area, land access and barge landing areas. The airstrip is a separate lease comprised of 18.6 hectares.

2. **Section 5.4.4 Wastewater Treatment**
   Re: Has the camp been at or near full capacity (150 people) since the changes to the sewage treatment system? If so, how has it performed?
   To date the treatment plant was only used during the summer of 2002 at which time the maximum number of people was approximately 40-45. We had no indications at the time that capacity design rates are not achievable.

3. **Section 5.6.1 Fuel**
   Re: How will the bermed facilities account for the extra fuel that may be stored within the tanks?
   Fuel Storage Tanks are only filled to 85% to allow for expansion and avoid overflows which reduces the useable volumes from 2.4 million liters to 2.0 million liters. In addition, as per the National Fire Code, secondary containment capacity required is 110% of the largest tank (825 m^3). Farewell's secondary containment has a capacity (2145 m^3) in excess 100% of all the tanks useable capacity that far exceeds these requirements.

4. August 19, 2005 Letter from DIAND – Water Resources Division

Re: Does the wastewater stored in the contingency lagoon get treated once the treatment system is operational?

Once the plant is meeting discharge criteria, the lagoon contents are recycled. As indicated, this can only be performed in the summer. If waste is directed to the lagoon in the winter, and the camp is operating the following summer, the plan is to recycle it then. If the camp is not open, it remains in the lagoon until it meets the License discharge criteria and is then decanted. In all cases, the Inspector's approval is obtained before discharging.

Re: Has Shell ever performed any repairs to their sewage lagoon? If so, what were these repairs, why were they required, and when were they performed?

No repairs have been required to date other than above ground level berm buildup in 2001 at the Inspectors request. Due to its proximity to the channel bank, the monitoring is as much for proactive bank erosion monitoring as it is for actual breaching. As indicated in the Project Description, a plan is in place to close and reclaim the lagoon.

Re: When will Shell Canada be initiating the reclamation of the site? Will Shell be performing any progressive reclamation of the site to deal with areas of impacted sediments and soils?

Shell plans to retain the Farewell site into the foreseeable future. During Niglintgak Development all the useable space at Farewell will be required. We propose to develop a progressive remediation plan, for Farewell, after Niglintgak Development construction is completed. The framework for that plan is likely to be based on a concept similar to "A Federal Approach to Contaminated Sites". Accessible areas would be identified in the plan with proposed timing of remediation. The impacted sediments within the lagoon will be addressed with its closure/reclamation.

Re: When is Shell Canada proposing to do this assessment of the off-base pad area?

The assessment of the area off the gravel base pad (off lease) relates to a significant spill in 1981. Shell was not the owner of the fuel and hence not the Generator of any offsite contamination that may exist as it relates to that spill. Therefore, Shell does not feel it is their responsibility to assess this area.

Re: Does Shell anticipate any lateral movement of contaminants?

It should be noted that the use of CCME guideline for Barium is not appropriate to be applied to barite (barium suphate) due to the leachability differences. As allowed for in the CCME Guideline, a more appropriate guideline would be "Soil Quality Guideline for Barite: Environmental Health and Human Health"- Alberta Environment. The other drilling product likely mixed with the gravels was bentonite. These two products are not expected to be an issue in respect to lateral movement.

Any other contaminants (with risk of movement) greater than established criteria for the site, would either be remediated or monitored as per an agreed to monitoring plan.

Soil Monitoring as proposed in Section 7.1 of the A&R Plan should include analysis for sodium and potassium.

Agreed – it is normally a part of the salinity package but is not specifically mentioned in the Plan.

The Camp Farewell Emergency Response Plan should include specific details with respect to procedures for spill response for spills on and under ice. As well, the location of the spill response equipment onsite should be identified, in addition to the equipment list.

