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Dr. Kathleen Racher
Manager, Water Resources Division
PO Box 1500
Yellowknife, NT X1A 2R3

Your file - Votre référence

Our file - Notre référence N7L1-1816

January 09, 2007

Mr. Gordon Wray
Chairman
NWT Water Board
PO Box 1326
Yellowknife, NT X1A 2N9

Dear Mr. Wray:

RE: Shell Canada Limited
Proposed winter 2006/2007 Winter Field Program
Type B Water Licence – Level 1 Environmental Screening

Indian and Northern Affairs Canada (INAC) have conducted a screening for the proposed 2006 – 2007 Winter Field Program submitted by Shell Canada Limited pursuant to *Section 5* of the *Canadian Environmental Assessment Act* (CEAA). The project has also been screened by the Environmental Impact Screening Committee (EISC), pursuant to the 1984 Inuvialuit Final Agreement.

INAC has determined that this project, as proposed, is not likely to cause significant adverse environmental effects and concurs with the EISC's similar determination as concluded in their screening decision, providing that proposed mitigation measures are carried out and licence conditions met. INAC recommends that the application proceed through the regulatory process. Incorporation of the recommended mitigative measures into the terms and conditions of the licence is required.

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

If you require further information, please contact me at (867) 669-2749.

Sincerely,

Dr. Kathleen Racher
Manager
Water Resources Division

CEAA SCREENING FORM
Department of Indian Affairs and Northern Development (DIAND)

1. Public Registry Required Information

Applicant: Shell Canada Limited
400 4th Avenue SW
P.O. Box 100, Station M
Calgary Alberta, T2P 2H5
Ben Seligman
Phone: (403) 691-4396

CEAR Number : 06-01-22716

Subject Descriptors: Land Use

Alias Project Title: Niglintgak winter field program

Lead RA and Screening Division: DIAND, Operations

RA Contact: DIAND North Mackenzie District, Tel: 867-777- 3361

Lead RA Trigger Types: CEAA Law List Regulations

Other Screening Trigger Types: Inuvialuit Final Agreement

EA Start Date: November 06th, 2006 (CEAA s.5 notification and scope)

EA Type: Screening

Physical Activity as identified from Inclusion List: Land use

Physical Work Being Assessed: Land Use, Water Use, and Oil and Gas Activity (Geotechnical drilling)

Phase of Project / Primary Undertaking: Geotechnical Drilling

Multiple Activities: __Yes _X_No Indicate One: drilling

Project Category Code: **Point** Linear Areal (Underline one)

Geographic Place Name: Camp Farewell, Richards Island (KIBS)

EA Determination: 20-1-a

EA Determination Date: February 2nd, 2007

Estimated monitoring termination date: 2007/ 2008 - DIAND Land Use Inspector

EA Terminated: No

2. General File Information

DIAND Land Use Permit Number: **NWT Water License Number:** **CWS KIBS Permit**	N2006S0033 N7L1-1816
Type of Applications:	New land use permit, water license application, KIBS access permit
Present licence/permit/lease number:	Nil
Proposed Date of Activity:	January 2007
Other RAs or Screening Divisions:	Provided in Appendix D, "CEAA EA Coordination"
Other RA Types of Approval:	Provided in Appendix D, "CEAA EA Coordination"
Project File Locations:	DIAND North Mackenzie District (Inuvik)
DIAND District:	North Mackenzie, Inuvik

3. Proponent

Ben Seligman
Shell Canada Limited
400 – 4th Avenue S.W.
P.O. Box 100, Station M
Calgary, Alberta, T2P 2H5
Phone: (403) 691-4396
Fax: (403) 691-4850

Type of Proponent: Industry

4. Project Location

Appendix I

Topographic Map Sheet Number:	107C
Latitude / Longitude:	Latitude 69 18' 32.2" Longitude 135 15' 44.7"
Watershed:	Kumak Channel / Mackenzie Delta
Street Name:	N/A
Surrounding Land Status:	Crown Lands in the Inuvialuit Settlement Region
Special Designation:	The Project occurs on lands designated under the Community Conservation Plans of Inuvik, Tuktoyaktuk and Aklavik, also within the Kendall Island Bird Sanctuary.

5. Proposed Project and Schedule:

The majority of work will take place between January 2007 and April 2007 will involve the following activity:

The proposed 2006/2007 winter fieldwork is a continuation and expansion of previous years' fieldwork. These studies and a synthesis of existing technical information are being used to develop a suitable knowledge base for the ongoing project planning, assessment of impacts, and development of environmental protection plans. In addition, the program will be used to conduct some routine maintenance at Camp Farewell. The 2006/2007 Winter Field Program will also provide Shell the opportunity to test some detailed engineering and design related to the Niglintgak development.

The field program will take place in four areas. The majority of the proposed work is planned for the Niglintgak area and is focused around the GCF (Gas Conditioning Facility) set down site and the HDD (Horizontal Directional Drilling) crossing. Other activity is planned at both Camp Farewell and in the vicinity of the Kittigazuit S-Bends.

A geotechnical survey will be conducted at the GCF set down site and alternative flowline right-of-way to collect additional detailed information on the local permafrost. Thermistors will be installed in up to 10 boreholes. The information gathered will be used as input into design of the GCF foundation. As well, information will also be used to determine the depth of the active layer and the boundaries of thick ice on the higher ground between the GCF set down site and two shallow ponds adjacent to the site to assist in design of the onshore facilities.

Up to 29 boreholes will be drilled at various locations around the GCF set down site. Four of these boreholes will be used to address HDD alignment and scope changes that have occurred since the 2005 geotechnical survey and four will be drilled at the alternative flowline right-of-way to the open cut location.

An auger drill rig, an air rotary rig, and combination rig will be used during the program. A water based bentonite mud system will be used for the deeper holes. Thermistor strings will be installed in up to ten boreholes. The ground temperature data will become part of the baseline information used for establishing the detailed engineering design requirements for the pilings at the development site. Thermistors consist of small beads about 3 mm in diameter strung within the borehole to the ground surface. The number of beads to be installed in each selected borehole may vary from one to ten depending on the depth of the hole and the soil layers being encountered. Ground temperatures will be continuously measured and the thermistor readings will be collected twice a week. Upon the conclusion of the winter field program, long-term data loggers will be connected to each thermistor string and downloaded from the data logger to a computer twice a year until the start of the anchor field's construction.

Sediment Sampling at Gas Conditioning Facility Set Down Site and Approach

Material from approximately seven boreholes surrounding the GCF set down site and approach will be collected and analyzed. These samples are representative of the sediment material that will be excavated and disposed during the preparation of the GCF set down site. Handling protocols for sampling collection will be specific to the analytic parameters analyzed.

Sediment Sampling at the Test Pit Site

Shallow sediment sampling will be conducted at the test pit location. Six samples will be collected at the surface and six further samples will be taken at a depth of 2 m using hand tools or hand-held power tools (e.g. shovel, auger, hammer drill with coring attachment). Samples will be taken at random locations within the area to be excavated and will be above the river water level. Samples will be analyzed for particle sized, moisture content, total organic content, major and trace metals as total metals, total petroleum hydrocarbons, total volatile hydrocarbons, extractable hydrocarbons, Polycyclic aromatic hydrocarbons (PAHs), alkylated PAHs, and acid-volatile sulphides/simultaneously extracted metals.

Gas Conditioning Facility Installation Simulation and Permafrost Degradation Testing

A test pit approximately 16m x 10m x 2m deep is located north of the proposed access channel to the GCF set down site and below the high water mark will be excavated to conduct GCF installation and permafrost degradation testing. The excavated site will be used to test the insulated foundation designed to protect permafrost and the results of the test will allow improvements to be made to the insulated foundation design to minimize potential impacts on permafrost.

The material excavated from the test pit will be disposed of in two locations, once on the ice of Kumak Channel, the second on the ice in the erosion zone at the SE corner of Niglintgak Island. Two thirds (2/3) of the excavated material will be disposed of on the ice in Kumak Channel as proposed by Shell Canada Ltd.. The material will be divided into two equal portions each of which will be placed on the ice in a different format. One format will be designed to favour local disposal and the other to favour delayed release and further movement with the ice pans. The remaining one third (1/3) of the material will be placed on the ice at a second disposal allocation on the SE corner of Niglintgak Island. The disposal site is in a highly erosive zone, and it is predicted that the material placed here will erode into Kumak Channel through natural processes during the spring freshet.

Benchmark Installation

A benchmark will be installed on land, south east of the proposed GCF location. This benchmark will provide a reliable vertical datum control point adjacent to the GCF construction site as well as provide a vertical control point for measuring extraction induced field subsidence. Benchmark installation will consist of drilling a 10 m hole with one of the geotechnical drill rigs and using an adfreeze technique a central rod will be placed within a steel sleeve.

Ground Penetrating Radar Survey at Niglintgak Island Stockpile Approach

The Niglintgak Island stockpile is a previously disturbed stockpile area on the west shore of the Kumak Channel north of the GCF set down site. To prepare for its reuse, additional bathymetric information of the approach is required. This will be collected using ground penetrating radar (GPR) ice profiling from the surface of the river ice. An area of Kumak Channel will be cleared from the end of the ice road to the stockpile site. An ice profiler with GPR equipment, as used for construction of the ice road, will be pulled behind a truck or snow machine to collect bathymetric information on the approach to the stockpile site.

Spring Break-up Peak Water Level Monitoring.

This work will involve the measurement of flood depths in the vicinity of the proposed GCF set down site. As detailed engineering of the GCF progresses, confirmation of peak water levels is needed to ensure the designed height of the GCF substructure is above the maximum water levels. The GCF test pit will have been instrumented with a water level pressure transducer. It will be tied to an onshore data logger to record water levels throughout the period of spring break-up.

Kittigazuit S-Bend Area Sediment Sampling

If the GCF is transported through the Kittigazuit S-Bends, detailed sediment information is required for the regulatory permitting of dredging activity and subsequent disposal in marine waters, associated with the GCF transportation. The sediment sampling program will be conducted in two phases. The first phase will be conducted in the winter of 2007, and will consist of 16 samples at a depth of 2 meters along the proposed dredge area in the S-Bends, and a total of 21 surface samples in six potential disposal areas. The first phase of the sampling program is designed to collect data from the dredge site and each of the potential disposal sites. It is not the intent of the first

phase to fully characterize the sediments at each of the disposal sites. It will be the intent of the second phase of the sampling program should the proponent wish to apply for a Disposal at Sea permit from EC, to adequately characterize the disposal areas. This phase of the sampling program may be conducted in the future and is outside the scope of this screening. Crew will travel from the public ice road to the various sampling locations by tracked vehicle and skidoo. Site reconnaissance will be conducted by skidoo to check for sufficient ice thickness before heavier equipment is moved from the ice road to the sampling sites. The general location of sampling sites will be determined before the start of the field program. Once in the field, sampling locations will occur as close to the predetermined sampling spots as possible while optimizing on using areas that have minimal snow cover. If snow clearing is required, a blade or snowplow will be used. Ideally, no snow clearing will be done and the sample site can be prepared using a 0.2 m or 0.3 m (8 or 12 inch) power auger mounted to the tracked vehicle to drill through the ice.

Cores will be collected from the ice surface using a vibracore sediment sampler. This method of sample collection allows acquisition of cores up to 2 m long for sediment analysis. Coring will confirm or validate how sediments differ horizontally from existing hydroacoustic data collected in previous field seasons and evaluate physical and chemical properties vertically in the areas likely to be dredged. Sediment samples obtained from the cores will supply additional information regarding the distribution of potential contaminants within the proposed dredging and disposal footprints i.e., within a zone 3 km wide on either side of the shipping channel in the Kittigazuit S-Bends area.

Cores will be examined upon collection and samples will be obtained for laboratory analysis. Parameters to be analyzed include, but are not limited to, metals and metalloids (including methylmercury), Polycyclic aromatic hydrocarbons (PAHs), acid-volatile sulphides/simultaneously extracted metals (AVS/SEM), grain size and organic carbon content. Additional sampling and analyses may be required based on engineering requirements and ongoing discussions with Environment Canada and Fisheries and Oceans Canada.

Camp Farewell General Maintenance Activities

Shell Canada has an existing Crown lease for Camp Farewell. Camp Farewll has been used as a base camp by Shell for over 30 years. In anticipation of the infrastructure needed to develop and support the Niglintgak anchor field and in compliance with the Crown lease for Camp Farewell, general maintenance work will be conducted at this site. All work will take place within the exiting Crown lease boundaries during the winter, and will include:

- removal of six mooring piles;
- installation of three new mooring piles, and
- repair of the winter access road from the dock/ice road to the camp area.

Existing pilings are located below the high water mark and have been heavily damaged by ice. The six existing pilings will be cut off approximately 0.3 m (or one foot) below grade. Three new pilings will be installed using a geotechnical drilling rigs mobilized from the geotechnical survey work completed at Niglintgak. Two of the new pilings will be 5 m above the mean water mark and one will be 0.5 metres above the mean water mark. Each location will have approximately three or four raking piles. Pilings will be anchored using an adfreeze mixture of sand, water and possibly cement. Each group of piles will be cut at or close to ground level and welded to a steel pile cap. A cast steel bollard will be bolted down to the pile cap. The bollard 0.5 m from the mean water mark will be removed at the end of each navigation season to prevent damage during spring break-up. If necessary, all bollards may be removed at the end of each season. Piles will be placed approximately 10 m deep. Approximately 48 m3 of gravel for winter road repair will be obtained from existing privately owned sources south of the Inuvik airport and will be brought to Camp Farewell by ice-road.

Access

To access the Niglintgak field development area and Camp Farewell, a dedicated ice road will be constructed from Bar-C (Tununuk Point) to the Niglintgak Field Development Area. The Kittigazuit area will be accessible from the public ice road constructed between Inuvik and Tuktoyaktuk.

Water Requirements

All potable water will be brought from Inuvik for camp use at Camp Farewell. Other water needs will be taken from Middle Channel under the existing Camp Farewell water licence (Licence # N7L1-1762).
At Niglintgak, water required for the combination geotechnical drill rig is less then 3 m3 per day and will be withdrawn from Kumak Channel at the Niglintgak site. Water for the construction of the ice road from Tununuk Point to Niglintgak will be withdrawn from the Middle Channel of the Mackenzie River. There may be approximately 3 km of winter site roads constructed at Niglintgak to access the geotechnical drilling locations. If required, approximately 1,800 m of these site roads will be overland and 1,300 m over water and will be constructed using water withdrawn from Kumak Channel. Approximately 600 m3 in total will be required for the over land portions of the ice road construction. Daily withdrawal will not exceed 300 m3/day, which is the maximum allowed under a Type B Water Licence. Water withdrawn from the Mackenzie River will be screened with 2.54 mm fine mesh to prevent entrainment of fish, in accordance with the Department of Fisheries and Oceans Freshwater Intake End-of-Pipe Fish Screen Guideline (1995).

Wastewater Treatment and Disposal

All waste from the Niglintgak site will be collected and transported to Camp Farewell. Non-hazardous solid waste from both Niglintgak and Camp Farewell will be either incinerated or stored for transportation to Inuvik and disposal in the Inuvik landfill. If applicable, camp kitchen waste that cannot be incinerated will be stored at Camp Farewell in animal-proof containers for shipment to Inuvik. Sewage and greywater will be collected and transported to Inuvik for treatment at the sewage treatment center. All waste generated during the Kittigazuit sediment sampling activities will be collected and transported to Tuktoyaktuk for disposal. It is anticipated that 7,000 kg of camp waste, 170 m3 of greywater, 40 m3 of sewage and approximately 10 m3 of drill mud associated with the geotechnical air/mud rotary rig will be generated during the program.

