Department of National Defence

Specifications for the Remediation of the Beach Refuel Area at the FOX-M, Hall Beach DEW Line Site

Environmental Protection Plan

Prepared for

Department of National Defence

Prepared by

UMA Engineering Ltd. Telephone: 780-486-7000

17007 - 107 Avenue Fax: 780-486-7070

Edmonton Alberta T5S 1G3

July 2002

Table of Contents **Page No.**

List of Tables

1.0 Introduction

1.1 SCOPE AND OBJECTIVES

.1 This Environmental Protection Plan (EPP) has been prepared to detail mitigative measures for potential environmental impacts associated with the due diligence clean up activities at the FOX-M, Hall Beach site.

.2 The EPP is to be implemented by the Contractor through appropriate actions and the application of contingency plans. The EPP is designed to be used during clean up activities in conjunction with the Contract Drawings and Specifications. It forms part of the Contract Documents and reference to it can be found throughout the Contract Specifications.

.3 The EPP provides:

.1 an overview of the activities involved in Due Diligence clean up activities (Section 2.0);

.2 an overview of the regulatory environment which includes legislation and regulations from federal and territorial authorities. It also describes the requirements of other regional agencies (Section 3.0);

.3 a description of the general environmental protection measures required to minimize or avoid potential adverse effects (Section 4.0);

.4 a description of protection measures required for specific valued environmental components at the FOX-M, Hall Beach site (Section 5.0);

.5 details related to environmental inspection responsibilities and procedures (Section 6.0); and

.6 contingency plans describing emergency actions and reporting requirements (Section 7.0).

.4 The protection measures described herein are to be implemented by the Contractor to minimize or avoid potential adverse environmental impacts. These procedures are considered appropriate for known and anticipated situations and conditions. However, should certain procedures or protection measures prove impractical, imprudent or insufficient in field situations, appropriate modifications or substitutions are to be proposed by field personnel, reviewed and approved by the Engineer in consultation with regulatory officials.

2.0 Project Description Overview

2.1 PROJECT RATIONALE

.1 In March 1985, Canada and the United States signed a Memorandum of Understanding (MOU) agreeing to modernize the North American Air Defence System. The memorandum sets out the requirements for replacement of the Distant Early Warning (DEW) Line with an upgraded system called the North Warning System (NWS).

.2 Of the original 42 DEW Line sites, 21 sites were closed in 1963 and are currently under the administration of Indian and Northern Affairs Canada (INAC), formerly the Department of Indian Affairs and Northern Development (DIAND). The other 21 sites continue to be administered by the Department of National Defence (DND). Eight of these sites have been converted to NWS Long Range Radar (LRR) sites, eight to NWS Short Range Radar (SRR) sites, and the other five sites have been decommissioned and closed. The FOX-M LRR site is also a Logistics Support Site, and is manned year-round.

.3 Environmental investigations of the DEW Line sites were carried out to identify the principal contaminants and determine the impact of these substances on the Arctic ecosystem. In addition, an evaluation of past waste disposal practices, specifically landfill locations, contamination sources and potential for contaminant migration, were conducted at each site. Based on the information obtained during the environmental studies, the DEW Line Clean Up Protocol was developed and provided a consistent approach to the clean up of the sites.

.4 The environmental and engineering surveys at FOX-M were carried out over the period of 1989 to 1993 and documented the environmental implications and potential effects of the clean up work. Detailed environmental and engineering site investigations were carried out over the period from 1997 to 2001 with the objectives of more accurately delineating known contaminated areas, and verifying overall site conditions. The need for mitigation, monitoring and/or actual project activity modification was also identified. During these later site investigations, specific environmental issues were identified that required prompt attention, prior to the overall site cleanup.

.5 In 1998, A Cooperation Agreement (Environmental Provisions) between DND and Nunavut Tunngavik Incorporated (NTI) was signed, which outline requirements for the restoration, clean up and related activities at the DEW Line sites in Nunavut.

.6 Specific to the FOX-M, Hall Beach site, the Due Diligence cleanup requirements are as follows:

- Excavation and disposal of contaminated soils located in close proximity to water bodies;
- Hydrocarbon contaminated soil storage area construction;
- Removal and collection of surface debris in the excavation area; and,
- General site grading of work areas.

2.2 PROJECT ACTIVITIES

.1 The clean up activities at FOX-M site are based on the DEW Line Clean Up Protocol outlined in the DND-NTI Cooperation Agreement. The following sections describe the major activities to be performed in the Due Diligence clean up of the FOX-M site. Detailed requirements are described in the Contract Specifications and Drawings. It is intended that the EPP be read in conjunction with these documents to determine all project requirements.

.2 The Due Diligence clean up activities include the following:

- excavation of contaminated soil, including hydrocarbon contaminated soils;
- demolition of the Beach Masters Shed;
- development of granular borrow areas; and
- site grading.