The Emergency Response Plan is planned for a detailed review in the fourth quarter 2005. Spill response for on and under ice will be incorporated at that time. As well, Mackenzie Delta Spill Response Corporation (MDSRC) is currently developing spill response procedures for the various scenarios for use by its members. Shell is a member of MDSRC. Most of this equipment is owned by the MDSRC, and is mobile, temporary in nature. Attempting to identify in the plan where the response equipment will be located is not possible. When the camp/stockpile is in operation, a MDSRC container or equivalent will be situated onsite. All site personnel will be made aware of the locations onsite during the Orientations. During critical operations, such as fuel unloading, some of the equipment is deployed specific to the task and discussed during the pre-job meeting.

Re: Spill Reporting Requirements

Agreed – The specific Response Plans do have an incorrect reporting threshold and will be corrected in the updated plan by directing the user to the respective protocols.

5. August 24, 2005 Letter from Environment and Natural Resources to the NWTWB

Re: ….under the Niglintgak Development Plan, it is reasonably foreseeable that the magnitude of the Operations at Camp Farewell, conditional upon approval of the MGP, will considerably increase.

The statement is true if compared to the recent years. Over the existence of Camp Farewell, it has seen high levels of activity, e.g. support for 3 drilling rigs, seismic activities.

Re: Implement an Integrated Waste Management Plan including waste segregation and recycling to minimize the amount of waste disposed of by incineration and open burning.

An Integrated Waste Management Plan is being developed for the Niglintgak Development. Farewell is part of this Plan. Should the Development not proceed, the plan can be modified for Camp Farewell alone. Shell will familiarize camp personnel with selected waste management options during site orientations.

Re: Open burning in a pit or sloop should be restricted to acceptable waste material only – i.e. paper, cardboard, and clean untreated wood.

This is the intent for the sloop. The document "Municipal Solid Wastes Suitable for Open Burning" will be included in the next update of the Operations and Maintenance Manual as part of the Solid Waste Disposal Plan.

Re: The proponent should review the incineration options available and provide justification for the selected device to the regulatory authority. The proponent should also state how compliance with the CWS will be demonstrated. *Note:CWS referenced is Canada Wide Standards*

It should be noted that the existing, "semi-permanent" camp has a capacity of 35 people. Any capacity above that is accommodated with temporary, contracted camps that supply their own incineration. Shell is a strong advocate of environmental protection and will do whatever is practicable in terms of reduction and segregation. Shell proposes to combine a waste Reduction & Segregation Audit with the Water Use Audit as identified in Appendix B of the Application.

It is questioned why recommendations re: air emissions are being made for a License to withdraw and discharge water. If the intent is to target camp incinerators, then it is suggested that it be accomplished in a process that encompasses all camp incinerators – not only the ones specifically requiring Water Licenses.

The proponent should demonstrate to the regulatory authority that appropriate training will be provided to personnel operating the incinerator.

A written procedure will be developed for the existing incinerator and communicated to the personnel operating it.

The residual ash from incineration may itself contain toxic contaminants and should be assessed in accordance with the NWT Environmental Guideline for Industrial Waste Discharges to determine the appropriate disposal method.

The camp incinerator ash can be analyzed on a one time basis to ensure it meets Schedule III and IV in the Guide however camp incinerator ash does not appear to fit the definition,

within the Guide of industrial waste. “Industrial – Any enterprise involved with manufacturing, fabricating, processing including commercial and Institutional operations.”

The proponent should conduct a Phase 3 ESA at the Farewell Camp. If the proponent feels there is sufficient data from the Phase 2 ESA to characterize the site and/or risk to human health and the environment, then the proponent should develop a remedial action plan and begin remediating the large volume of contaminated soil in areas currently accessible.

Shell plans to retain the Farewell site into the foreseeable future. During Niglintgak Development all the useable space at Farewell will be required. We propose to develop a progressive remediation plan, for Farewell, after Niglintgak Development construction is completed. The framework for that plan is likely to be based on a concept similar to “A Federal Approach to Contaminated Sites”. Accessible areas would be identified in the plan with proposed timing of remediation. The impacted sediments within the lagoon will be addressed with its closure/reclamation.

As stated in the “Interim Abandonment and Restoration Plan” – Komex International, June 2002 Shell was not the owner/generator of the large offsite spill.