Fuel Storage:

Most of the fuel for the 2006/2007 Winter Field Program will be staged out of the existing facility at Camp Farewell. Fuel will be brought to Camp Farewell by ice road. Portable 10,000 litre fuel sloops will be used to store fuel at Camp Farewell. Each container will have secondary containment with automatic shut off valves on the nozzles.
Fuel hauling trucks will be used to haul fuel to the Niglintgak site for daily refueling. The tracked vehicle would be re-fuelled on site as needed. Contingency fuel will be stored in a drum or can on the field trucks used to transport the crew to the various sites.

Accidents and Malfunctions:
• Unanticipated releases of mechanical fluids, fuel or hydrocarbons could contaminate soil, water or the atmosphere. Potential accidents and malfunctions that might adversely effect the environment include:

- Ground disturbance from human traffic on sensitive terrains.
- Fuel spills and drill additive spills could result in ground contamination (from mechanical failure or operator error)
- spillage of glycol from the mud cooler exchanger;
- spillage of wastewater from a waste treatment system malfunction
- well kicks or blowouts of drilling fluids, sand, sediment, or hydrocarbon gases or fluid; and
- Wildlife encounters, such as an attack on humans (surprise encounter) or personnel shooting and injuring wildlife (responding to perceived threat or actual attack) could occur.
- Wildlife disturbance, such as disturbance of a bear den or caribou / reindeer migrating through the program.
- Shallow Gas encounters
- Late ice formation and snow conditions
- Severe weather

Information Sources Used:

X_ Other government data __ Historical maps __ Scientific reports X_ Project Description for the EISC		X_ CEAA public registry system information __ Contour maps __ Oil and gas water licence questionnaire _X_Other: application & additional company information

6.a) Description of Environment

Climate

The Tuktoyaktuk Coastal Plain Ecozone is classified as having a low arctic ecoclimate (ESWG 2004). The mean annual temperature is approximately -11.5^0 C with a summer mean of 4.5 ^{0} C and a winter mean of -26.5 ^{0} C. Mean annual precipitation ranges 125–200 mm. Precipitation mainly falls as rain, and while it is highly variable in the coastal and delta regions, there is a general increase in amount of precipitation from the coast southwards. West winds can elevate water levels in the Mackenzie River delta (Frank Pokiak, Inuvik Community Workshop, October 27, 2003) due to increased wind velocities hindering water movement from the Mackenzie River to the Beaufort Sea.
The most common forms of visual obstruction in the winter are steam fog, ice crystal haze, blowing snow and whiteouts (Dome et al. 1982). The normal airflow direction over the region is westerly in summer and northwesterly in winter, with potentially severe weather resulting from deviations in this pattern (Dome et al. 1982). Considerable variation can occur over this region, particularly between coastal and inland areas. Generally, the wind strength and duration decrease from the coast southwards.

Camp Farewell is classified as having a high subarctic ecoclimate, with very cold winters and cool summers. Mean temperatures range from –27.6°C in January to 14.2°C in July. The mean annual precipitation is 249 mm (Environment Canada 2002).

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 (ESWG 1995). 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 1995). The region is underlain by continuous permafrost with high ice content in the form of ice wedges and pingos.

Soils and Permafrost

Permafrost is defined as sediments that remain below 0 ^{0} C for two or more years (Taylor et al. 1996). Permafrost occurs beneath all terrestrial areas and many waterbodies of the Tuktoyaktuk Coastal Plain, generally exceeding 500 m in thickness (Mackay 1999). Active layer depth (depth of seasonal thaw) develops to about 1 m thick (Bigras 1990, Smith et al. 2001). 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 1995). Typically these soils are said to be underlain by a continuous layer of permafrost (> 90% permafrost), though more recent data describe the outer Delta and portions of Richards Island as being discontinuous permafrost with about 35-65% permafrost beneath the area (Heginbottom 1998). In the 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. Pingos are found within the area. Ice rich soils are insulated and maintained by extensive vegetation cover. However, these soils are susceptible to permafrost degradation as a result of erosion and increased temperatures.

Vegetation

The vegetation at Niglintgak is a part of the Southern Arctic Ecozone developed by the Ecological Stratification Working Group (ESWG 1995). In this zone, vegetation grows on a veneer of unfrozen organic or granular substrate overlying the permafrost boundary. In wetter areas, sedges, cotton-grasses and sphagnum moss dominate high-centered and low-centered polygons. Drier areas support ericaceous shrubs. Riparian communities include wet sedge communities and taller shrubs. On the floodplain of the Mackenzie River, which comprises a large part of the Niglintgak area, shrub communities and wet sedge – cotton-grass meadows predominate.

Two rare plant species have been recorded in the Niglintgak production area):

- Arctic seashore willow (Salix ovalifolia Trautv. var. arctolitoralis [Hultén] Argus) at four locations.
- Wedgeleaf willow (Salix sphenophylla A. Skvortsov) in one location.

Arctic seashore willow was found at two locations along the east edge of Niglintgak Island south of the proposed flowline crossing. Two more locations were recorded at the southernmost and the northernmost proposed drilling location along the west edge of the island. It is a trailing and freely branched deciduous shrub, which grows prostrate on beach ridges, sand spits, tundra meadows, and shores of lakes and lagoons in the Mackenzie Delta to coastal Alaska (Cody 2000). Wedgeleaf willow was found at the northern most drilling location along the west edge of the island. It is a prostrate shrub with brownish, trailing branches, which grows in the Mackenzie Delta, coastal Alaska and the Arctic coast near the Yukon border (Cody 2000).
Both of these willow species are now listed as "May be at Risk" in the draft NWT Species Monitoring – Infobase. This ranking system currently utilizes the following categories: May be at risk, sensitive, undetermined and secure.

Wildlife

Terrestrial Birds and Mammals
A variety of birds and mammals occur within the Mackenzie Delta, including waterfowl, raptors, passerines, ground dwelling birds, grizzly bear, black bear, caribou and moose. The Mackenzie Delta provides important habitat for many different species of migratory birds. Numerous waterfowl and waterbirds use the delta seasonally for staging, nesting, breeding and moulting. Waterfowl and waterbirds include ducks, swans, geese, loons, cranes, shorebirds, seabirds and gulls. Many of the waterfowl species and some waterbirds are important food sources for local residents. Several species of raptor, passerine and ground-dwelling birds are also present in the study area. Of the birds found in the Mackenzie Delta area, Eskimo curlew, short-eared owl, Ross' gull and two subspecies of peregrine falcon are considered to be at risk by COSEWIC.

Terrestrial mammals present in the proposed study area include a variety of ungulates, bears, and furbearers. These species include caribou, polar bear (seasonal), grizzly bear, black bear, moose, muskrat, beaver, fox (red and Arctic), wolf, marten, lynx, wolverine, snowshoe hare and several species of small rodents. Several of these species are economically important to the surrounding communities (see back of project description). Caribou are an important food source for all of the communities within the area of the proposed study, while smaller mammals such as marten, lynx and muskrat, are trapped for their fur. The polar bear, grizzly bear and the wolverine are currently the only terrestrial mammal species that are considered to be at risk by COSEWIC (2003), however, information on some species, such as the grey wolf and polar bear, is insufficient to make an accurate determination.

Kunnek Resource Development Corporation runs a reindeer herding operation in the Mackenzie Delta. They annually cross between Richards Island and the mainland at Swimming Point, and graze around Richards Island in summer and the mainland across from Richards Island and up towards Tuktoyaktuk in winter.

Polar bear are typically restricted to areas with sea ice. However, maternity dens (October to March) and secondary winter habitat occur along the coastline of the Mackenzie Delta, Richards Island and the Tuktoyaktuk Peninsula. The outer Mackenzie Delta, particularly Richards Island, provides excellent habitat for Arctic fox.

Marine Mammals
Five species of marine mammals occur regularly in the southern Beaufort Sea: the bowhead whale (Balaena mysticetus), beluga whale (Delphinapterus leucas), ringed seal (Phoca hispida), bearded seal (Erignathus barbatus), and polar bear (Ursus maritimus). All species form an important part of the Inuvialuit's subsistence harvest.

Beluga Whale
Beluga whales occur in both offshore and coastal waters of Arctic and Subarctic regions, and are closely associated with open leads and polynyas (Hazard 1988). Aggregations in offshore areas may be associated with feeding (Harwood et al. 1996), whereas use of warm coastal waters is associated with calving and molting (Sergeant and Brodie 1969; Finley 1982). Low saline and warm estuarine waters help facilitate the annual molt (St. Aubin et al. 1990), which may explain why belugas aggregate in the Mackenzie River
estuary (Harwood et al. 1996) during June to August. Beluga whale distribution is affected by ice cover, tidal conditions, prey resources, water temperatures, and human interactions (Lowry 1985). In August, belugas migrate from the Mackenzie River estuary east towards Amundsen Gulf and Viscount Melville Sound, and then in autumn, travel west along the Alaskan coast and offshore areas under the polar ice pack (DFO 2000).
The beluga whale is considered to be not at risk federally (COSEWIC 2003), and is secure in the NWT (GNWT 2000). It is not listed as depleted under the Marine Mammal Protection Act, nor is it classified as a strategic stock (NOAA 2002).

Fish and Fish Habitat
A large number of small clear lakes occur within the Tuktoyaktuk Coastal Plain. These lakes generally range in depth from 3 m - 10 m, although some are known to exceed 20 m (Sekerak et al. 1992). The lakes tend to remain ice-covered for around 250 days per year, with freeze-up generally occurring in September or October and break-up occurring in late June (Bond and Erickson 1985). Spring break-up in the relatively higher Tuktoyaktuk Coastal Plain is caused by melting as opposed to flooding of the ice by warmer water, as in the active portions of the Mackenzie Delta. Many lakes in the region provide conditions suitable for overwintering fish. This includes freshwater species such as lake whitefish, broad whitefish, least cisco, northern pike, Arctic grayling, lake trout, burbot, pond smelt, ninespine stickleback and longnose sucker. In many cases, these fish populations are resident year round, but lakes that are connected to the ocean with streams that flow throughout the open water season also provide overwintering habitat for diadromous species such as lake whitefish, broad whitefish and least cisco. Regional lakes that are greater than 3 m deep provide potential year-round habitat for a variety of resident fish species, including lake trout, least cisco, lake whitefish, broad whitefish, northern pike, burbot and Arctic grayling (Lawrence et al. 1984). Deep lakes that are well connected to distributary channels also provide overwintering habitat for non-resident populations of least cisco, lake whitefish, broad whitefish, northern pike and burbot that spend the open water period in Mackenzie River channels or coastal areas. Shallower lakes may provide summer feeding or rearing habitat if they are connected to deeper lakes or distributary channels, but fish would have to migrate out before onset of winter. Where Arctic grayling are present, streams that connect lakes or connect lakes to distributary channels provide summer spawning, feeding and rearing habitat. Regional streams are generally small and provide no overwintering habitat (Lawrence et al. 1984). Many streams are ephemeral or intermittent and provide only periodic connection between lakes, while larger streams serve as migration routes for the diadromous species listed above. They also provide summer habitat for freshwater species such as Arctic grayling, northern pike, pond smelt, burbot and ninespine stickleback, which move in from lakes where they are resident. Streams are generally clear, with total suspended solid (TSS) levels below 10 mg/L. The Mackenzie River channels of the outer delta, including East, Middle, Harry and Kumak channels, provide critical year-round habitat for inconnu, broad whitefish, lake whitefish, least cisco, northern pike and burbot. In addition to feeding, rearing and overwintering habitat (deeper channels), the channels also serve as migration routes for large populations of diadromous and other migratory species that move annually between the Mackenzie River or delta and the Beaufort Sea coast. The shallow coastal shelf waters along the outer delta islands range from fresh to slightly brackish, depending on time of year, Mackenzie River flow, and wind direction from the Beaufort Sea. In addition to providing habitat for the freshwater and diadromous species already discussed, the coastal waters also support a number of low-salinity tolerant marine species including pacific herring, starry flounder and saffron cod.

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

This project is located between the communities of Tuktoyaktuk and Inuvik. Inuvik is the major supply and services point for the region having both highway access and daily jet service to the south. Tuktoyaktuk has daily air service from Inuvik in smaller aircraft as well as a winter ice road from Inuvik when ice conditions are suitable.

Local suppliers will be used wherever possible for equipment and consumables. Longer-lasting benefits may also be realized through economic diversification complementary to development such as travel agents, services, hotels, restaurants. While Shell's project may incrementally contribute to these longer-term effects, most impacts will be short term and will be related to seasonal employment.

7. Consultation on Project by Proponent

Community consultation in Inuvik, Tuktoyaktuk and Aklavik took place in June and August 2006. Meetings in June were held with the Hunters and Trappers Committees (HTC), in August they were with the HTCs, the Elders Committees and the Community Corporations.

The goals of the consultation were to:

- Share new information and receive feedback from community members and leaders.
- Allow Project Team members to gain a better understanding of the general issues and concerns of community members.
- Obtain feedback and incorporate it into plans where applicable.

see project description for more information.

Group	Date	Location
Inuvik Hunters and Trappers Committee	June 13 and August 9	Hunters and Trappers Committee Office
Inuvik Elders Committee, Community Corporation	August 9	Ingamo Hall
Tuktoyaktuk Hunters and Trappers Committee	June 13 and August 8	Hamlet Council Chambers
Tuktoyaktuk Elders Committee, Community Corporation	August 8	Hamlet Council Chambers
Aklavik Hunters and Trappers Committee	June 12 and August 8	Hamlet Council Chambers
Aklavik Elders Committee, Community Corporation	August 8	Hamlet Council Chambers

Government Consultation

DIAND sent out a letter asking for comments to government agencies, local aboriginal and local government groups. Responses to this request are listed below.

Federal Government		Contact Person	Dates Comments Received
NWT Water Resources.	✔	Nathen Richea	CEAA response – , 2006
DFO/CCG	✔	Mark Lange/Briar Young	Letter to EISC – October 17th, 2006
NEB	✔	Anne-Marie Buchwald	CEAA response – October 20th, 2006
EC	✔	Lorraine Sawdon	CEAA response – October 24th, 2006 Letter to INAC – November 1st, 2006 Letter to EISC – December 12th, 2006 Letter to INAC – January 9th, 2007 Letter to EISC – January 26, 2007
NRCan	✔	M. Turpin	Letter to INAC – October 26th,2006

Federal Government		**Contact Person**	**Dates Comments Received**
Parks Canada	✔	Ed McLean	CEAA response – October 26th, 2006
Territorial Gov't.		**Contact Person**	**Dates Comments Recieved**
ENR	✔	Jason Mcneill	Letter to EISC – October 11th, 2006 Letter to Water Board Oct. 31st, 2006
Health	✔	Chris Beveridge	No Comment
Transportation	✔	John Cowan	CEAA response – November 3rd, 2006
MACA	✔		No comment
PWNHC	✔	Tom Andrews	No comment
Other			

Aboriginal Groups		**Contact Person**	**Dates Comments Received**
EISC	✔		Screening decision letter– October 13th, Dec. 14th, 2006 (IFA's 11(17)(b))
Inuvik Hunters & Trappers Committee	✔		No comment
Tuktoyaktuk HTC	✔	Lila Voudrach	Letter to EISC – October 11th,2006
FJMC	✔	Robert Bell	No comment
Inuvialuit Game Council	✔		No comment
Wildlife Management Advisory Council (NWT)	✔		No comment
Public/Interested Parties/Other		**Contact Person**	**Dates Comments Received**
Inuvik Comm. Corp.	✔		No comment
Tuktoyaktuk Comm Corp.	✔	Vince Steen	Letter to INAC – November 1st, 2006

Summary of Aboriginal Group and other Public Concerns

EISC:

- The EISC decided that the development would have no significant negative impact on the environment or Inuvialuit wildlife harvesting in the Inuvialuit Settlement Region (IFA Section 11. (17)(b).
  In rendering its decision, the EISC made the following recommendations:
  - The proponent has committed to ensuring that test pit sediment will not exceed CCME criteria and that disposal will be subject to DFO approval. The EISC recommends that alternate disposal of excavated material be considered such as dispersal on land, possibly at the Niglintgak stock pile site, rather than on channel ice, to prevent the disposition of any potential deleterious substances in fish bearing waters.
  - The proponent should develop plans for removal of the trial foundation and associated monitoring equipment located in the test pit. Since the test pit area has been demonstrated to be fish habitat, this would preclude any potential degradation of such habitat.
  - The proponent has committed to conducting bear den surveys in conjunction with ENR. The EISC supports this and recommends that the survey be broadened to include identification of possible

polar bear maternal den site areas. The EISC sees this as a means in reducing the potential negative impact on bears in the region.