.1 Access

.1 Access to the FOX-M site is provided by commercial aircraft, charter aircraft and by ship.

.2 Local access to construction, demolition, clean up and other work areas is generally via existing road networks. Graded areas, such as the Retrograde Storage Area, are to be used for temporary storage of materials.

.3 Do NOT interfere with NWS operations at the site.

.3 Excavation of Contaminated Soil

.1 For this project, the definition of contaminated soil has been established in accordance with the DEW Line Clean Up Criteria (DCC) as shown in Table 2.1. These criteria target specific inorganic elements and PCBs, and are designed to be protective of the Arctic ecosystem. Non-hazardous contaminated soils are to be

stored in the existing sewage lagoon.

.2 All work related to the excavation and disposal of contaminated soils is to be completed in accordance with Section 02066 of the Contract Specifications.

Table 2.1: DEW Line Clean Up Criteria (DCC) for Contaminated Soil

Substance	Criteria	
	DCC Tier I (ppm)	DCC Tier II (ppm)
Arsenic (As)	--	30
Cadmium (Cd)	--	5
Chromium (Cr)	--	250
Cobalt (Co)	--	50
Copper (Cu)	--	100
Lead (Pb)	200	500
Mercury (Hg)	--	2
Nickel (Ni)	--	100
Zinc (Zn)	--	500
Polychlorinated Biphenyls (PCBs)	1	5

.4 Excavation and Storage of Hydrocarbon Contaminated Soil

.1 A risk management approach has been used in the development of the clean up requirements for hydrocarbon contaminated soils at the FOX-M, Hall Beach DEW Line site. A preliminary evaluation criterion of 2500 ppm Total Petroleum Hydrocarbon (TPH) concentration in the soil is used. The Beach Refuel Area has been targeted for clean up as indicated on the Drawings and Specifications.

.2 For the purposes of this project, hydrocarbon contamination is further defined as follows:

.1 Type A: Hydrocarbon contaminated soil in which the primary hydrocarbon product consists of lubricating oil and grease as determined by laboratory analysis.

.2 Type B: Hydrocarbon contaminated soil in which the primary hydrocarbon product consists of diesel, fuel oil, and/or gasoline as determined by laboratory analyses.

.3 Contaminated soils which contain contaminants in excess of DCC Tier II criteria, and are co-contaminated with hydrocarbons, are to be treated as DCC Tier II soil in accordance with Section 02066 of the Contract Specifications.

.4 Contaminated soils which contain contaminants in excess of DCC Tier I criteria, and are co-contaminated with hydrocarbons, are to be treated as Type A or Type B

hydrocarbon contaminated soil, as appropriate, in accordance with Section 02066 of the Contract Specifications.

.5 All work related to the excavation of hydrocarbon contaminated soils is to be completed in accordance with Section 02066 of the Contract Specifications. Type B hydrocarbon contaminated soils are to be disposed of in a hydrocarbon contaminated soil storage area.

.5 Handling of Hazardous Waste Materials

.1 "Hazardous" waste materials are defined as follows:

Hazardous waste materials are wastes or materials that are designated as "hazardous" under Nunavut Territorial or Federal legislation; or as "dangerous goods" under the *Transportation of Dangerous Goods Act* (TDGA). The *Canadian Environmental Protection Act* (CEPA) regulates material containing PCBs at greater than fifty parts per million (ppm). Specifically identified hazardous materials include: batteries; asbestos; fuel tank bottom sludges; solvents; PCB-containing liquids; fuels and lubricating oils; alcohols and glycols; and heavy metal-contaminated liquids. Disposal requirements of hazardous waste materials expected during the acute issues cleanup are presented in Table 2.2.

.2 Hazardous waste materials may be encountered during sorting of site and demolition debris. Collect and sort hazardous waste materials using equipment suitable for the task.

.3 If a substance is discovered that is suspected to be explosive, immediately eliminate all ignition sources in the area (including smoking, flares or flames in the immediate area). Clean up the material and dispose of only under the supervision of a permitted explosive expert. If fire or heat threatens the area of the potentially explosive material, all personnel will move to a distance of at least 1000 metres from the material. Implement the procedure outlined in the Contractor's Contingency Plan for dealing with such substances.

.4 Test any suspected radioactive material and handle, package, and dispose of all confirmed radioactive materials as outlined under the *Transportation of Dangerous Goods Act* and the *Atomic Energy Control Act.*

.5 Package hazardous waste materials in accordance with the Transportation of Dangerous Goods Regulations, as applicable.

.6 Conduct all work related to hazardous waste materials in accordance with Section

02090 of the Contract Specifications.