The Proponent is requested to supply:

- ***Confirmation that the communities mentioned have authorization to accept waste;***

Although not specifically identified, The Town of Inuvik’s Water License does not dis-allow it and does infer acceptability in Part D, 1 where it specifies “The Licensee shall direct all piped and pumpout sewage to the Sewage Disposal Facilities or as otherwise approved by the Board”. “Pumpout sewage means all toilet wastes and/or greywater collected by means of a vacuum truck for disposal at an approved facility.”

- ***Confirmation that the Proponent has received permission from the local communities to transfer proposed waste types and quantities to community waste handling facilities; and***

Due to the discontinuous operation of the camp, permission is obtained on a project basis at the time of execution– not a blanket approval. Permission was granted to the hauling contractor as lately as January 2005 when the camp was open for 48 days. The Town of Inuvik currently allows sewage from outside the town boundaries under By-Law #1945/util/01.

- ***Alternate disposal options in the case that communities cannot accommodate the waste.***

Onsite treatment is our primary option and community facilities disposal alternate although the alternate may be chosen for short duration camp activity. We realize that communities may reach capacities at which they can no longer accept outside waste and therefore it is important that Camp Farewell remain as self-reliant as possible in terms of waste management. Future modifications identified for the waste water treatment plant will further reduce the dependency on the community systems. Regulatory pressures to abandon camp waste incineration could foresee ably increase dependency.

The proponent is requested to submit its hazardous waste management practices or plan for the proposed facility and activities showing compliance with the Environmental

Guideline for General Management of Hazardous Waste and the Transportation of Dangerous Goods Regulations (NWT)

An Integrated Waste Management Plan, which includes hazardous materials, is being developed for the Niglintgak Development. Farewell is part of this Plan. Should the Development not proceed, the plan can be modified for Camp Farewell alone. Shell will familiarize camp personnel with selected waste management options.

In the past, "equipment servicing wastes" were collected and transported out of NWT to approved recycling and disposal facilities. This was normally handled under the specific project.

Shell Canada intends to fully meet the requirements of the Guideline for General Management of Hazardous Waste and the Transportation of Dangerous Goods Regulations (NWT).

Plan for and include the locations of hazardous materials and waste storage areas on the site map included in the Emergency Response Plan.

Being a stockpile site and not of continuous operations, it is difficult to identify the locations of hazardous materials within the site in advance. Hazardous waste storage areas will be identified in the next update of the Emergency Response Plan scheduled for Q4 2005.

Re: Emergency Response Plan

Thank you for identifying incorrect names and numbers. These will be corrected in the next update of the Emergency Response Plan scheduled for Q4 2005 and all the numbers will be validated at that time.

A legible site map should be provided that also includes the locations of spill response equipment and all hazardous materials and waste storage areas.

Most of this equipment is owned by the MDSRC, and is mobile, temporary in nature. Attempting to identify in the plan where it will be located is not possible. When the camp/stockpile is in operation, a MDSRC container or equivalent will be situated onsite. All site personnel will be made aware of the locations on site during the Orientations. During critical operations, such as fuel unloading, some of the equipment is deployed specific to the task and discussed during the pre-job meeting. e.g. boom and boat during fuel offloading. The Control Points are identified which was the intent of the map the writer referenced. The recommendation re: hazardous materials and waste storage was addressed in a previous point.

The Sewage Spill Response Plan should also include but not be limited to a clean up strategy in the case of a spill under non-frozen conditions and a Remediation plan for the spill area.

The Sewage Spill Response Plan will be updated to account for non-frozen conditions.

6. August 26, 2005 Letter from Environment Canada to NWTWB

The contact spill response number for Environment Canada in the Emergency Contact List should be 920-5181

Thank you for identifying the incorrect number. These will be corrected in the next update of the Emergency Response Plan scheduled for Q4 2005 and all the numbers will be validated at that time.

A review of the WC&GO Response Plan would suggest there is very little expertise on site at any given time and no response equipment is stored downstream of Control Point #1. Nor is there any contingency plan for the transportation of spill equipment (from Camp Farewell or Swimming Point)to appropriate control points in the event of a spill in the Mackenzie River.