- A portion of the project is proposed to take place in the Beluga Management Plan Zone 1 (a). The EISC recommends that no activity take place in Zone 1 (a) in accordance with Beluga Management Plan, prior to the Marine Protected Area regulations having been promulgated and the MPA management plan put in place, to ensure the protection of beluga habitat.
- The EISC recommends that any above-ground thermistors cables be covered. This would prevent a repeat of a recent incident where reindeer bulls become entangled in above-ground cables and died or had to be destroyed.
- The proponent indicates the presence of two rare plants in the Niglintgak production area. The EISC recommends that the proponent mark the locations of the rare plant areas. This would ensure that such rare plants and their habitat are not further endangered.
- Considerations should be given to the removal of old pilings rather than cutting them off below grade as suggested, to prevent any potential danger to boats and vessels operating in the area.

Proponents Response to EISC's Recommendations

#	EISC Recommendation	Shell Response
1	The proponent has committed to ensuring that test pit sediment will not exceed CCME criteria and that disposal will be subject to DFO approval. The EISC recommends that alternate disposal of excavated material be considered such as dispersal on land, possibly at the Niglintgak stock pile site, rather than on channel ice, to prevent the disposition of any potential deleterious substances in fish bearing waters.	**The condition to meet the CCME sediment quality guidelines has been discussed and reviewed with both Environment Canada and Fisheries and Oceans. The common understanding is that the intent of the CCME guidelines will be maintained by consideration of natural variation in background sediment quality. The accompanying letter provided by MPEG provides technical explanation of the role, and intent of the CCME guidelines within the regional context of Mackenzie Delta sediment characteristics. The underlying premise of using the CCME guidelines as a benchmark to assess the chemical characteristics of the material planned to be disposed on ice demonstrates that native, naturally occurring material only, is involved and therefore no adverse water or sediment quality effects are likely to occur. In addition, the amount of river sediment to be disposed is small, amounting to a small fraction of the daily sediment load of the Kumak Channel at the time of the planned disposal.**
		The test pit material will be disposed of both on ice in the middle of Kumak Channel and in the erosive zone at the south end of Niglintgak Island. This approach was agreed with both Environment Canada and Fisheries and Oceans during a teleconference held 9th January 2007. A disposal methodology has been submitted to Environment Canada, Fisheries and Oceans, and Canadian Wildlife Service.

2	The proponent should develop plans for removal of the trial foundation and associated monitoring equipment located in the test pit. Since the test pit area has been demonstrated to be fish habitat, this would preclude any potential degradation of such habitat.	**Plans will be developed to remove the test pit foundation and monitoring equipment during construction of the main Gas Conditioning Facility foundation. During construction, suitable equipment for this job will be on site.**
3	The proponent has committed to conducting bear den surveys in conjunction with ENR. The EISC supports this and recommends that the survey be broadened to include identification of possible polar bear maternal den site areas. The EISC sees this as a means in reducing the potential negative impact on bears in the region.	**A grizzly bear survey has been completed and Shell has discussed the feasibility of a polar bear survey with the Dept. of Environment & Natural Resources (ENR). ENR advised Shell that a polar bear survey is not feasible at this time for the following reasons:** **- ENR does not have the capability (technology) to conduct the survey.** **- ENR does not have potential polar bear denning maps for the region.** **In the absence of a survey, ENR advised that banks with snow accumulation be avoided and standard bear avoidance protocols be followed if a bear is sighted.**
4	A portion of the project is proposed to take place in the Beluga Management Plan Zone 1 (a). The EISC recommends that no activity take place in Zone 1 (a) in accordance with Beluga Management Plan, prior to the Marine Protected Area regulations having been promulgated and the MPA management plan put in place, to ensure the protection of beluga habitat.	**The EISC re-screened the Kittigazuit S-Bends sediment sampling program and issued its conclusion on 15th December, stating that the program 'will have no significant negative impact on the environment'. In accordance with the recommendations from the re-screening conclusion, Shell discussed details of the sediment sampling program with Environment Canada at the meeting of 19th December 2006. During a teleconference held 9th January 2007 Environment Canada endorsed the sediment sampling program planned for winter 2007. Therefore, no further amendments to the sampling plans are foreseen.**
5	The EISC recommends that any above-ground thermistors cables be covered. This would prevent a repeat of a recent incident where reindeer bulls become entangled in above-ground cables and died or had to be destroyed.	**The requirement to cover thermistor cables has been included in the geotechnical consultant's scope of work.**
6	The proponent indicates the presence of two rare plants in the Niglintgak production area. The EISC recommends that the proponent mark the locations of the rare plant areas. This would ensure that such rare plants and their habitat are not further endangered.	**Shell will mark rare plant sites and endeavour to avoid them during the execution of field program activities.**
7	Considerations should be given to the removal of old pilings rather than cutting them off below grade as suggested, to prevent any potential danger to boats and vessels operating in the area.	**Shell considers that it will not be possible to remove the piles completely. Instead, Shell intends to cut the old piles off 1' below grade. Should frost jacking of the remainder of the piles take place, this is not expected to exceed 1' and so should not cause any obstruction to vessels operating in the area.**

Proposed 2006/2007 Sediment Sampling Program in the Kittigazuit S-Bends (Submission # 09/06-03) - EISC Screening Conclusion, 14 December 2006		
#	**EISC Recommendation**	**Shell Response**

1	That the proponent increase sediment sampling program in accordance with the recommendations contained in the letter from Environment Canada of December 12, 2006 to ensure adequate background information is obtained to address concerns expressed by Joint Secretariat staff.	**Shell plans to take at least 14 core samples at depth along the S-Bends and 21 surface samples in potential dredge disposal areas. Shell will conduct a further sediment sampling program once final disposal sites have been selected. Numbers of samples will be in accordance with Disposal at Sea permitting requirements. This approach was discussed with Environment Canada at the meeting of December 19, 2006 and agreed with Environment Canada during a teleconference dated January 9, 2007.**
2	That the proponent address any other recommendations made by Environment Canada both in its letter of December 12, 2006 or that may arise from the subsequent meeting planned between the company and Environment Canada on December 19, 2006.	**Shell has addressed recommendations made by Environment Canada both in its letter dated December 12, 2006 and at the meeting dated December 19, 2006.**
3	That should any significant change in the development occur the EISC must be informed.	**Shell does not anticipate significant change to the program but will inform the EISC should this happen.**

- **Kittigazuit S bends -**
-
- The EISC decided that the development would have no significant negative impact on the environment or Inuvialuit wildlife harvesting in the Inuvialuit Settlement Region (IFA Section 11. (17)(b).
  In rendering its decision, the EISC made the following recommendations:

    - That the proponent increase sediment sampling programming in accordance with the recommendations contained in the letter from Environment Canada of December 12, 2006 to ensure a adequate background information is obtained to address concerns expressed by Joint Secretariat staff.

    - That the proponent address any other recommendations made by environment Canada both in its letter of December 12, 2006 or that may arise from the subsequent meeting planned between the company and Environment Canada on December 19, 2006; and
    - That any significant change in the development occur the EISC must be informed.

Letter to EISC from Proponent;

We are providing this letter in relation to the disposal of sediments to be excavated from a test pit on the right downstream bank of Kumak Channel in the Niglintgak anchor field area. It is our understanding that Shell Canada Limited (Shell) is planning to conduct a test excavation at this location in the Mackenzie Delta, within the Inuvialuit Settlement Region, as part of preliminary work to develop detailed plans for preparing the future site of the Niglintgak Gas Conditioning Facility. The test excavation is planned for winter 2006 and its approximate size is 16 m x 10 m, with a depth of 2 m. The amount of excavated material is estimated as 512 m_3, which takes into account removal of additional sediment to create sloped sides around the periphery of the pit. The preferred method of disposal of the excavated material is spreading it on the ice over the thalweg of Kumak Channel during the winter, and allowing the material to be transported downstream by the river during breakup in spring.

In the "2006/2007 Winter Field Program, Niglintgak Natural Gas Field Development Project Description" submitted by Shell to the Environmental Impact Screening Committee (EISC) in September 2006, Shell indicated that it is planning to dispose of the excavated material on ice if laboratory analysis of sediments in the area of the test pit determines that sediment quality parameters are "below the acceptable criteria (CCME, 1999)". The criteria identified by Shell are assumed to represent the Canadian interim sediment quality guidelines (ISQGs; CCME 2006). Shell

also indicated that the method of disposal will be subject to approval by Fisheries and Oceans Canada (DFO). Following screening, the EISC concurred that chemistry of test pit sediments should be compared to "CCME criteria" (i.e., CCME guidelines) and that disposal will require DFO approval. In addition, the EISC recommended that alternative disposal of excavated material be considered to avoid deposition of potentially deleterious substances in fish-bearing waters.

The purpose of this letter is to provide our opinion regarding the lack of potential effects of disposal of excavated material on water quality and aquatic life in Kumak Channel, based on Shell's current plan of disposal on ice. Our aim is to address the question: Does the planned sediment disposal method pose any risk from contaminants in the sediment to aquatic biota that reside in Kumak Channel?

Applicability of Canadian Sediment Quality Guidelines

The Canadian sediment quality guidelines were identified by Shell and the EISC as the values guiding the method of disposal of excavated sediments. Although these guidelines are valuable tools for evaluating bottom sediment quality and potential effects of human disturbances on bottom sediments, it is necessary to first clarify what they represent and that they are not applicable to the disposal of river sediments in a remote area.

CCME sediment quality guidelines are based on concurrent measurements of bulk sediment chemistry and biological effects at a large number of sites. These guidelines are correlation-based rather than cause-effect based (Borgmann 2003) and provide no information regarding bioaccumulation or biomagnification potential. For each parameter, the guidelines consist of an ISQG, also referred to as a "threshold effect level", and a probable effects level (PEL). The ISQG can be used to categorize sediments into those that may be toxic and those that are likely non-toxic, but cannot be used to infer potential for toxicity. Hence, exceedance of the ISQG cannot be interpreted as the likelihood of a toxic effect on aquatic organisms. Toxicity testing of sediments spiked by single substances has shown that ISQGs tend to be highly conservative, which partly reflects the use of sediment data from sites with mixtures of contaminants to develop these guidelines (Borgmann 2003).

Due to the approach used to develop CCME guidelines, they are generic and conservative, and do not take into account site-specific natural background conditions. However, it is known that levels of metals and organic compounds above the ISQG can occur naturally in remote areas, without adverse effects on resident aquatic organisms (Chapman et al. 2003). Aquatic organisms are adapted to the physical and chemical characteristics of their habitat, which may include elevated levels of certain chemicals as dictated by surficial geology and other factors in the upstream watershed.

Based on the information summarized above, use of ISQGs to select the method of disposal of sediments from the planned test pit is not appropriate. In fact, ISQGs used in this manner violate a key precept of CCME (2006), specifically that guideline values cannot be below natural background concentrations.

Sediment Chemistry in the Test Pit Area

Shell conducted a bottom sediment chemistry survey in the area of the test pit in September 2006, which included sampling of surface sediments and an attempt to collect sediments from the depth of the planned excavation (2 m). Due to wet (flooded) surface conditions that caused the sediment to liquefy and would have made it very difficult to recover cores from the test pit area with available equipment, deep sediments could only be obtained from about 1.5 m below the sediment surface, from two sites located 10 to 20 m southeast of the test pit. Surface sediment samples were collected at eight sites within the pit area and at the two sites where deep samples were taken.

Results of the survey indicate that sediment chemistry is at background both in surface sediments within the test pit area and in deep sediments next to the test pit area. Background sediment chemistry in Mackenzie River Delta channels and lakes is characterized by natural exceedances of ISQGs by certain metals (e.g., arsenic, cadmium, chromium, zinc) and a number of polycyclic aromatic hydrocarbons (PAHs) derived from oil seeps and other natural sources (Graf Pannatier 1997, Yunker et al. 2002, IORVL 2004). Consistent with background sediment chemistry in the Delta, sediments from the test pit area contained levels of arsenic, cadmium, zinc, naphthalene and phenanthrene above ISQGs, but within the regional ranges estimated by (MPEG 2007) for the Inuvialuit Settlement Region. These results indicate that sediment quality is not unusual in the area of the planned test pit.

Amount of Sediment to be Disposed on Ice

As noted above, the estimated amount of river sediment to be disposed following excavation of the test pit is 512 m_3. Based on available estimates of flow and total suspended sediment (TSS) data for the Kumak Channel at the time of break-up, when the river is at flood stage, this amount can be related to the natural sediment load of Kumak Channel to provide a sense of perspective. Carson et al. (1998) estimate that the sediment load carried by the East, Middle and Reindeer channels into the Beaufort Sea during the month of June averages about one million tonnes per day, with much higher loads carried by the channels during the spring break-up period, which generally lasts for only a few days. Kumak Channel, a distributary of Middle Channel, can be expected to carry about 20% of the total load. The Hydrological Atlas of Canada referenced in Polar Gas (1984) indicates that mean annual sediment concentration in the northern delta channels can range between 200 and 400 mg/L. The total suspended sediment concentrations (TSS) during post-peak spring break-up conditions in 2003 and 2004 have been measured at about 300 mg/L in Kumak Channel. Based on visual observations, TSS concentrations at peak spring break-up conditions are expected to be much higher and likely closer to 1000 mg/L. Near-peak flows in Kumak Channel during spring break-up have been measured in 2003 and 2004 at between 3,000 and 5,300 m_3/s.

Based on the sediment load information discussed above for delta channels, the amount of sediment to be disposed on ice from the test pit is equivalent to approximately between 0.1 and 0.6% of the daily sediment load of Kumak Channel at break-up, or to the amount of suspended sediment carried by the channel during a period of between 2 and 9 minutes. Because the test pit sediment contains up to 20% sand, which would settle relatively rapidly, the sediment load in suspension could be even less.

Potential for Contaminant Release and Increased Bioaccumulation/Biomagnification

Release of sediment-associated contaminants (e.g., metals, PAHs) has been raised as a concern in connection with Mackenzie Gas Project (MGP) activities that would result in resuspension of bottom sediments (e.g., dredging). We anticipate similar concerns with regard to the planned disposal of excavated sediments in Kumak Channel. There are a number of factors that indicate that contaminant releases or increased uptake of contaminants would be negligible during the time of break-up if the excavated sediments were placed on river ice:

- Concentrations of metals and PAHs in bottom sediments at the test pit location are at the regional background.
- Increases in suspended sediment concentration will be of short duration, corresponding to the period of break-up. Observations made during the break-up periods in 2003, 2004 and 2005 on Kumak Channel indicate that once break-up of the middle-of-channel ice cover is initiated and the ice pans start to move downstream, it takes less than 24 hours for all the ice to move out of the channel and water level to drop from flood peak levels to near-bankfull levels.
- Background suspended sediment concentrations and concentrations of metals and PAHs are

naturally elevated during break-up; as demonstrated above, the total additional sediment load due to disposal of excavated material is small, even in comparison to the hourly sediment load of the Kumak Channel during break-up.