Table 2.2: Hazardous Waste Material Disposal Requirements

Hazardous Waste Material	Disposal Requirement
• batteries • heavy metal-contaminated organic liquids: - Cadmium > 2 ppm - Chromium > 10 ppm - Lead > 100 ppm • liquids containing organic compounds with chlorine concentrations > 1000 ppm • liquids containing organic compounds with PCB concentrations > 2 ppm and < 50 ppm • liquids containing organic compounds other than those described above	Off-site licensed treatment/disposal facility (by others).
• fuel tank bottom sludges • fuels, lubricating oils, alcohols and glycols	Off-site licensed treatment/disposal facility (by others) OR on-site incineration in accordance with Sections 02090 of the Contract Specifications.
• liquids and solids containing organic compounds with PCB concentration > 50 ppm	Off-site licensed treatment and disposal facility; e.g. Alberta Special Waste Management System Facility – Swan Hills, Alberta. (by others)

.6 Disposal of Non-Hazardous Materials

.1 Non-hazardous materials collected or generated during the acute issues cleanup are anticipated to include wood, metal, empty barrels, and concrete. Stockpile these materials in accordance with Section 02060 of the Contract Specifications.

.7 Demolition of Existing Facilities

.1 Dismantle the Beach Masters Shed at FOX-M in accordance with Section 02060 of the Contract Specifications.

.2 Remove hazardous materials, if any, from structures prior to demolition. (See Section 2.2.5.)

.3 Stockpile non-hazardous materials at the Retrograde Storage Area, as directed by the Engineer.

.8 Development of Granular Borrow Areas

.1 Several sources of granular borrow material are identified on the Contract Drawings. Where possible, use existing sources of borrow material during clean up. Use of alternate sources requires approval from the Engineer. After site clean up, grade all borrow areas to match surrounding contours.

.9 Site Grading

.1 Site grading operations consist of shaping and grading disturbed areas to blend in with natural contours. Disturbed areas include:

- contaminated soil excavation areas;
- areas disturbed during demolition operations; and,
- granular borrow areas.

.2 During grading operations, restore natural drainage where feasible. This applies to areas that can be restored by excavation or placement of common fill material. Reshaping during the period of maximum thaw requires careful supervision by the Contractor.

.3 Areas not to be disturbed include:

- the operating LRR facilities;
- areas susceptible to permafrost degradation (refer to Section 5.7).

3.0 Regulatory Overview

3.1 INTRODUCTION

.1 Comply with all applicable environmental laws, regulations and requirements of Federal, Territorial, and other regional authorities, and comply with any permits, approvals and authorizations that may be required under this contract.

.2 The Contractor is subject to and must comply with those permits and approvals obtained on behalf of and by DND to conduct this work.

.3 Through all project phases, work in close cooperation with regulatory authorities and DND to ensure compliance.

3.2 FEDERAL ACTS, REGULATIONS AND GUIDELINES

.1 Several federal Acts, regulations, and guidelines affect project activities across all Canadian jurisdictions. The most relevant to the DEW Line Clean Up EPP are outlined below:

.1 *The Canadian Environmental Protection Act* regulates toxic substances from their production or import, to consumption, storage and disposal. This Act also incorporates, amongst others, the former Ocean Dumping Regulations and PCB Storage Regulations.

.2 The *Transportation of Dangerous Goods Act* and Regulations promote public safety in the transportation of dangerous goods. The Act applies to all handling, offering for transport and transporting of dangerous goods by any means of transport whether or not the goods originate from or are destined for any place or places in Canada.

.3 The *Fisheries Act* protects fish and fish habitat from pollution, harmful alteration, disturbance and destruction, and impediments to fish movement. Fisheries and Oceans Canada will be given the opportunity to review permit applications or restoration plans submitted by other agencies.

.4 The *Arctic Waters Pollution Prevention Act and Regulations* govern development and shipping activity in Arctic waters adjacent to the mainland and islands of the Canadian Arctic, to ensure the continuing welfare of the residents of the areas, and to protect the ecological balance in water, ice and land areas.

.5 The *Migratory Birds Convention Act* provides for the protection of designated migratory species, their habitats, and the regulated harvest of certain species.

.6 The *Canada Wildlife Act* provides for the involvement of the Government of Canada

in cooperative research and management programs involving wildlife species normally the responsibility of provinces or territories. This is particularly relevant to rare and endangered species or species such as caribou which seasonally move across various regulatory boundaries.

.7 The *Constitution Act* is the enabling legislation for the Inuvialuit Final Agreement (IFA). The IFA in turn details the terms and conditions for developments and other uses of lands within the Inuvialuit Settlement Region.

.8 The *Canada Shipping Act* regulates shipping activities under the jurisdiction of Canada. Regulations cover technical standards of operation safety and pollution aspects related to shipping activities in Canadian waters.

.9 The *Navigable Waters Protection Act* pertains to the erection of structures or facilities used to support or impede navigation in waters under the jurisdiction of Canada.