The last time the stockpile portion of the site was in operation(2002), all supervisory staff plus some of the other workers were trained in spill response and deployment of the response equipment. The Shell representative on site at that time had 25 years of experience involving emergency response in the Mackenzie Delta as well as other parts of Canada. As can be appreciated, the general work force is transient and of a temporary nature. The Mackenzie Delta Spill Response Corporation (MDSRC) holds two training sessions each year which are open to the general worker population. Shell has also sponsored some people to attend in the past and continue to do so as recently as September 14-15, 2005. As well, the Mission of the MDSRC is to protect the environment by providing spill preparedness and safe, effective response services to the Member Companies i.e. Mutual Aid.

Most of this equipment is owned by the MDSRC, and is mobile, temporary in nature. When the camp/stockpile is in operation, a MDSRC container or equivalent is situated onsite. As well, during critical operations, such as fuel unloading, some of the equipment is deployed specific to the task and discussed during the pre-job meeting. During fuel offloading, in addition to booms around the fuel barges, a secondary boom is deployed at a control point and a boat is at ready. The current activity level does not warrant permanently storing equipment at downstream control points.

When the site is operational in the summer season, a helicopter is on standby at the site, and has moved equipment from Swimming Point to Farewell during exercises. A loader is also situated at Farewell during activity. Transporting additional equipment to the site from other locations is part of the logistical operations.

In the winter, trucks, loaders, and graders are readily available to transport equipment as needed.

Shell Canada is requested to provide a copy of the contractor's fuel handling and spill clean up procedures, and an explanation of how Shell has ensured that the contractor is cognizant of and in adherence to permit conditions.

Shell currently does not have a fuel contractor and therefore cannot supply a copy. In the past, all barged fuel has been transported by NTCL and their response plan is approved by the appropriate regulatory authority. Any fuel supplied by truck in the winter has been subject to a bidding process which results in the contractor being project specific.

CWS requires advance notification in the event the camp becomes active. *Note:CWS referenced is Canadian Wildlife Service*
Shell will advise CWS in the event the camp becomes active.
It is suggested that all recommendations related to wildlife be addressed as conditions of the CWS Permit rather than in the water license.

If activities are proposed to occur during the breeding season, the proponent should check for active nests of birds and avoid disturbing or destroying them.
Shell has and will continue to do whatever practicable to minimize disturbance of birds and nests. e.g. there have been nests in the past on the landing from the Camp 2nd floor exit. Steps are taken to not disturb them, however, in the event of a fire, the door would be utilized.

The proponent does not mention how they would deal with contaminated snow in their project description.
Contaminated snow will be handled with a method that avoids the situation of waterfowl becoming oiled. Possible methods include an open tank that can be covered for the summer or equipment that melts the snow during the winter operation.

In order to reduce disturbance to wildlife, CWS recommends that aircraft used in conducting project activities maintain a flight altitude of at least 610m during horizontal (point to point flight)
Shell and its contractors will meet the minimum flight altitude specified in the CWS permit for Farewell operation. It is suggested that project requirements should be specified in the project specific permit.

In order to reduce disturbance to resting, feeding or moulting birds, CWS recommends that aircraft used in conducting project activities maintain a vertical distance of 1000m and a minimum horizontal distance of 1500m from any observed concentrations of birds.
Shell and its contractors will meet the minimum distances specified in the CWS permit for Farewell operation. It is suggested that project requirements should be specified in the project specific permit.

Environment Canada recommends that all field operations staff be made aware of the proponents commitments to these mitigation measures and provided with appropriate advice / training on how to implement these measures.
These mitigation measures will be included in the site orientations and posted in the camp.

The proponent must ensure they remain in compliance with the Act and Regulations during all phases and in all undertakings related to the project.
Shell fully intends to remain in compliance with the Migratory Birds Convention Act and Migratory Birds Regulation.

While conducting their operations, the proponent should be aware of the special status, and implement mitigation measures to minimize disturbance to, or contact with, these species.
Shell will communicate the intent of SARA and mitigation measures to site staff.

The Operations and Maintenance Manual along with the Emergency Response Plan will be updated and forwarded to the NWTWB. The Integrated Waste Management Plan will be available in the first quarter of 2006.