- Metals and PAHs tend to be sediment-bound in a non-bioavailable form. Sediment resuspension will result in the formation of substances (iron and manganese oxyhydroxides) that bind dissolved metals released from sediments and settling sediment particles tend to scavenge dissolved metals from the water column (Chapman et al. 1998). PAHs have low water solubility. In particular, a large proportion of organic compounds in sediments tends to be bound to black carbon, in a non-bioavailable form (Koelmans et al. 2006). Metals of potential concern in Mackenzie River sediments and PAHs do not biomagnify (Chapman et al. 2003).
- Case studies of dredging involving much greater volumes of sediments have demonstrated that releases of sediment-associated contaminants are limited and transient, even at sites with contaminated sediments (i.e., sediments containing much higher levels of metals and PAHs than present in Kumak Channel sediments) (Anchor Environmental 2003, Fredette and French 2004, Jones-Lee and Lee 2005).
- No chemicals/wastes will be added to the sediments to be disposed of during the excavation process, and emergency response plans will be in place during excavation to prevent spills and leaks that might add contaminants to excavated sediments.

Conclusions

In our professional opinion, use of the ISQGs to select the method of disposing test pit natural sediments is not appropriate, as supported by CCME (2006). Our position is based on the intended use of these guidelines (as a screening tool, rather than to infer effects) and the fact that the guidelines do not take into account site-specific natural background conditions.

The planned method of disposing excavated river sediments will pose negligible risk to resident aquatic biota in Kumak Channel. The main points supporting our position are as follows:

- Natural river sediments will be disposed, with contaminant levels at the regional background.
- The amount of sediment to be disposed will be extremely low (on the order of 0.1 to 0.6%) compared to the daily sediment load of Kumak Channel.
- Release of naturally occurring sediment-associated contaminants will not occur in amounts that would be harmful to aquatic life.

Recommendations/Comments from EC letter to EISC

Shell Canada Ltd. has re-submitted the Kittigazuit S-bends sediment sampling portion of this program, which entails the collection of 10 to 15 samples, from at least two depth horizons. An additional 10 to 15 samples will be taken in the areas proposed for disposal of the dredged material. General location of sampling sites has yet to be determined. Cores and samples will be analyzed for metals and metalloids, polycyclic aromatic hydrocarbons, acid-volatile sulphides/simultaneously extracted metals, grain size and organic carbon content.

The Kittigazuit area will be accessible from the Inuvik-Tuktoyaktuk public ice road. All wastes generated during the Kittigazuit S-Bends sediment sampling will be transported to Tuktoyaktuk for disposal.

Environment Canada submitted a letter to the EISC, dated November 3, 2006 detailing our concerns and recommendations. Specific to this portion of the proposed program, Environment Canada recommended the following:

1. In a discussion with the Proponent on October 5, 2006, Environment Canada indicated that it is the Proponent's responsibility to ensure that dredge areas and disposal sites are adequately characterized. EC recommends that

the Proponent's sediment sampling program for the Kittigazuit S-Bends dredge areas and disposal sites be expanded to a minimum of 30 samples: 15 at surface, 15 at depth. In order to designate a new disposal area the following information will be required:

a. Coordinates of disposal area
b. Bathymetry
c. Currents
d. Sediment Chemistry
e. Description of the benthic community
f. General Description – i.e. other users, ice action, activity of surrounding area, etc
g. Quantity of material to be disposed at site.

It should be noted that the analytical methodology and quality assurance protocol for polynuclear aromatic hydrocarbons (PAH), and Dioxins/ Furans must conform to that outlined in the "Interim Quality Assurance Guidelines for Determination of Polynuclear Aromatic Hydrocarbons in Marine Sediments for Ocean Disposal" and the "Internal Quality Assurance Requirements for Analysis of Dioxins in Environmental Samples", respectively. Both of these documents are available from Environment Canada. For more information please see http://www.pyr.ec.gc.ca/disposal_at_sea/table1_e.htm

The re-submitted proposal did not incorporate all of these recommendations. As a result Environment Canada and Shell Canada Ltd. discussed the sampling program on Dec.11, 2006. Currently, Shell plans to collect 20 samples at surface and 14 samples at depth along the S-bends. Further discussions with Shell Canada Ltd. regarding the sediment sampling program are scheduled for Dec.19, 2006. Pending further discussions with the Proponent, EC is satisfied that the program will be conducted in such a manner as to meet EC's expectations.

On January 26, 2006, EC submitted a second letter to the EISC in which EC stated the following:

Shell Canada Ltd. (Shell) is proposing a winter program at Niglintgak with activities scheduled to commence February 2007. Environment Canada (EC) has reviewed the applications that Shell Canada Ltd. has submitted to the EISC regarding their proposed activities, and submitted comments to the EISC on October 10, November 3, and December 12, 2006 for their consideration.

The EISC has granted approval to Shell for their proposed program, provided certain conditions are met. One condition states:

> *"The proponent has committed to ensuring that test pit sediment will not exceed CCME criteria and that disposal will be subject to DFO approval."*

EC, Fisheries and Oceans Canada (DFO), and Shell met and held a conference call on December 19, 2006, and January 9, 2007 respectively to discuss the disposal of material on ice in Kumak Channel. Results from chemical analyses conducted have shown that both the material to be disposed of in Kumak Channel and material in unaffected areas have constituents that exceed the CCME guidelines.

In EC's October 26, 2006 submission to the Mackenzie Gas Project Joint Review Panel, EC stated that:

> *"The MGP should show leadership by appropriately utilizing standards set under the Canadian Council of Ministers of the Environment (CCME) Canadian Environmental Quality Guidelines (CEQG) e.g. water, sediment and biota tissue residue (CCME, 1999, 2002) except where background biogeochemical levels naturally exceed the guidelines then site specific objectives would be applied, to minimize project impacts on the receiving environment."*

The CCME guidelines are designed to be conservative and to be a tool for assessing the quality of water and/or sediments. The guidelines indicate that if the values observed are above the guidelines, the next

step in the assessment is to develop site-specific objectives. In this case, Shell used available data to determine the regional background ranges for the Kumak Channel. EC has reviewed these ranges, and believes that they are acceptable for the Niglintgak Winter program for 2006/2007.

EC, DFO and Shell continue to have discussions regarding the monitoring of the material disposed of on Kumak Channel. Shell has committed to implementing an effective monitoring program and to continue working with EC and DFO towards this end.

Concerning the sediment sampling at the Kittigazuit S-Bend, the EISC stated:

> *"that the proponent increase [the] sediment sampling program in accordance with the recommendations contained in the letter from Environment Canada of December 12, 2006 to ensure adequate background information is obtained to address concerns expressed by Joint Secretariat Staff." And*
>
> *"that the proponent address any other recommendations made by Environment Canada both in its letter of December 12, 2006 or that may arise from the subsequent meeting planned between the company and Environment Canada on December 19, 2006."*

Shell and EC met to discuss the sediment sampling program on December 19, 2006 and also had a conference call on January 9, 2007. EC understands that Shell will implement a phased sampling program. The first phase will be conducted in the winter of 2007, and will consist of 16 samples at a depth of 2 metres along the proposed dredge area in the S-Bends, and a total of 21 surface samples in six potential disposal areas. The first phase of the sampling program is designed to collect data from the dredge site and each of the potential disposal sites. It is not the intent of the first phase to fully characterize the sediments at each of the disposal sites, but will be the intent of the second phase of the sampling program should the proponent wish to apply for a Disposal at Sea permit from EC. Shell will conduct the second phase of sampling at a closer date to when they propose to conduct the dredging works. As EC has detailed specific requirements related to the disposal at sea permitting, the Proponent is strongly advised to contact EC and get approval on its sediment sampling plan before conducting any sampling or analysis work.

Inuvik Hunters & Trappers Committee:
- No comment

Tuktoyaktuk Hunters & Trappers Committee:
- No Comments

Tuktoyaktuk Community Corp.

- Do not have no objection or concerns with this application
- That Inuvialuit content be used when and where ever possible
- That use of local contractors be used when and wherever possible
- That a copy of the final report be forwarded to the TCC upon completion of this project
- That any updates to this application be sent to the TCC for viewing

Fisheries Joint Management Committee:
- No comment

Inuvik Community Corporation:
- No comment

Information Request to Proponent

How deep are the boreholes for the sediment sampling at the test pits?

Is there a reason why the Beluga Whale has been discussed, but other wildlife, terrestrial and marine, have not? Further, there is no fish information incorporated into the screening.

is Shell and Chevron coordinating garbage/ sewage trucking

Proponents response to IR

Sediment sampling at the test pit is to approximately 2m depth. Sediment sampling is also planned at various locations around the GCF set-down site and these boreholes will be to a depth of 10-15m.

In the screening project description (Section 11.5.3) emphasis was placed on the Beluga whale due to the winter field program activity proposed in the Marine Protected Area which centres itself on the protection of habitat for Beluga and Beluga harvesting. Section 11.5 of the screening document also includes a section on terrestrial birds and mammals. Section 11.3.3 focuses on fish and fish habitat. Further information on fish and fish habitat has been obtained through the Shell fish and fish habitat survey program carried out this past summer.

Shell and Chevron are in discussions about coordinating a number of activities this winter, including garbage and sewage trucking.

8.a) Description of Effects (Tables A, B and C), Mitigation, Residual Effects and Significance.

Environmental and Cumulative Environmental Effects

Table 12-1 outlines mitigation measures that are applicable to all aspects of the field program.

Concern and/or Anticipated Impact	Mitigation
Avoidance of Traditional and Cultural Activities and Sensitive Areas	Traditional harvesting areas or activities and cultural sites will be avoided through scheduling and/or modification of the field program on consultation with the Inuvik, Aklavik and Tuktoyaktuk Hunters and Trappers Committees and with advice of the wildlife monitor. A wildlife monitor will be involved in all surveys to help ensure that sensitive areas and interference with harvesting and other activities are avoided.
Impacts to Terrestrial Wildlife	While there is a small potential for wildlife harm, *i.e.*, human protection from problem wildlife, training of all staff as well as operational procedures will be used to minimize this potential. An Inuvialuit wildlife monitor will be present at all field sites to insure impacts to aquatic and terrestrial wildlife are minimal. No denning habitats were identified in Niglintgak or Camp Farewell area (Shell, 2006)

Sensory Disturbance to Wildlife	Flight guidelines in the ISR will be followed, wherever feasible, to minimize impacts to wildlife (Joint Secretariat 2002).
	Helicopters will remain above a 1,500 foot ceiling while in transit.
	Individual flights will be scheduled to avoid overlap with other aerial over flights, industrial activities and human use.
	Attraction or avoidance by wildlife to survey sites is expected to be minimal. All attractants to wildlife, *i.e.*, garbage, will be removed from survey locations. All camp kitchen waste will be stored in animal proof containers.
	Environment and Natural Resources' *Bear Encounter Response Guidelines for Oil and Gas Activities* will be followed.
Impacts to Terrestrial Habitat	Geotechnical activities will be carried out only when the ground is frozen which will minimize surface disturbance. All boreholes will be backfilled to the original ground surface.
	A minimum of 0.15 m of snow and/or ice cover is required to protect the ground surface.
	Field crews will be required to pack out all materials used during the field program, *e.g.*, lunch wrappers, paper, sample containers. Removal of riparian vegetation will be minimized. Existing access routes will be used.
Impacts to Aquatic Wildlife and Habitat	The use of casing and/or hollow-stem augers will be employed at the inwater drill sites to reduce the potential for sedimentation into the river. The number and duration of in-water drill/sampling sites will be minimized during the program to reduce impacts to overwintering fish. Ice thickness and strength will be checked at watercourse crossing to ensure it is sufficient to withstand the weight of machinery. The work at Camp Farewell will be conducted during the winter, and located above the mean water mark and in an area of bottom fast ice (shallow water) where no fish are present. Test pit material disposal will be over deeper water in Kumak Channel and will not be deposited within shallow waters of the floodplain, therefore will not affect fish spawning habitat. Test pit location is within the final construction pad footprint for the gas conditioning facility set down and will not increase the overall planned disturbance footprint.
Soil/Surface Contamination	To the extent possible, all refuelling activities will be restricted to established refueling locations. Spill trays will be used when re-fuelling takes place on site during work in the Kittigazuit S-Bend area. Safe handling and disposal of waste from the geotechnical drill rigs will be used to avoid soil contamination. 0

Fuel Spill	An emergency spill containment contingency plan will be in place for Camp Farewell, Niglintgak and Kittigazuit to respond to any fuel leaks/losses to the surface. A spill response kit will be taken into the field at Kittigazuit and Niglintgak. A spill response kit is also available at Camp Farewell.
Cultural or Heritage Resources	Should heritage resources be found during other project activities, work will cease in the immediate vicinity and regulators and the Prince of Wales Northern Heritage Centre will be notified.

Cumulative Effects and Mitigation

This cumulative effects assessment summarizes how expected effects of the proposed surveys, which may be insignificant on their own, may combine with the activities of other projects in the region, thereby compounding environmental effects and increasing their significance level.

The overall effects of baseline biological and historical data collection are limited. The primary project-specific effects that could potentially occur as a result of the proposed 2006/2007 fieldwork include:

- Sensory disturbance from aircraft.
- Sensory disturbance from winter road traffic.
- Sensory disturbance from human activity on the ground.
- Intrusion on important cultural, spiritual or traditional use sites.

While there is small potential for wildlife harm, *i.e.*, human protection from problem wildlife, training of all staff in operational procedures will be used to minimize this potential. This issue as well as other safety concerns, policies and incident management are addressed in the Emergency Response Plans.
Shell is aware of a number other developments in the ISR, including exploratory wells and seismic activity as well as other baseline data collection activities such as geotechnical and biological information gathering.

Interactions with other projects and activities could result in incremental effects of the following types of impacts:

- increased sensory disturbance of wildlife within area the field work is to be conducted due to aircraft overflights and landings, human activities on the ground at survey sites and other activities. This could result in energetic stress to wildlife, displacement or, in a worst case, seasonal abandonment of habitat

- interference with traditional activities as a result of aircraft over flights and human activities on the ground

- intrusion on important cultural or spiritual sites as a result of aircraft over flights and human activities.

To minimize the potential for these cumulative effects to occur, the following measures will be employed:

- Use of Appropriate Mitigation Measures and Procedures as identified in Section 12 of Project Description.
- Scheduling of Activities: Wherever possible overlap with other known activities will be avoided. This includes internal project scheduling, consideration of external industry over flights and non-industry activities.
- Avoidance of Traditional Harvesting Areas as identified in Section 9 of Project Description.

8.b) Effects of the Environment on the Project

The Health and Safety Field Manual that includes the Emergency Response Plan (ERP) has been developed for the Winter Field Program includes a protocol for a functional communication system and emergency phone numbers. All project staff conducting field work will be provided a copy of the ERP and will be briefed on their specific responsibilities before beginning any field work. All key field staff will also be expected to have the ERP in their possession while in the field conducting their field work.

9.a) Summary of Proponents Mitigation Measures

The following are areas of concern in regards to the project and the environment and summarized in the following paragraphs.

Soils and Permafrost
Vegetation
Wildlife
Aquatic Resources
Archaeological, Historical or Palaeontological sites
Interference with Other Land Uses

Disturbance to Soil and Permafrost – This will be minimal due to the fact that most equipment and fuel will be transported via winter road to the site. Any Impacts to Soils, Terrain or Permafrost are expected to be minimal due to protected snow covering.

Disturbance to Vegetation - Impacts to vegetation species and communities will be mitigated by having the operation occur in the winter, by limiting the impact area to as small as possible, and by utilizing existing impacted areas to reduce the footprint of the proposed project.

Disturbance to Grizzly Bears and dens - ENR conducted a grizzly bear den survey at Niglintgak in Fall 2006 and concluded that there is only one inactive den in the project area. All measures ill be taken to avoid that area during the winter program by establishing a no-go zone around it to ensure no disturbance.

Wildlife
The potential impacts to wildlife by this project are related to noise and or movement disturbance.
With the use of the proposed mitigation measures, residual effects, including residual cumulative effects, on wildlife are concluded to be low in magnitude, local in extent (sub-regional in the event of impact to wildlife migration) and immediate to short-term in duration.

An Inuvialuit Wildlife monitor will be on site at all time to monitor for wildlife.

Aquatic Resources
Proper waste & fuel storage, transfer and disposal methods will mitigate impacts to aquatic resources. These include the use of an impermeable containment site, drip-trays, and hand pumps with a spill kit on site. A spill contingency plan is also in place for the project. Any artesian occurrences are to be reported and contained.
Observations will be made on how the ice in Kumak Channel melts, how the excavated material is carried and where it is deposited. A more comprehensive monitoring program is being developed in conjunction with DFO, EC and Shell Canada Ltd to monitor the effects of disposal and the disposal methods.

With the use of the proposed mitigation measures, residual effects, including residual cumulative effects, impacts on aquatic resources are concluded to be low in magnitude, local and immediate- to short-term in duration (short-term in the event of introduction of pollutant to a frozen water body).

Heritage Resources
Since there are no known archaeological sites there should be no conflicts.
By following the appropriate land use conditions and their mitigation results, cumulative effects to these sites will be low in magnitude, very localized and of immediate to short term in duration.

Other Land Users
Residual cumulative effects from other users will be low in magnitude, local in extent and immediate to short term in duration.

9.b) Reviewers Comments

GNWT/ENR:

The Department of Environment and Natural Resources (ENR) has reviewed the above referenced project and has the following comments and recommendations.

Fuel Storage, Transfer and Refueling
The Proponent has stated that the use, transfer, and storage of fuel are required in various locations and in support of various components of the Project. In addition to the Mitigation Measures proposed by the Proponent the following additional recommendations are made:

Recommendations

Fuel Caches:
• Fuel caches should be designed and located to allow and for safe storage and facilitate local containment and efficiency of clean-up in the event of a leak or spill. This should include but not be limited to:
  - o the placement of caches and at a distance greater than 100 metres from any local high water mark
  - o the placement of caches not be located in a drainage channel
  - o at a location that avoids steep grades from waterbodies
• The use of secondary containment with an impervious liner, such as self-supporting insta-berms, for storage of all barreled fuel rather than relying on natural depressions to contain spills.

Fuel Transfer/Refueling:

• In addition to the restriction of refueling activities, to the extent reasonably possible, to established refueling locations, that drip trays be used during all refueling activities and placed under parked or not in use field vehicles.
• That a Spill Contingency Plan that details procedures to be used in the event of spills or leaks of fuel or any other hazardous materials that may occur as result of the project be readily available to operators/contractors in the field, that operators/contractors should be pre-versed in those contingency procedures, and to ensure that appropriate equipment in support of those contingencies, including spill kits, are readily available to operators/contractors in the field.
• That Spill Contingency Plan includes provisions for the diligent, safe, and appropriate storage and disposal of materials used in and as a result of the clean up of spills.

Waste Management - Solid and Liquid Camp Waste Disposal in Communities

Section 5.8 of the Project Description states:

"Solid wastes from both Niglintgak and Camp Farewell will be either incinerated or stored for transportation to Inuvik and disposal in the Inuvik Landfill. If applicable, camp kitchen waste that cannot be incinerated will be stored at Camp Farewell in animal-proof containers for shipment to Inuvik. Sewage and greywater will be collected and transported to Inuvik for treatment at the sewage treatment center.

"All waste generated during the Kittigazuit sediment sampling activities will be collected and transported to Tuktoyaktuk for disposal.

"It is anticipated that 7,000 kg of camp waste, 170 m3 of greywater, 40 m3 of sewage and approximately 10 m3 of drill mud associated with the geotechnical air/mud rotary rig will be generated during the program".

And, Section 2.9 of the Water Licence Application Questionnaire states "All hazardous wastes will be collected and transported to Inuvik for disposal at an approved site".

Comment

Traditionally, the disposal of wastewater from projects in the ISR region by both Shell and other Oil & Gas proponents at the Inuvik lagoon has been planned as a contingency only. However, recent Industrial planning in the region has turned to relying on Inuvik waste management infrastructure as a primary waste disposal strategy.

For example, the Chevron Canada Limited Taktuk, Langley and Farewell Drilling Program for the Winter of 2006-2008, recently stated that "in the event that a suitable treatment system is not available or not able to meet expected licenced performance (discharge) criteria, effluent will be hauled by vacuum tank truck to the municipal treatment facility in Inuvik for disposal. This contingency assumes that authorization is granted by the Town of Inuvik, and sufficient treatment capacity is available" (Sec 5.4.4.7 Wastewater Treatment, Submission to the Inuvialuit Environmental Impact Screening Committee, Water Register N7-1-1815).

In this present project, it is concerning that the Proponent is proposing the disposal of untreated wastewater in the Inuvik lagoon as its primary waste management strategy, rather than as contingency. Also, it is noted that this Proponent has planned for the use of the Tuktoyaktuk waste facilities. However, discussions with community Administrative personnel by ENR have shown that they have not been consulted with respect to these plans. It appears that the Proponent has assumed the use of these facilities. Also, for clarification, Inuvik is not and does not have an approved hazardous waste disposal facility.

It is not the position of the GNWT that the use of community waste management infrastructure for the controlled disposal of certain solid and liquid camp waste produced by Proponents of Industry is inappropriate, but that it must be done in a responsible, planned, and sustainable manner. Furthermore, there is potential that a cumulative waste stream may result from a combination of present and future Industrial projects that rely on community waste management infrastructure. This could result in a significant strain on present and/or future community infrastructure - infrastructure that is designed and maintained for the purpose of managing waste produced in the community, not waste from sources outside the community jurisdiction.

In summary, there are three main concerns resulting from the proposed use of municipal waste management infrastructure by proponents for disposal of Industrial camp-based liquid and solid wastes:

1. Community support for the use of water/sewer/landfill facilities needs to be forthcoming in advance of the project proceeding. This must include the communication of expected waste types and volumes to be transferred and/or disposed of in the community.
2. The community needs to have in place a bylaw allowing it to provide waste management services to facilities that are outside of their geographical jurisdiction i.e. the municipal boundary.
3. The community needs to be aware of the long-term impacts of this use on its infrastructure and capital budgets.

Subsequently, in order to minimize potential adverse impacts, facilitate the communication of pertinent and required information, and allow for responsible and sustainable planning for present and future waste management requirements and infrastructure for both industry, and for NWT communities, the following recommendations are made.

Recommendations

In regards to the transport and disposal of Industrial based camp wastes to NWT communities:

a) It is requested that the proponent practice due diligence and include in its waste management plan the consideration and implementation of pollution prevention strategies such as purchasing policies and on-site diversion and segregation programs to reduce and control the volumes of wastes produced, transported, and disposed of.

b) The Proponent is requested to supply in combination with the project description and application in advance to the project proceeding:

- Confirmation that the community has authorization to accept the proposed and listed wastes types *and* quantities at community waste handling facilities,
- Confirmation that the Proponent has received permission from the community to transfer proposed waste types and quantities to community waste handling facilities, and
- Alternate disposal options in the case that the referenced community's waste handling facility cannot accommodate the proposed and estimated waste types and quantities.

c) All hazardous wastes should be safely stored and transported in sealed containers (odour free to prevent animal attraction) and safely transported to a facility that is a registered recycling or disposal facility for industrial hazardous wastes.

d) In the future, is requested that proponents develop a Project Waste Management Report that is provided and accessible to the NWT Water Board, Environment and Natural Resources (ENR) and Municipal and Community Affairs (MACA), and the communities in question. This Report will facilitate an inventory of waste streams produced through Industrial operations that can be used for the evaluation and planning of potential requirements for present and future industrial waste management infrastructure in the NWT. This Report should specifically detail:

- o The identification of waste types and quantities produced with an associated description of waste segregation (including liquid, solid, non-hazardous, hazardous, combustible, and non-combustible),
- o The associated on-site treatment and disposal methods,
- o The associated waste transported off-site with locations and methods of disposal.

Proponents Resonse to IR

With respect to ENR's fuel cache recommendations, fuel transfer/refueling recommendations and waste management recommendations, Shell will factor all these recommendations into its detailed planning for the winter program.

I have the following additional comments:
1. For our project activities in the Kittigazuit S-Bends, the small amount of waste that is generated will be transported back to the subcontractor's facilities in Tuktoyaktuk and the waste will become part of the subcontractor's waste stream. The subcontractor has confirmed that they will be able to handle this waste.
2. For our project activities at Niglintgak and Camp Farewell, Shell has provided details of the project waste management plan to Mr.Rick Campbell of the Inuvik Public Services Dept.

GNWT/Health: No Comment

GNWT/Prince of Wales Northern Heritage Centre (PWNHC): No comment

Fisheries and Oceans (DFO):

Letter to EISC October 17th, 2006

DFO's review has concluded that impacts to fish and fish habitat associated with test pit construction and disposal of sediment on ice over Kumak Channel would likely be minimal.
Our conclusion is based on the fact that 1) works will be carried out in the winter and avoid many in-water disturbances, and 2) the natural disturbance from spring freshet (water and ice scour) likely masks the small project contributions. However, our conclusion is contingent upon the lab analysis of the test pit sediment not exceeding CCME criteria.

DFO finds that the proposed works are likely to have low negative effects and that the local sensitivity of fish and fish habitat during the time of disposal is low. As a result, DFO considers this proposal to be a low risk to

fish and fish habitat.
We have provided a list of comments/questions for the EISC's consideration in their review of the proposal:

Test Pit – Location

To minimize disruption to the shoreline of Kumak Channel, the location of the test pit should be located within the footprint of the proposed gas conditioning facility (GCF) set down.
Should the test pit remain in its proposed location, the proponent has indicated that upon completion of the monitoring the test pit will remain in place and allowed to fill in naturally as a result of flooding. Plans for the removal of the trial foundation and associated monitoring equipment located within the test pit should be included in the project description.

Disposal – Location

Alternative disposal locations should be considered in the project description.
Should the lab analysis of the test pit sediment exceed acceptable criteria of the CCME (1999), an alternative disposal method should be considered.

Sediment Sampling (all locations)

A detailed list of all analytical sampling parameters/tests should be provided.
Camp Farewell -Removal of existing mooring piles
The method(s) for the removal of the existing mooring piles that are located below the high water mark should be provided. Rationale as to why the piles are not entirely removed should be provided.

IR 1 from DFO

how deep are the boreholes at the GCF and the size of the test pit areas at the sediment sampling sites?

Camp Farewell -Removal of existing mooring piles The method(s) for the removal of the existing mooring piles that are located below the high water mark should be provided. Rationale as to why the piles are not entirely removed should be provided.

Proponents response to IR's

1. As per my previous e-mail, borehole depths at the GCF site are approximately 10-15m. We only have one test pit planned for the field program and this is described in section 5.2.1.4 of the screening project description. As per Figure 5-1 of the screening project description, the test pit is approximately 16m long by 10m wide by 2m deep.

2. We plan to cut the upper part of the old mooring piles 1' (0.3m) below grade. This will be done by clearing a small amount of surface material away from each pile to allow access to the pile at 1' below grade. A standard cutting torch will be used to remove the upper part of the old piles. We do not intend to remove the entire length of the old piles for 2 reasons:
- More disturbance would be caused by the requirement to clear a larger volume of material from around the piles to gain access to remove them entirely. By removing only the upper part of the pile we cause less disturbance because we need less access space.
- We expect that any long-term frost jacking of the remainder of the piles will not exceed 1' (0.3m) and so will not cause the pile to protrude above grade. Therefore, we expect no obstruction to vessels. This rationale was discussed with Transport Canada at a meeting on 31 August.

Environment Canada (EC):

Concerns and Recommendations:

2. Environment Canada recommends that a condition in the water licence be the development and implementation of a monitoring program by the Proponent, in conjunction with EC and DFO, to monitor any changes in water quality in Kumak Channel during spring break up and subsequent dispersal of test pit material. This monitoring program should be designed to evaluate the prediction that the release of the excavated material to the Kumak Channel will not have a detrimental impact to the receiving environment.

3. In a discussion with the Proponent on October 5, 2006, Environment Canada indicated that it is the Proponent's responsibility to ensure that dredge areas and disposal sites are adequately characterized. EC recommends that the Proponent's sediment sampling program for the Kittigazuit S-Bends dredge areas and disposal sites be expanded to a minimum of 30 samples: 15 at surface, 15 at depth for the dredge area and for each of the proposed disposal sites. In order to designate a new disposal area the following information will be required:
    a. Coordinates of disposal area
    b. Bathymetry
    c. Currents
    d. Sediment Chemistry
    e. Description of the benthic community
    f. Description – i.e. other users, ice action, activity of surrounding area, etc
    g. Quantity of material to disposed of at site.

    It should be noted that the analytical methodology and quality assurance protocol for polynuclear aromatic hydrocarbons (PAH), and Dioxins/ Furans must conform to that outlined in the "Interim Quality Assurance Guidelines for Determination of Polynuclear Aromatic Hydrocarbons in Marine Sediments for Ocean Disposal" and the "Internal Quality Assurance Requirements for Analysis of Dioxins in Environmental Samples", respectively. Both of these documents are available from Environment Canada. For more information please see http://www.pyr.ec.gc.ca/disposal_at_sea/table1_e.htm

4. The Proponent has indicated that solid wastes from Niglintgak and Camp Farewell that are not incinerated are to be transported and disposed of in Inuvik's landfill. Further, all grey water and sewage are to be disposed of in Inuvik's sewage lagoon. Wastes generated during the Kittigazuit S-Bends sampling program are to be disposed of in Tuktoyaktuk. Environment Canada recommends that the Proponent look into alternate disposal options. Many small northern communities such as Inuvik and Tuktoyaktuk do not have the capacity to handle industrial waste streams. As projects such as the Mackenzie Gas Project progress, northern communities may not be able to treat the volumes of industrial waste anticipated. Proponents are encouraged to commence utilizing alternate disposal options.

5. Meeting the requirements of the *Fisheries Act* is mandatory, irrespective of any other regulatory or permitting system. Section 36(3) of the *Fisheries Act* specifies that unless authorized by federal regulation, no person shall deposit or permit the deposit of deleterious substances of any type in water frequented by fish, or in any place under any conditions where the deleterious substance, or any other deleterious substance that results from the deposit of the deleterious substance, may enter any such water. The legal definition of deleterious substance provided in subsection 34(1) of the *Fisheries Act*, in conjunction with court rulings, provides a very broad interpretation of deleterious and includes any substance with a potentially harmful chemical, physical or biological effect on fish or fish habitat.

6. A spill kit including shovels, barrels, sorbents, pumps, etc. shall be consistently maintained and readily available at all storage and refilling stations.

7. Fuel containers, including barrels, should be marked with the responsible party's name, product type, and year purchased or filled.

8. It is recommended that drip pans are utilized when refueling to capture any spilt fuel or lubricants.

9. Environment Canada recommends the use of secondary containment with an impervious liner, such as self-supporting insta-berms, for storage of all barreled fuel rather than relying on natural depressions to contain spills.

10. A copy of the spill contingency plan should be posted at each fuel cache and refuelling station.

11. The proponent shall ensure that all hazardous wastes, including waste oil, receive proper treatment and disposal at an approved facility.

12. The exact locations of all fuel caches should be reported to regulatory authorities, including Environment Canada, as soon as they are determined.

13. The Proponent is encouraged to make use of recycling facilities for all recyclable materials.

14. Drilling additives or muds shall not be used in connection with holes drilled through ice unless they are re-circulated, contained such that they do not enter the water, or are demonstrated to be non-toxic.

15. The Migratory Bird Sanctuary Permit issued by Canadian Wildlife Service (EC) for project activities within the Kendall Island Bird Sanctuary may have more specific permit conditions than the mitigation measures provided here.