We trust the above adequately responds the questions and recommendations. If additional information is required, please feel free to contact Mr. Randy Hetman Ph:(403) 969-0730, Fax:(403)269-7948 Email:randy.hetman@shell.com or myself as indicated below.

Yours truly

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VIA FAX

October 4, 2005

Dr. Kathleen Racher
Northwest Territories Water Board
P.O. Box 1326
Yellowknife, NT
X1A 2N9

Dear Dr. Racher

Subject: Shell Canada Limited Camp Farewell Type B Water License Renewal Application – Information Request No. 2 Response

In response to your like captioned letter of September 23, 2005, Shell Canada Limited offers the following information:

1. **Section 5.2 Camp Overview**
   Re: we require information on the dimensions/size of the buildings on site. How many permanent and non-permanent buildings are located on site and what is their associated construction materials?
   The 35 person, permanent camp has a footprint of 40'x160' and has the typical camp type construction material of wood frame with metal cladding on the exterior. There are three permanent, storage buildings entirely of steel construction. The sizes are 24'x48', 36'x 40' and 40'x81'.
   A temporary camp, approximately 40'x110' and 40'x80' is currently onsite and has the typical camp type construction material of wood frame with metal cladding on the exterior.

2. **Section 5.4.4 Sewage Treatment**
   Re: Shell plans to decommission the contingency lagoon and remediate it.

   When would remediation take place?
   As indicated in the Project Description Section 5.4.4: *"When justified by camp use, the installation of a polishing unit will be proposed. Any upgrade would follow the required regulatory notification process. The polishing unit should alleviate the need for storage. Once the effectiveness of the polishing unit is proven, the lagoon can be decommissioned and remediated, as identified in the Interim Abandonment and Restoration Plan (Appendix C)."*
   Once the additional treatment unit is installed, and it can be demonstrated that discharge criteria can be met immediately, it is felt that a lagoon will no longer be required. Once the

decision is made to take the lagoon out of service, initiating remediation would be targeted for the summer following end of service.
An above ground temporary storage tank may be required for short term storage.

How will it be remediated?
As indicated in the Restoration Plan Farewell Camp Section 5.3 and 5.4: *" Treatment of the sediment that has accumulated in the lagoon is required to comply with remedial standards and Inspector concurrence will be sought at the time of lagoon reclamation planning. Prior to remediation, effluent from the lagoon will be required to meet discharge criteria set out in Northwest Territories Water Board Licence # N7L1-1762, Item 4 of Part D before discharging to the Mackenzie River.*

Following lagoon decanting, dewatering of the sludge will be performed using natural air-drying potentially coupled with mixing of absorbents. The depth of the sludge is not expected to exceed 0.5 m and should be mixed in thin lifts to increase drying efficiency. The sludge can be dried in the lagoon and may require mechanical mixing to enhance the drying process.

Air drying is expected to require approximately 3 months with at least 2 of the 3 months having an average daily temperature above 0 ℃.; therefore drying should incorporate the months of June to September. Treatment of the lagoon sediment / sludge in this manner negates the need for off-site transport and disposal. Air drying the digested sludge / sediments in this manner constitutes a Process to Significantly Reduce Pathogens (PSRP) as designated by the Environmental Protection Agency (EPA, 1989). Treatment of lagoon sediment / sludge is required to meet Item 6 of Part D of the Water Board Licence, as confirmed by the District Inspector. The process of air drying will also serve to reduce hydrocarbon compounds that are present. As such, the dried sediments are expected to be suitable for subsequent reuse as fill following the drying and treatment process. They could also be beneficially reused as a topsoil amendment as part of site reclamation.

The sewage lagoon should be reclaimed by backfilling the lagoon using the dykes and treated sediments to conform to the surrounding landscape. It may be beneficial to spread alluvial sediments over the prepared grade to approximate the surrounding topsoil conditions."

Where will the new lagoon be located?
There is no intent at this time to construct a new lagoon.