16. Environment Canada recommends that camp waste be made inaccessible to wildlife at all times. Camp waste can attract predators of migratory birds (e.g., foxes and ravens) to an area if not disposed of properly.

17. Section 35 of the Migratory Birds Regulations states that no person shall deposit or permit to be deposited, oil, oil wastes, or any other substance harmful to migratory birds in any water or any area frequented by migratory birds.

18. The following comments are pursuant to the Species at Risk Act (SARA), which came into full effect on June 1, 2004. Section 79 (2) of SARA, states that during an assessment of effects of a project, the adverse effects of the project on listed wildlife species and its critical habitat must be identified, that measures are taken to avoid or lessen those effects, and that the effects need to be monitored. This section applies to all species listed on Schedule 1 of SARA. However, as a matter of best practice, EC asks that species listed on other Schedules of SARA and under consideration for listing also be included in this type of assessment. This recommendation for best practice includes all species designated as at risk by COSEWIC (Committee on the Status of Endangered Wildlife in Canada).

    In the Project Description, the Proponent has identified several bird species, several fish species, wolverine, and grizzly bear as being considered at risk by COSEWIC and as occurring in the project area (although EC notes that the bird species would not occur in the project area in winter). The Proponent incorrectly describes the information on polar bears as insufficient to make an accurate determination (Project Description, Section 11.5.1, page 52). Note that the polar bear was assessed as a species of Special Concern by COSEWIC in 2002. In light of new information on polar bear populations, the status of the species is currently being reassessed. Upon completion of this assessment and after consultations with the relevant communities and wildlife management boards, polar bear may be added to Schedule 1 of SARA.

    Impacts on Species at Risk from the Project could include disturbance and attraction to operations.

    EC recommends:

- The primary mitigation measure for Species at Risk should be avoidance. The proponent should avoid contact with or disturbance to each species.
- The proponent has identified some mitigation measures to reduce adverse effects of the project on wildlife species (Project Description, Table 12-1, page 57-58) and states that it is working with the Environment and Natural Resources division of the Government of the Northwest Territories (GNWT) to collect information on grizzly bear sites. The proponent should continue to consult with GNWT and appropriate status reports, recovery strategies, action plans, and management plans to identify other appropriate mitigation measures to minimize effects to grizzly bears, polar bears, and wolverines from the project.
- The proponent has not identified whether any monitoring will occur for Species at Risk. The proponent should record the locations and frequency of any observations of Species at Risk and note any actions taken to avoid contact or disturbance to the species.

19. Please note that any spill of fuel or hazardous materials, adjacent to or into a water body, **regardless of quantity,** shall be reported immediately to the NWT 24-hour Spill Line, (867) 920-8130.

20. Environment Canada should be notified of changes in the proposed or permitted activities associated with this land use permit application.

Letter to INAC from EC

This letter is to advise you that discussions between DFO, EC and Shell Canada Ltd. have lead to the following modifications to components of the Niglintgak Natural Gas Field Development Winter Program 2006- 2007:

1. Material excavated from the test pit will be disposed of in two locations, one on the ice of Kumak Channel, the second on the ice in the erosion zone at the SE corner of Niglintgak Island.

    a. 2/3 of the excavated material will be disposed of on the ice in Kumak Channel as proposed by Shell Canada Ltd... The material will be divided into two equal portions each of which will be placed on the ice in a different format. One format will be designed to favour local disposal and the other to favour delayed release and further movement with the ice pans.
    b. The remaining 1/3 of the material will be placed on the ice at a second disposal location on the SE corner of Niglintgak Island. The disposal site is in a highly erosive zone, and it is predicted that the material placed here will erode into Kumak Channel through natural processes during the spring freshet. Shell Canada Ltd. will be providing EC and DFO with more information regarding the specifics of the disposal methodologies and quantities by January 20, 2007.

2. Shell Canada Ltd. has committed to work with DFO and EC to develop and implement a monitoring program designed to determine the effects of the disposal activity and each of the disposal methods.

Information Request to Proponent:

Environment Canada would like to know the List the paramaters to be analyzed.

Has RWED been consulted? Are there grizzly bear dens in the area?

Comment [LJS1]: Donald, could the same font be used throughout the screening?

Proponents response to IRs

Sediment sampling of GFC set down site and approach:

1) Samples will be used for visual classification and establishing excess ice content, frozen/unfrozen moisture content, index testing, grain size analysis, salinity, and bulk density, etc. CRREL barrel samples may be used for thaw settlement, creep testing, etc.
2) Perform a sufficient number of tests to permit the development of geotechnical properties for use in designing the proposed foundations. Perform tests in accordance with ASTM/CRREL guidelines (or equivalents).
3) Tests to determine the following:
- Unfrozen Cohesive Soils - moisture content, density, salinity, Atterberg limits, consolidation and shear strength tests.
- Unfrozen Cohesionless Soils - Specific gravity, grain size, friction angle, etc.
- Frozen soils - Ice content, frozen and unfrozen moisture content, soil resistivity and pH value, salinity, creep strength (if necessary, otherwise use published information), etc.

4) Strength and creep tests.
5) Tests and procedures to establish strength and deformation characteristics best meeting detailed engineering analyses and foundation design requirements.
6) The Geotechnical Consultant Contractor shall store samples for a minimum period of twelve (12) months following demobilization.

ENR performed a grizzly bear den survey at Niglintgak in Fall 2006 and concluded that there is only one inactive den in the project area. All measures will be taken to avoid that area during the winter program by establishing a no-go zone around it to ensure no disturbance.

Parks Canada (PC): No comment

10. Significance

After taking into account the above mitigation measures, are any of the adverse environmental effects significant?

__Yes X No if yes, identify which one(s) and proceed to 11; if no, proceed to #12

11. Likelihood of Occurrence

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

n/a Yes n/a No If yes, which one(s)?

12. Consultation on Screening Report

Public consultation on screening report deemed necessary? __Yes _X_ No
Deadline for comments on screening report N/A
Public Comments Received on Screening Report? __Yes _X_ No

13. Monitoring Program by Proponent

There will be minimal disturbance associated with this project. All waste materials, paper or other refuse will be collected and removed for disposal in Inuvik. As a result, the program should not require any form of clean up, reclamation, disposal and/or decommissioning.
All equipment and waste materials will be removed from the Niglintgak development area upon completion of the 2007/2008 Winter Field Program.
Camp Farewell is a permitted long-term use. All waste material will be removed from site and faculties closed.
The sites investigated will be inspected prior to departure.

Shell Canada Ltd. has committed to work with DFO and EC to develop and implement a monitoring program designed to determine the effects of the disposal activity and each of the disposal methods.

14) CEAA Determination and Authorization - DIAND North Mackenzie District

Determination:

_X_ Section 20 (1)(a) - Project may proceed as it is not likely to cause significant adverse environmental effects.
___ Section 20 (1)(b) - Project may not proceed as it is likely to cause significant adverse environmental effects that cannot be justified.
___ Section 20 (1)(c)(i) - Project must be referred to the Minister of Environment as it is uncertain whether the project is likely to cause significant adverse environmental effects.
___ Section 20 (1)(c)(ii) - Project must be referred to the Minister of Environment as it is likely to cause significant adverse environmental effects.
___ Section 20 (1)(c)(iii) - Project must be referred to the Minister of Environment as public concerns warrant the reference.

Authorization:

Approved By: Conrad Baetz, District Manager, INAC — Date _____

Approved By: Cheryl Baranieckl, Manager, EPOD, EC — Date 12 Feb 07.

Approved By: Gordon Wray, Chair, NWT Water Board — Date _____

14) CEAA Determination and Authorization - DIAND North Mackenzie District

Determination:

X Section 20 (1)(a) - Project may proceed as it is not likely to cause significant adverse environmental effects.

___ Section 20 (1)(b) - Project may not proceed as it is likely to cause significant adverse environmental effects that cannot be justified.

___ Section 20 (1)(c)(i) - Project must be referred to the Minister of Environment as it is uncertain whether the project is likely to cause significant adverse environmental effects.

Section 20 (1)(c)(ii) - Project must be referred to the Minister of Environment as it is likely to cause significant adverse environmental effects.

Section 20 (1)(c)(iii) - Project must be referred to the Minister of Environment as public concerns warrant the reference.

Authorization:

Approved By: Conrad Baetz, District Manager, INAC — Date: 26 9/07

Approved By: Cherly Baraniecki, Manager, EPOD, EC — Date

Approved By: Gordon Wray, Chair, NWT Water Board — Date: Feb. 15/07

Appendices

APPENDIX A: Subject Descriptors

Choose from this list and insert as a "Subject Descriptor"

Agriculture
Buildings
communications
Defense
energy
forestry
industry
inland waters
mining
oceans
✔ oil and gas
parks
transportation

APPENDIX B: Geographic Place Name
Refer to project description

APPENDIX C: Screening Checklist and Cumulative Effects Checklist

APPENDIX D: CEAA EA Coordination

APPENDIX E: DIAND Recommended Land Use Permit Conditions

APPENDIX F: NWT Water Board - Water Licence Conditions

APPENDIX G: Community Conversation Areas Affected by Program

APPENDIX H: Proponents Project Location Map

APPENDIX C

Table A. Identification of Project Components and Environmental Effects

Identify all components of the project under screening and their potential adverse environmental effects

Project Components

(✓ check all the items appropriate to this project)

✔ access
- __ construction
- __ abandonment/removal
- __ modification e.g, widening, straightening

__ automobile, aircraft or vessel movement
__ blasting (sumps)
__ building
__ burning
__ burying (sumps)
__ channeling
__ cut and fill
__ cutting of trees or removal of vegetation
__ dams and impoundments
- __ construction
- __ abandonment/removal
- __ modification

__ ditch construction
__ drainage alteration
__ drilling other than geoscientific
__ ecological surveys
✔ excavation
__ explosive storage
✔ fuel storage
✔ garbage
- __ disposal of hazardous waste
- ✔ disposal of sewage
- ✔ waste generation

__ geoscientific sampling
- __ trenching
- __ diamond drill
- ✔ borehole core sampling
- __ bulk soil sampling

__ gravel
__ hydrological testing
__ site restoration
- __ fertilization
- __ grubbing
- __ planting/seeding
- __ reforestation
- __ scarify
- __ spraying
- __ recontouring

__ slash and burn
__ soil testing
__ topsoil, overburden or soil
- __ fill
- __ disposal
- __ removal
- __ storage (replacement over sumps)

__ stream crossing/bridging (ice roads)
__ tunneling/underground
__ other, explain

✔ accidents or malfunctions Describe: See section 5 of screening.

✔ effects of environment on project. Describe: See section 8.b) of screening.

Project Effects
(✓ check all the items appropriate to this project)

Biophysical Environment

1. ✓ deposit into surface water
2. __ deposit into ground water
3 __ change in surface water flow
4. __ change in ground water flow
5. __ change in water temperature
6. __ change in drainage pattern

7. ✓ change in air quality
8. __ change in air flow
9. __ micro-climate change
10. __ ice fog

11. ✓ change in ambient noise levels
12. __ change in slope stability
13. __ change in soil structure
14. ✓ alteration of permafrost regime
15. ✓ destabilization/erosion
16. __ soil compaction

17. __ loss of access to non-renewable resource
18. __ depletion of non-renewable resource

19. __ removal of rare/endangered plant species
20. __ introduction of species
21. __ toxin/heavy metal accumulation

22. __ removal of rare/endangered wildlife species
23. __ change in wildlife health
24. ✓ impact to large mammals
25. ✓ impact to small mammals
26. ✓ impact to fish
27. ✓ impact to birds
28. __ impact to other wildlife
29. __ impact in a calving, nesting or spawning area
30. __ removal of wildlife buffer zone
31. __ change in wildlife habitat/ecosystem
32. __ other:

Directly-related Socio-economic and Cultural Environment

33. __ impact to trappers
34. __ impact to hunting
35. __ impact to outfitters
36. __ recreational or back country use
37. __ impact to fishing
38. __ impact to First Nation traditional use
39. __ impact to community
40. __ impact to industry
41. __ impact to community health
42. __ change in work force economics
43. __ change in housing or infrastructure
44. __ change in regional transportation
45. __ other, explain

_____

46. __ impact to traditional use area
47. __ impact to historical site or cultural landmark
48. __ impact to local aesthetics
49. __ impact to archaeological or historical site
50. ✓ other, explain __ Chevron Canada may be doing a drilling program in an adjacent area_____

Table B. Identification of Other Resource Uses and Their Environmental Effects

Identify relevant past, current and future (pending applications) physical works and activities and their potential adverse environmental effects.

Other Resource Uses

(✓ check all the items appropriate to this project)

__ agriculture

__ forestry
- __ commercial
- __ domestic

_✓_ fishing

_✓_ hunting/subsistence

___ other:

__ urbanization
- __ commercial / residential (cottages)
- __ built structures
- __ infrastructure

__ mining
- __ exploration
- __ open pits
- __ underground

__ quarries

__ transportation/communications
- __ roads / trails
- __ channels / canal
- __ telephone lines, satellite dishes, cables
- __ beacons

__ solid waste disposal

__ energy project
- __ hydro
- __ pipeline
- __ transmission line
- ✓ oil and gas exploration

__ other water licenses, permits, leases

__ land claims
- _✓_ selected
- __ withdrawn
- __ special management
  - __ heritage sites
  - __ cultural sites

__ other private lands held under tenure

__ recreational

__ trapping

__ mineral processing

__ airport

__ recreation

___ other:

___ other:

Effects from other Resource Uses
(✓ check all the items appropriate to the scope of this project)

Biophysical Environment
1. ✓ deposit into surface water
2. __ deposit into ground water
3. __ change in surface water flow
4. __ change in ground water flow
5. __ change in water temperature
6. __ change in drainage pattern
7. ✓ change in air quality
8. __ change in air flow
9. __ micro-climate change
10. __ ice fog
11. ✓ change in ambient noise levels
12. __ change in slope stability
13. __ change in soil structure
14. ✓ alteration of permafrost regime
15. ✓ destabilization/erosion
16. __ soil compaction
17. __ loss of access to non-renewable resource
18. __ depletion of non-renewable resource
19. __ removal of rare/endangered plant species
20. __ introduction of species
21. __ toxin/heavy metal accumulation

22. __ removal of rare/endangered wildlife species
23. __ change in wildlife health
24. ✓ impact to large mammals
25. __ impact to small mammals
26. ✓ impact to fish
27. ✓ impact to birds
28. __ impact to other wildlife
29. __ impact in a calving, nesting or spawning area
30. __ removal of wildlife buffer zone
31. __ change in wildlife habitat/ecosystem
32. __ other, explain_____

Directly-related Socio-economic and Cultural Environment
33. __ impact to trappers
34. ✓ impact to hunting
35. __ impact to outfitters
36. __ recreational or back country use
37. __ impact to fishing
38. __ impact to First Nation traditional use
39. __ impact to community
40. __ impact to industry
41. __ impact to community health
42. __ change in work force or community economics
43. __ change in housing or infrastructure
44. __ change in regional transportation
45. __ other, explain_____
46. __ impact to traditional use area
47. __ impact to historical site or cultural landmark
48. __ impact to local aesthetics
49. __ impact to archaeological or historical site
50. __ other, explain_____

Table C. Comparison of Effects as Identified in Table A and Table B

Matching Numbers	Description of cumulative adverse environmental effects
7	Air Quality change caused by running of helicopters, heli portable drills, generators and other fuel burning machinery during the life of the project will all contribute to emissions to the air environment. These emissions may cause air quality problems in localized areas where the equipment is concentrated. These effects will only be temporary and only in small areas for a limited period of time.
11	Changes in Ambient Noise Levels - this due to the increase in noise levels from heavy equipment and other machinery over the project areas in a wilderness environment. Most wildlife in the affected areas will avoid equipment due to the noise levels.
14&15	Destabilization/Erosion and Alteration of permafrost regime may occur if proper construction techniques are not adhered to
24 26 & 27	Mammals and birds may be temporarily displaced for short time periods due to the activity. Due to the short period of time required for this project there will be very minimal disturbance to wildlife.

APPENDIX D: CEAA EA Coordination

CEAA Section 5 Notification

Pursuant to section 5 of the CEAA Federal Coordination Regulations, potential responsible authorities (RAs) and federal authorities (FAs) were requested on October 2nd, 2006 to review the proposed project and, pursuant to subsection 6(1) of the CEAA Federal Coordination Regulations, inform the lead RA by November 1st, 2006 whether they are a responsible authority or could provide specialist advice. The responses are provided in the following table:

Role of Federal Departments/Agencies

Department/Agency (District)	Responsible Authority	Specialist Department	No Involvement
Indian and Northern Affairs (Inuvik)	Lead RA		
Environment Canada (CWS)	X		
Fisheries and Oceans (Inuvik)		X	
Parks Canada		X	
NWT Water Board	X		
Natural Resources Canada (Ottawa)		X	
NEB		X	

Federal Approvals

INAC:	*Territorial Lands Act* Land Use Permit
EC/CWS	KIBS Access Permit
Type B Water Licence	*Northwest Territories Water Act, Northwest Territories Water Regulations*

Section 8 Requirements of the CEAA Federal Coordination Regulations

With respect to section 8 of the FCR, the RA prepared a determination of the scope of the project, the factors to be considered, and the scope of those factors as follows:

Scope of the Project

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

   The principal project will be tracked/wheeled drill units, soil sampling and testing.

2 - Other associated physical works or physical activities to be undertaken to carry out the project. For this project to be completed the following activities will have to be undertaken to complete the project. There are several planned activities for the 2006/2007 Winter Field Program, they are:

- Geotechnical Survey at Gas Conditioning Facility (GCF) Set-down, the Horizontal Directional Drilling (HDD) Crossing and the Alternate Flowline Right-of-way.
- Sediment Sampling at Gas Conditioning Facility Set-down Site and Approach.
- Sediment Sampling at the Gas Conditioning Facility Test Pit.
- Gas Conditioning Facility Installation Simulation and Permafrost Degradation Testing.
- Gas Conditioning Facility Installation Test Pit Material Disposal on ice, over Kumak Channel and on the SE corner of Niglintgak Island.
- Benchmark Installation adjacent to the GCF set-down site.
- Ground Penetrating Radar Bathymetry Survey at Niglintgak Island Stockpile Approach.
- Spring Break-up Peak Water Level Monitoring at the Gas Conditioning Facility Set-down.
- Sediment Coring and Sampling at Kittigazuit S-Bends.
- Camp Farewell Site Maintenance.

3. Other undertakings in relation to the physical works and activities identified in items (1) and (2) above.

No further related activities have been identified in relation to the physical works and activities for this proposed Project. Any additional activities would be subject to future examination under the *Territorial Lands Act,* the *Migratory Bird Convention Act,* possibly the *NWT Waters Act and Fisheries Act,* and consequently under CEAA.

Factors to be Assessed

The factors considered within the scope of an environmental assessment are those set out in subsection 16(1) of the CEAA.

Scope of the Factors to be assessed

The following spatial and temporal boundaries for the project are suggested:

1- Spatial Boundaries

Local -	Impacts are limited to the campsite, drill sampling and test pit locations.
Subregional	Impacts may extend 1 km beyond the limits of the campsite, drill sampling and test pit locations.
Regional:	Impacts may extend beyond 25 km from the campsite, drill sampling and test pit locations.

2 – Temporal Boundaries

Immediate:	Impact duration is limited to less than two days.
Short Term:	Impact duration is longer than two days but less than a month.
Medium Term:	Impact duration is one month or longer but less than one year.
Long Term:	Impact duration extends one year or longer.

Section 9 Agency Contacts

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District Manager
North Mackenzie District
Indian and Northern Affairs Canada
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Mr. Mike Fournier
Northern Environmental Assessment Coordinator
Environmental Protection Operations Directorate
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Mr. Gordon Wray, Chairman
Northwest Territories Water Board
C/O Dr. Kathleen Racher, Technical Advisor
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P.O. Box 1500
Yellowknife, Northwest Territories X1A 2R3
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APPENDIX E

CONDITIONS ANNEXED TO AND FORMING PART OF LAND USE PERMIT NUMBER N2006

31 (1) (a) - LOCATION AND AREA

1.1	The Permittee shall not conduct this land use operation on any lands not designated in the accepted application, unless otherwise authorized, in writing, by the Engineer.	**PLANS**
1.2	The Permittee shall not conduct any part of the land use operation within three hundred (300) metres of any privately owned land or structure, unless otherwise authorized, in writing, by the Engineer.	**PRIVATE PROPERTY**
1.3	(a) The Permittee shall offset vehicle travel in areas without a snow covered surface. (b) The Permittee shall confine the line to a maximum width of ten (10) metres, unless otherwise authorized, in writing, by a Land Use Inspector.	**OFFSET VEHICLE TRAVEL**
1.4	The Permittee shall not construct parallel lines or roads, unless authorized by the Engineer.	**PARALLEL ROADS**
1.5	The Permittee shall remove from Territorial Lands, all scrap metal, discarded machinery and parts, barrels and kegs, buildings and building material.	**REMOVE WASTE MATERIAL**
1.6	The Permittee shall locate all lines, trails and rights-of-way to be constructed parallel to streams a minimum of thirty (30) metres from any stream except at crossings, unless otherwise authorized, in writing, by a Land Use Inspector.	**PARALLELLING STREAMS**
1.7	The Permittee shall at all times conform to all applicable Federal, Territorial or local regulations, ordinances or bylaws, and land claim agreements.	**CONFORM TO APPLICABLE LAWS**

31 (1) (b) - TIME

2.1	The Permittee's Field Supervisor shall contact or meet with a Land Use Inspector at the Inuvik office of the Department of Indian Affairs and Northern Development, telephone number (867) 777-3361, at least 48 hours prior to the commencement of this land use operation.	**CONTACT INSPECTOR**
2.2	The Permittee shall advise a Land Use Inspector at least ten (10) days prior to the completion of the land use operation of (a) his plan for removal or storage of equipment and materials, and (b) when final clean-up and restoration of the lands used will be completed.	**REPORTS BEFORE REMOVAL**

2.3	The Permittee shall submit a progress report to the Engineer every ten (10) days during this land use operation.	**PROGRESS**
2.4	The Permittee shall not conduct any overland movement of equipment or vehicles before 0800 hours local time on November 15th unless otherwise authorized, in writing, by a Land Use Inspector.	**START-UP DATE**
2.5	The Permittee shall not conduct any overland movement of equipment and vehicles after 0800 hours local time on April 15th, unless otherwise authorized, in writing, by a Land Use Inspector.	**SHUT-DOWN DATE**
2.6	The Engineer, for the purpose of this operation, designates April 15, as spring break-up.	**SPRING BREAK-UP**
2.7	The Permittee shall remove all ice bridges prior to spring break-up or completion of the land use operation, unless otherwise approved, in writing, by a Land Use Inspector.	**REMOVE ICE BRIDGE**
2.8	The Permittee shall remove all snow fills from stream crossings prior to spring break-up or completion of the land use operation, unless otherwise approved, in writing, by a Land Use Inspector.	**REMOVE SNOW FILLS**
2.9	The Permittee shall commence and foster revegetation on all parts of the land used, as may be directed by a Land Use Inspector, within one (1) year of the completion of the land use operation.	**RE-ESTABLISH VEGETATION**
2.10	The Permittee shall complete all clean-up and restoration of the lands used prior to the expiry date of this Permit.	**CLEAN-UP**
2.11	The Engineer reserves the right to impose closure of any area to the Permittee in periods when dangers to natural resources are severe	**CLOSURE**

31 (1) (c) - EQUIPMENT

3.1	The Permittee shall not use any equipment except of the type, size, and number that is listed in the accepted application, unless otherwise authorized, in writing, by a Land Use Inspector.	**ONLY APPROVED EQUIPMENT**
3.2	The Permittee shall equip bulldozer blades used in this operation with "mushroom" type shoes or a similar type of device which shall be extended twenty (20) centimetres below the cutting edge of the blade.	**BULLDOZER BLADES AND SHOES**
3.3	The Permittee shall keep all garbage and debris in a covered metal container until disposed of. This container shall be marked with the Permittee's name.	**GARBAGE CONTAINER**
3.4	The Permittee shall ensure a garbage container is on site.	**GARBAGE CONTAINER**

31 (1) (d) - METHODS AND TECHNIQUES

4.1.	The Permittee shall construct and maintain winter roads with a minimum of fifteen(15) centimetres packed clean snow at all times during this land use operation. If this cannot be done, then the Permittee shall construct Ice Roads in a manner approved by a Land Use Inspector.	**SNOW ROADS/ ICE ROADS**
4.2	The Permittee shall plug all bore holes as the land use operation progresses.	**PLUG HOLES**
4.3	The Permittee shall replace all excavated material from the test pits prior to the expiry of this Permit.	**TEST PITS**
4.4	The Permittee shall not erect camps or store material on the surface ice of streams, channels, lakes or any other waterbodies unless authorized in writing by an Inspector.	**STORAGE ON ICE**

31 (1) (e) - TYPE, LOCATION, CAPACITY AND OPERATION OF FACILITIES

5.1	The Permittee shall ensure that the land use area is kept clean and tidy at all times.	**CLEAN WORK AREA**

31 (1) (f) - CONTROL OR PREVENTION OF FLOODING, EROSION AND SUBSIDENCE OF LAND

6.1	(a) The Permittee shall, where flowing water from bore holes is encountered, plug the bore hole in such a manner as to permanently prevent any further outflow of water. (b) The artesian occurrence shall be reported to the Engineer within forty-eight (48) hours.	**PLUG ARTESIAN WELLS**
6.2	The Permittee shall remove any obstruction to natural drainage caused by any part of this land use operation.	**NATURAL DRAINAGE**
6.3	The Permittee shall not use any material other than water and / or clean snow in the construction of ice bridges, ramps and snow fills.	**ICE BRIDGE MATERIAL**
6.4	The Permittee shall not allow any ice bridge to hinder the flow of water in any stream.	**ICE BRIDGE**
6.5	The Permittee shall remove or V-notch snow fills in stream crossing as the land use operation progresses, unless otherwise authorized, in writing, by a Land Use Inspector.	**REMOVE WATER CROSSINGS**
6.6	The Permittee shall prepare the site in such a manner as to prevent rutting of the ground surface.	**PREVENTION OF RUTTING**

6.7	The Permittee shall not move any equipment or vehicles unless the ground surface is in a state capable of fully supporting the equipment or vehicles without rutting or gouging.	**VEHICLES MOVEMENT FREEZE-UP**
6.8	The Permittee shall suspend overland travel of equipment or vehicles if rutting occurs.	**SUSPEND OVER-LAND TRAVEL**
6.9	The Permittee shall save the organic soil stripped from the excavation area.	**SAVE ORGANIC SOIL**
6.10	The Permittee shall place the organic soil over the disturbed area prior to the expiry date of this Permit.	**PLACE ORGANIC SOIL**

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

7.1	The Permittee shall not use chemicals in connection with the land use operation without the prior approval of the Engineer.	**APPROVAL OF CHEMICALS**
7.2	The Permittee shall remove all garbage and debris from the land use area to a disposal site approved, in writing, by a Land Use Inspector.	**REMOVE GARBAGE**
7.3	The Permittee shall dispose of all combustible waste petroleum products by removal.	**WASTE PETROLEUM DISPOSAL**
7.4	The Permittee shall dispose of all toxic or persistent substances in a manner as approved, in writing, by the Engineer.	**WASTE CHEMICAL DISPOSAL**
7.5	The Permittee shall report all spills immediately in accordance with instructions contained in "Spill Report" form N.W.T. 1086(10/79). 24 hour spill report line (867) 920-8130.	**REPORT CHEMICAL AND PETROLEUM**

31 (1) (h) - WILDLIFE AND FISHERIES HABITAT

8.1	The Permittee shall not unnecessarily damage wildlife habitat in conducting this land use operation.	**HABITAT DAMAGE**
8.2	Your operation is in an area where bears may be encountered. Proper food handling and garbage disposal procedures will lessen the likelihood of bears being attracted to your operation. Information about the latest bear detection and deterrent techniques can be obtained from the Department of Resources, Wildlife and Economic Development at (867) 777-7308 or (867) 777-7230.	**BEAR/MAN CONFLICT**
8.3	The Permittee shall not in any circumstances deposit or allow the deposit of any deleterious substances (including but not limited to fuels, lubricants, hydraulics, and coolants) of any type into any waters,	**DEPOSITING DELETERIOUS SUBSTANCES**

or in any place under any conditions where the deleterious substances may enter any waters.

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

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

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

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

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

31 (1) (k) - PETROLEUM FUEL STORAGE

11.1 The Permittee shall report, in writing, to a Land Use Inspector the location and quantity of all petroleum fuel caches within ten (10) days after the establishment. **REPORT FUEL LOCATION**

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

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

11.4 The Permittee shall not allow petroleum products to spread to surrounding lands or into water bodies. **FUEL CONTAINMENT**

11.5 The Permittee shall: **CHECK FOR LEAKS**

(a) Examine all fuel storage containers for leaks a minimum of once a day.
(b) Repair all leaks immediately.

11.6 The Permittee shall seal all container outlets except the outlet currently in use. **SEAL OUTLET**

11.7 The Permittee shall mark all fuel containers with the Permittee's name. This includes forty-five (45) gallon drums. **MARK CONTAINERS**

11.8 The Permittee shall at all times have on site sufficient spill clean-up equipment and material in readiness to clean-up all hazardous material which may be spilled. **OIL SPILL CLEAN-UP EQUIPMENT**

31 (1) (m) - MATTERS NOT INCONSISTENT

WITH THE REGULATIONS

12.1	The Permittee shall display a copy of this Permit in a conspicuous place in each campsite established to carry out this land use operation.	**DISPLAY PERMIT**
12.2	The Permittee shall keep on hand, at all times during this land use operation, a copy of the Land Use Permit.	**COPY OF PERMIT**
12.3	The Permittee shall provide in writing to the Engineer, at least forty-eight (48) hours prior to commencement of this land use operation, the following information: (a) person, or persons, in charge of the field operation to whom notices, orders, and reports may be served; (b) alternates; (c) all the indirect methods for contacting the above person(s).	**IDENTIFY AGENT**
12.4	The Permittee shall restore any trails used by trappers or hunters by slashing any and all trees that may fall across these paths or trails and by removing any other obstructions, such as snow piles or debris, that may be pushed across the trails.	**TRAILS RESTORATION**
12.5	The Permittee shall ensure that a copy of this Permit, operating conditions and definitions is provided to and understood by all contractors and sub-contractors prior to the start-up of this Land Use Operation.	**PERMIT CONTRACTORS & SUB-CONTRACTORS**
12.6	The Permittee shall submit to the Engineer a contingency plan, for chemical and petroleum spills, for use during the construction and operation of the winter road.	**CONTINGENCY PLAN**

Recommended Mitigation Measures Supplementary to Permit Conditions

Fuel Storage
- Fuel sloops located within 30 m of a water body should be parked within an impermeable dyke. This can be constructed of snow/ice material and will reduce the likelihood of a spill penetrating the ground and migrating into the water. Should equipment need access inside the dyked area for refueling, the opening should be on the uphill side.
- Refueling operations occurring outside an area described above should include a haz-mat/ drip tray under the tank receptacle.

Equipment
- All equipment parked or may be parked for four (4) hours or more, should have a haz-mat/drip tray under it, or be sufficiently diapered (leaky equipment should be repaired immediately).