3. **<u>September, 2005 Letter from DIAND – Water Resources Division</u>**

Re: As the Licensee holder for Camp Farewell, Shell Canada is responsible to ensure that prior to abandonment of the site that any land impacted due to onsite operations, within lease boundaries or not, be restored to any acceptable level as determined by the regulatory authority. As such, complete delineation of any area impacted by a spill originating at Camp Farewell must be performed by Shell Canada to devise a complete abandonment and restoration plan for the site.

Shell Canada will conduct further assessment of the spill area, including the off-base pad area, in 2006.
Shell will update the Farewell Abandonment and Restoration plan to include the off-base area.

4. **<u>September 16, 2005 Letter from the Environmental Impact Screening Committee</u>**
-that the proponent ensure their fuel berms are capable of containing 110% of any fuel stored in tanks within the berm to avoid any spilling over, and contaminating the area;
Fuel Storage Tanks are only filled to 85% to allow for expansion and avoid overflows which reduces the useable volumes from 2.4 million liters to 2.0 million liters. As per the INAC Lease and the National Fire Code, secondary containment capacity required is 110% of the largest tank (825 m^3) not of all fuel stored in tanks. Farewell's secondary containment capacity (2145 m^3) is roughly 107% of all the tanks useable capacity, far exceeds these requirements and is close to EISC's recommendation.

Re: that the proponent haul grey water to the Inuvik sewage treatment plant for disposal if requirements are not met. This would prevent any contamination of the environment and wildlife.
Shell assumes this recommendation is intended to not have grey water sprayed on land at Farewell. Under this license application, Shell is prepared to meet this requirement.

Re: that the proponent observe the recommendations in the Environmental Protection Branch, Environment and Natural Resources, and Indian and Northern Affairs(Water Resources) letters, that the remediation and reclamation plan be updated; that the proponent have an adequate Emergency Response Plan, with personnel who are well trained and practiced in case of emergency. The proponent should have in place and be prepared to deploy in a timely fashion the necessary emergency equipment. This would prevent time being lost in the event of an emergency, thus limiting any potential contamination of the environment.
Shell is prepared to review and update the Abandonment and Restoration plan and submit it to the NWTWB within one year of license issuance. This would provide time to conduct additional soil sampling if required.
Shell provided a comprehensive response to Information Request No.1 regarding Environment Canada's statement suggesting an inadequate Emergency Response Plan and expertise on site. Unfortunately, it was not available in time to the EISC for their September meeting. Please refer to our letter of September 16, 2005. Shell believes it has an adequate response plan that has been approved by Canadian Coast Guard although improvements are always possible. As indicated in the response, we had experienced personnel on site, conducted training and held an exercise when the stockpile was in operation. We will continue to ensure adequate response plan and expertise is available. We are also currently in the process of reviewing and updating the Farewell Emergency Response Plan and will incorporate the recommendations as indicated in our response to Information Request No 1. It will be submitted to the NWTWB as well as INAC and Transport Canada – Marine Safety.

We trust the above adequately responds the questions and recommendations. If additional information is required, please feel free to contact Mr. Randy Hetman Ph:(403) 969-0730, Fax:(403)269-7948 Email:randy.hetman@shell.com or myself as indicated below.

Yours truly

Randall Warren
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Email: (403) randall.warren@shell.com

cc: Mr. Rudy Cockney, INAC
Ms. Anne-Marie Buchwald, NEB
Mr. Wade Romanko, DOE
Ms. Vanessa Charlwood, CWS
Mr. Bruce Hanna, DFO
Ms. Christine Inglangasuk, EISC
Mr. Randy Hetman, Shell Canada Limited

SCHEDULE III
(*Subsection 6 (1)*)

APPLICATION FOR LICENCE, AMENDMENT OF LICENCE OR RENEWAL OF LICENCE

APPLICATION/LICENCE NO. **N7L1-1762**
(amendment or ***renewal*** only)

1. NAME AND MAILING ADDRESS OF APPLICANT

Shell Canada Ltd.
400 - 4th Avenue S.W.
P.O. Box 100, Station M
Calgary, AB T2P 0J4
Attn: Randall Warren

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 attach plans)

Renewal of water license for the permanent camp, Camp Farewell: please refer to attached documents.

5. TYPE OF UNDERTAKING

1. Industrial		4. Power		6. Conservation	
2. Mining and milling		5. Agriculture		7. Recreation	
3. Municipal	X				

8. Miscellaneous (describe)

6. WATER USE

To obtain water	X	Flood control	
to cross water course		To divert water	
to modify the bed or bank of watercourse		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 quality to be returned to source)

Quantity of water used not to exceed 150 m^3/day; to be withdrawn from the Middle Channel of the MacKenzie River during winter activities, and the Unnamed Lake to the north in the summer.

Treated wastewater will be discharged to the MacKenzie River (150 m^3/day) provided discharge criteria are met.

SCHEDULE III – *Concluded*

APPLICATION FOR LICENCE, AMENDMENT OF LICENCE, OR RENEWAL OF LICENCE – *Concluded*

8. WASTE DEPOSITED (quantity, quality, treatment and disposal)

Approximately 150 m^3/day of effluent to be deposited. Sewage and greywater to be treated using the existing Extended Aeration Sewage Treatment System. The effluent discharged to the MacKenzie River will comply with the effluent quality requirements listed in the amendment to License N7L1-1762, dated November 28, 2001, and with the requirements outlined in the Guidelines for the Discharge of Treated Municipal Wastewater in the Northwest Territories.

9. OTHER PERSONS OR PROPERTIES AFFECTED BY THIS UNDERTAKING (giving name, mailing address and location; attach list if necessary)

N/A

10. PREDICTED ENVIRONMENTAL IMPACTS OF UNDERTAKING AND PROPOSED MITIGATION

Please see attached documents.

11. CONTRACTOR AND SUB-CONTRACTORS (names, addresses and functions)

Camp is to be used to support future research, exploration and development activities in the Mackenzie Delta.

12. STUDIES UNDERTAKEN TO DATE (attach list if necessary)

Enhanced Phase I Environmental Assessment - Golder & Associates

Enhanced Phase I Environmental Assessment - Inuvialuit Environmental Inc.

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

13. PROPOSED TIME SCHEDULE

Project time scheduling is on-going with no completion date; Shell is requesting a 5 to 10 year water license term.

Start date: December 1, 2005 Completion date: On-going

NAME (Print)	TITLE (Print)	SIGNATURE	DATE

FOR OFFICE USE ONLY

APPLICATION FEE	Amount: $	Receipt No.:
WATER USE DEPOSIT	Amount: $	Receipt No.:

NORTHWEST TERRITORIES WATER BOARD

Water License Application Questionnaire
For
Municipal Undertakings

SECTION A - GENERAL

1. **Date:** July 14, 2005

2. **Applicant:** Shell Canada Limited

3. **Contacts:** Randall Warren

4. **Community Status:** Permanent field camp

5. **Population (according to most recent census results), and the Estimated Growth Rate over next five years:**
   Camp Farewell can accommodate 150 people.

6. **Indicate the Status of the municipality's license on the date of application:**
   Not applicable

7. **Has any baseline data been collected for the main water bodies in the area?**
   No

   If yes, please attach all data gathered on the physical, biological and chemical characteristics at each sampling location.

   Attach a summary or 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), in addition to water related information requested on this questionnaire?**
   No

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 facilities**
   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 water bodies/courses and any changes to these water bodies/courses which have or may occur as a result of water use or waste disposal facilities, locations of environmental monitoring sites.**

   Refer to the site plan located in the attached Project Description (Figure 5-1).

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 the NWT and include the following:

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

Refer to the Water Management Plan located in Appendix B of the attached Project Description, and Sections 2, 3 and 4 of the attached Operations and Maintenance Plan.

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.)**
- **b. details of the drainage basin, and existing and proposed drainage modifications**
- **c. details regarding direction and route followed by waste water flow from the area**
- **d. indications of the distance to nearby major watercourses, and fish bearing waters**
- **e. all sources of seepage presently encountered in the vicinity of these areas**
- **f. the volume of each seepage flow (m3/day), and**
- **g. the direction of each flow**

There is no solid waste disposal area located at Camp Farewell.