Operational
- No burning of plastics
- Waste oil should be recycled if possible

APPENDIX F

NWT Water Board Type B Water Licence Conditions

PART A: SCOPE AND DEFINITIONS

1 Scope

a) This Licence entitles Shell Canada Limited to use Water and dispose of Waste for industrial undertakings in the Mackenzie Delta for the Niglintgak Natural Gas Field Development 2007/2007 Winter Field Program located within the following area:

Latitude:	69 18' 32.2"N
Longitude:	135 15' 44.7"W

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: **N7L1-1816**

"**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*;

"**Artesian Aquifer**" means a water-bearing rock stratum, which when encountered

during drilling operations, produces a pressurized flow of groundwater that reaches an elevation above the water table or above the ground surface;

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

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

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

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

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

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

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

"**Project Description**" refers to the report titled "Shell Canada Limited, Niglintgak Natural Gas Field Development 2007/2007 Winter Field Program", dated August 2006, prepared by IEG Consultants Ldt.;

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

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

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

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

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

PART B: GENERAL CONDITIONS

1 The Licensee shall file an Annual Report with the Board and an Inspector not later than March 31st of the year following the calendar year reported which shall contain the following information:

a) the total quantity in cubic metres of fresh Water obtained from each Water source(s);

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 land or Water;

d) an itemized list indicating the names and quantities of all drilling mud additives used;

e) details of work completed;

f) details on the restoration of any Sumps;

g) a list of spills and unauthorized discharges;

h) results from all monitoring programs; and

i) any other details on Water use or Waste disposal requested by the Board within forty-five (45) days before the final report is due.

2 Meters, devices or other such methods used for measuring the volumes of Water used and Waste discharged shall be installed, operated and maintained by the Licensee to the satisfaction of an Inspector.

3 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.

4 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.

5 Thirty (30) days prior to the commencement of drilling, the Licensee shall notify the Board and an Inspector of the exact wellsite location(s) that have been selected for drilling.

6 Prior to the use of Water for industrial undertakings and pursuant to Section 17(1) of the *Act* and Section 12 of the Regulations, the Licensee shall have posted and shall maintain a security deposit of XXX in a form suitable to the Minister.

7 The security deposit shall be maintained until such time as it is fully or in part refunded by the Minister pursuant to Section 17 of the *Act*. This clause shall survive the expiry of this Licence or renewals thereof and until full and final restoration has been completed to the satisfaction of the Minister.

8 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 channels of the Mackenzie River, 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 then five (5) % 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 300 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 All sewage shall be directed to the Sewage Treatment Facility as approved by an Inspector.

2 The Licensee shall adhere to "*Drilling Waste Management: Recommended Best Practices*. Edition 1: Drilling Waste in the Mackenzie Delta (Inuvialuit Settlement

Region)" as published by the Environmental Studies Research Funds, 2004. (www.esrfunds.org)

3 If during the drilling, an Artesian Aquifer is encountered producing water flowing at the surface, the Licensee shall notify an Inspector immediately. A sample of not less than ten (10) litres shall be collected from the flowing source at the point of discharge from the well. Five (5) litres shall be made available to an Inspector for analysis, and the Licensee shall have the remaining five (5) litres analysed.

4 Any fluids generated to surface, including those produced from an Artesian Aquifer, shall be contained and shall not be disposed of without approval of an Inspector.

5 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.

6 Lost circulation that may contaminate groundwater must be immediately reported to an Inspector.

7 The Licensee shall dispose of all solid Waste in a manner acceptable to an Inspector.

PART E: CONDITIONS APPLYING TO MODIFICATIONS

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

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

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

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

d) an Inspector has not rejected the proposed Modifications.

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

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

PART F: CONDITIONS APPLYING TO STREAM AND WATER BODY CROSSINGS

1 The Licensee shall ensure that only clean snow and ice is used on all stream or water body crossings, and that no debris is left on the surface of the crossings.

2 Stream or water body crossings shall be notched or removed before spring break-up to facilitate natural flow.

3 The removal of naturally occurring material from the bed or banks of any stream or water body below the ordinary high water mark is not permitted.

PART G: CONDITIONS APPLYING TO CONTINGENCY PLANNING

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

2 The Licensee shall annually review by December 1st the approved Emergency Response & Spill Contingency Plan and submit any required revisions to the Board for approval.

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

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

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

PART H: CONDITIONS APPLYING TO ABANDONMENT AND RESTORATION

1 Upon completion of all activities, the Licensee shall ensure that all equipment and materials are removed from the site. Other final restoration activities as outlined in the Project Description should be implemented to the satisfaction of an Inspector.

NORTHWEST TERRITORIES WATER BOARD

Chairman **Witness**
1.

APPENDIX G

Community Conservation Plan Areas Affected by Program

The community conservation plans identify four management categories of lands (B through E). The project falls within the vicinity of all of three of these categories. The descriptions are as follows:

- Category C: lands and waters where cultural or renewable resources are of particular significance and sensitivity during specific times of the year. These areas shall be managed so as to guarantee the conservation of the resources.

- Category D: lands and waters where cultural or renewable resources are of particular significance and sensitivity throughout the year. As with Category C areas, these lands and waters shall be managed so as to guarantee the conservation of resources.

- Category E: lands and waters where cultural and renewable resources are of extreme significance and sensitivity. There shall be no development in these lands or waters. These areas shall be managed to guarantee absolutely no damage or disruption. This category offers the highest degree of protection, short of legal designation.

The proposed 2006/2007 Winter Field Program lies within the vicinity of several areas defined as Special Management Areas where recommended land use practices and timing of the program must be considered in relation to local harvesting. Special Management Areas within or near the project area are listed in Table 9-1 and illustrated in Figure 9-1
and Figure 9-2.

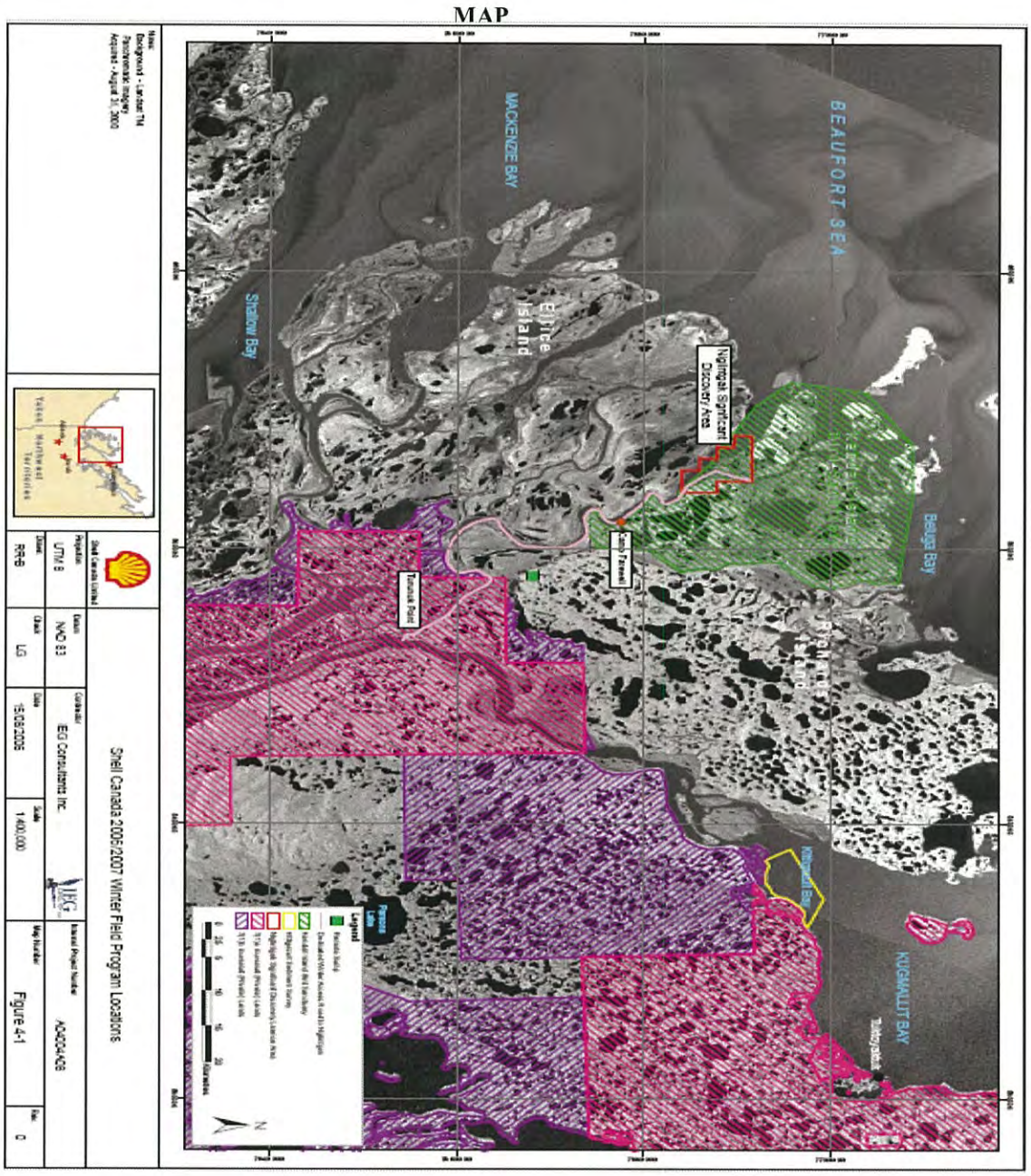
Table 9-1 Special Management Areas Near Fieldwork Activities

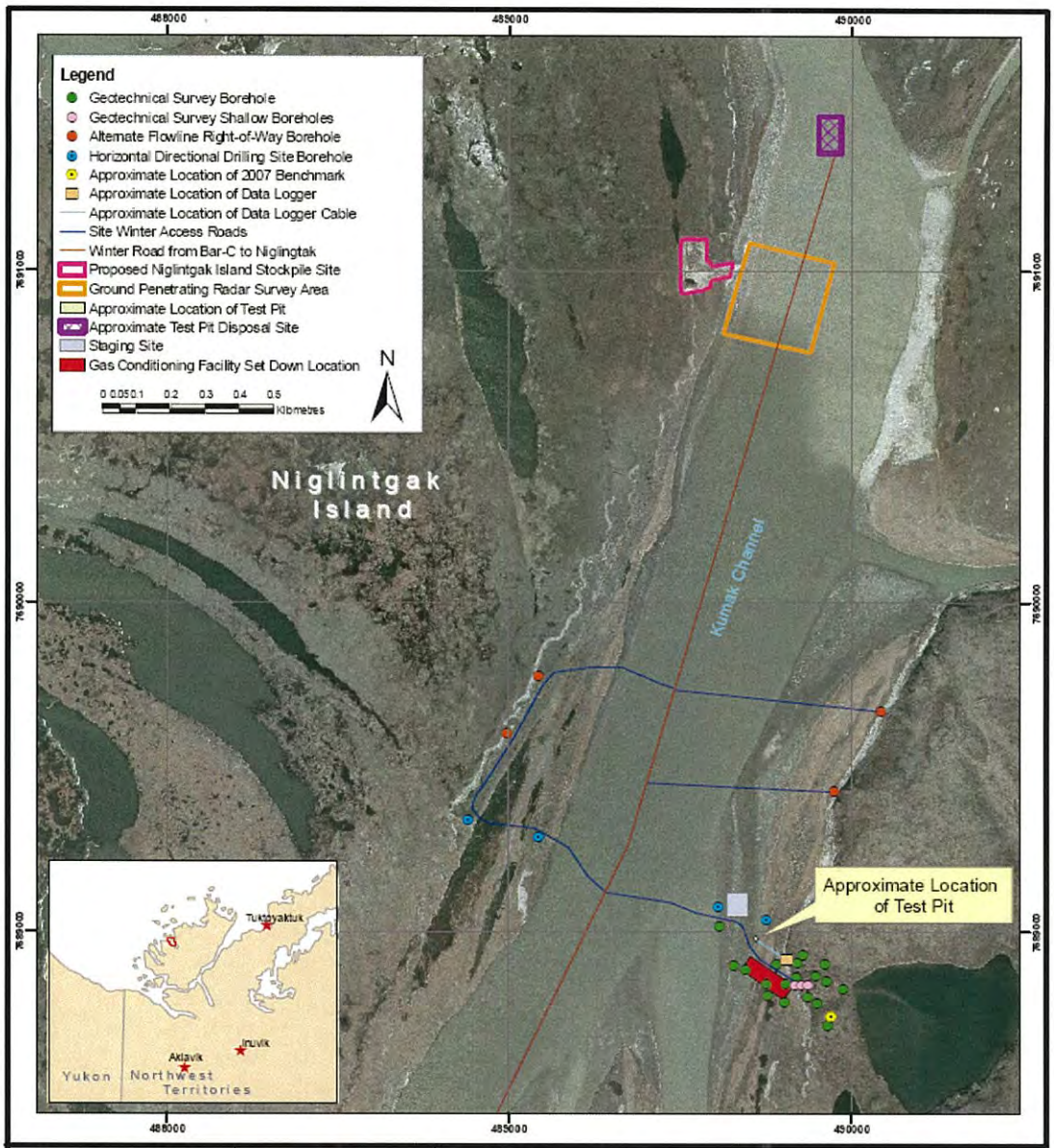
Site Number and Protective Status Category	Name	Location Description
302C	Spring Caribou Harvesting	Surrounding Husky Lakes, east of Cape Bathurst, just west of Mason River, extending south from the Mackenzie River to Sitidgi Lake, with the Tuktoyaktuk Peninsula at the northern boundary.
304C	Spring Goose Harvesting	Islands in the western portion of the Mackenzie River Estuary, from eastern Richards Island along the coast, including all of the Tuktoyaktuk Peninsula to Mason River Estuary, and the Husky Lakes. Other areas include sections of the Miner River, Anderson River and Gossley Lakes.
305C	Spring Fishing Areas	Various sites within the Tuktoyaktuk Planning Area.
315C	Winter Caribou Harvesting Areas	Richards Island, south to the northern part of Sitidgi Lake; Anderson River to the mouth of Mason River, including Tuktoyaktuk Peninsula
322C	Critical Grizzly Bear Denning Areas	Coastal areas, starting at western portion of Richards Island, east to Fingers Area, northeast to include Tuktoyaktuk Peninsula. A second area from mouth of Anderson River along the coat of Wood Bay, to include the mouth of the Horton River, south along the Horton River, southeast to include the main section of the Anderson River.
323C	Mainland Coastal Polar Bear Denning Areas	Three coastal areas: Kay Point to Summer Island; northeast portion of the Tuktoyaktuk Peninsula; northern portion of Cape Bathurst and Baillie Islands.
706D	Kendall Island Bird Sanctuary	The sanctuary is represented by an area of land and sea with Middle Channel and Harry Channels as boundaries, and the northern boundary extending from the southern tip of Garry Island, extending northeastward, bisecting Kendall Island Bird Sanctuary, as far as the mouth of Harry Channel.
718D	Central Mackenzie Delta	Lands and waters defined by the eastern edge of Mackenzie Bay, bordered to the south by Reindeer Channel, with the eastern border as Main Channel, with an extension along the East Channel.

Source: AICCP 2000; IICCP 2000; TCCP 2000

APPENDIX H

MAP





Notes:
Background - Landsat TM Panchromatic Imagery Acquired - August 31, 2000

Shell Canada Limited

Niglintgak Development Area 2006/2007 Winter Field Program Locations

Projection	Datum	Contractor		Internal Project Number	
UTM 8	NAD 83	IEG Consultants Inc.		A04004A08	
Drawn	Check	Date	Scale	Map Number	Rev.
RR-B	LG	16/08/2006	1:15,000	Figure 4-2	0