12. Describe 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.

Refer to the Emergency Response Plan for Camp Farewell in Section 7 of the attached Operations and Maintenance Plan. If the sewage treatment plant fails, sewage can be diverted to the lagoon or trucked .

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.

Refer to the Emergency Response Plan for Camp Farewell in Section 7 of the attached Operations and Maintenance Plan.

SECTION B - WATER SUPPLY

1. **Volume of Water Use:** 150 m^3/day

2. **Type of source:** fresh water lake / river

3. **Name of raw water source and alternative, if any:**
   Unnamed Lake in the summer and the Mackenzie River in the winter.

4. **Usual break-up and freeze-up months:**
   Break-up: late April Freeze-up: October

5. **Please provide short descriptions for the following:**
   a. **Freshwater intake facility**
   b. **Operating capacity of the pumps used**
   c. **Intake screen size**

   Refer to the Water Management Plan located in Appendix B of the attached Project Description

6. **Type of water storage facility:**
   Tank

7. **What is the capacity of the storage facility? (m3)**
   27.25 m^3 tank

8. **What is the rate of withdrawal from the source? (m3/day)**
   150 m^3/day

9. **Water is drawn from the source:**
   Yes

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

11. **At the intended rate of water usage, describe the effects on the river or lake from which water will be drawn.**
    The impact of water withdrawal on the Mackenzie River and on Unnamed lake is expected to be negligible.

12. **General condition of:**
    a. **Water supply facility**
    b. **Storage facility**
    c. **Distribution system**

    Good

13. **Are there any changes planned in the water supply system?**
    No

SECTION C - WATER TREATMENT

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

   _____X____Good _____Fair _____Poor

2. **Indicate the capacity of the treatment facility. (L/minute)**
   The treatment facility is essentially a tank where solids are allowed to settle out. The capacity of the tank is 27.25 m3.

3. **Type of water treatment facility:**
   Gravity separation of solids

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 analyses. Attach a diagram if possible.**
   Sedimentation

5. **Have there been any problems or health and environmental concerns with the water treatment facilities?**
   No

6. **Are there any changes planned in the water treatment facilities?**
   Depending on future use of the camp, an upgrade to the water treatment system would be considered, to ensure water withdrawn meets drinking water criteria. Any proposed upgrade would follow the normal regulatory review process.

SECTION D - SEWAGE DISPOSAL

1. **Indicate level of treatment the sewage will be receiving:**
2. **Indicate the capacity of the sewage treatment facility. (m3)**
3. **Indicate the retention time of the sewage while in the treatment facility.(days)**
   For questions 1-3 refer to the Water Management Plan located in Appendix B of the attached Project Description, and Sections 2, 3 and 4 of the attached Operations and Maintenance Plan.

4. **Indicate the estimated rate of discharge of waste water.**
   150 m^3/day

5. **Indicate the location of the discharge point.**
   Refer to the site plan included in the Water Management Plan, Appendix B in the Project Description.

6. **Will the discharge be seasonal or continuous?**
   Discharge will be seasonal while the camp is in operation.

7. **Comment on the general condition of the: Sewage collection system, discharge control system, dams, diversions, dykes or berms**
   According to the latest inspection report dated January 19, 2005, the waste disposal features were inspected and found to be acceptable.

8. **Have there been any problems or health and environmental concerns with the sewage disposal facilities?**
   Prior to installation of the current extended aeration sewage treatment system, a RBC treatment system was in place. Due to difficulties in meeting discharge criteria the RBC system was replaced with the current system.

9. **The average depth of the wastewater lagoon is**:
   The average depth of the lagoon is unknown. The lagoon currently only contains spring run-off seepage. Prior to it reaching the 1 meter freeboard, the contents are tested, treated if required, and then decanted when the contents meet discharge criteria.

10. **What is the design freeboard?**
    1 m

11. **Is there any harvesting of fish or shell fish in the waters where waste is discharged?**
    Fishing for recreational purposes only.

12. **Will the municipality be using a honey bag pit?**
    Not applicable

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, the sewage treatment system is a closed system for camp purposes only.