.10 The *Territorial Lands Act* provides the authority for administering and protecting lands under the direct control of the Minister of Department of Indian Affairs and Northern Development (DIAND) (Territorial Lands). The following regulations are pursuant to this Act:

.1 The Territorial Land Use Regulations provide regulatory control for maintaining sound environmental practices for any land use activities on Territorial lands. These regulations require that land use permits be issued for such operations as work involving the use of heavy equipment, establishment of camps, use of explosives, and clearing of lines, trails and rights-of-way, including construction of access roads.

.2 The Territorial Quarrying Regulations establish the fee schedule and procedures for extracting Crown-owned limestone, granite, slate, marble, gypsum, loam, marl, gravel, sand, clay or stone from Territorial lands. The regulations specify permits, applications, staking and dimensions of quarries.

.11 The *Nunavut Land Claims Agreement Act* provides for the conservation, development and use of the water resources of Nunavut and for the establishment of a Water Board to license all such water usage and waste disposal activities.

.12 *Canada Labour Act* and Regulations under the Act is the Labour code for all Federal Employees or activities on Federally owned or controlled land. Private Provincial or Territory employees are governed by the Provincial/ Territorial Labour Acts, even when working on Federal lands or facilities. The labour acts control such things as statutory holidays, maximum work hours and minimum wages.

.13 *Atomic Energy Control Act* and Regulations describe the packaging requirements and approvals needed for the transportation of radioactive materials.

.14 *Explosives Act* and Regulations define explosives, the permitting requirements needed to use explosive substances, packaging, handling and transporting requirements, and safety requirements.

.15 National Fire Code (NFC) establishes the standard for fire prevention, fire fighting and life safety in buildings in use, including standards for the conduct of activities causing fire hazards, maintenance of fire safety equipment and egress facilities, standards for fire extinguishers, etc. In addition, the NFC establishes the standard for prevention, containment and fighting of fires originating outside buildings which may present a hazard to a nearby community, and sets the standards for the storage and handling of dangerous goods, flammable liquids and combustible liquids.

.2 The following guidelines were used as reference in the development of the DEW Line Clean Up Protocol and Contract Specifications. These guidelines are identified as reference materials only.

.1 Guidelines for Effluent Quality and Wastewater Treatment at Federal Establishments indicate the degree of treatment and effluent quality that will be applicable to all wastewater discharged from existing and proposed Federal installations.

.2 National Guidelines for the Landfilling of Hazardous Waste (CCME Report, April 1991) are to be used by regulators, designers, owners, and operators of hazardous waste facilities. They cover site selection, design, construction, closure and post-closure care, monitoring, and operation. They are intended for new, not existing facilities.

.3 Guidelines for Preparation of Hazardous Material Spill Contingency Plans identify factors that should be considered in the development of hazardous material spill contingency plans and the information that should be incorporated into a comprehensive contingency plan.

.4 Code of Good Practice on Dump Closing or Conversion to Sanitary Landfill at Federal Establishments (1977) outlines the guidelines to improve operation and properly close existing dumps. It is intended to promote a consistent approach to the clean up of existing dumps to prevent contamination of water, air and land and to ensure that the best particular control technology is used.

.5 Code of Practice for Used Oil Management in Canada describes environmentally sound options for the handling, storage, collection, transportation, recycling, reuse and disposal of used oils in Canada. It is intended to provide guidance for used oil generators and to regulatory authorities in the formulation of provincial or regional used oil management strategies.

.6 Canadian Environmental Quality Criteria for Contaminated Sites compiled by the Canadian Council of Ministers of the Environment (CCME) provide numerical limits for contaminants in soil and water intended to maintain, improve, or protect environmental quality and human health at contaminated sites. The criteria are intended to provide general technical and scientific guidance to provincial, federal, territorial and non-governmental agencies in the assessment and remediation of contaminated sites across Canada. They serve as bench marks against which to assess the degree of contamination at a site.

.7 Canadian Drinking Water Guidelines are also compiled by CCME for Canadian Drinking Water Quality for specified uses of water likely of concern at contaminated sites.

.8 Technical Guidance on the Land Treatment of Petroleum Hydrocarbon Contaminated Soils at Federal Government Facilities or on Federal Crown Land (Environment Canada, 1993).

3.3 NUNAVUT AND NORTHWEST TERRITORY ACTS, REGULATIONS AND GUIDELINES

.1 In addition to the Federal and Territorial Acts and Regulations identified in Section 3.2, the Due Diligence clean up of the FOX-M DEW Line site in Nunavut is governed by the following:

.1 Guidelines for Municipal Type Wastewater Discharges outline requirements for water quality effluent from these facilities.

.2 Guidelines for Discharge of Treated Municipal Wastewater outline requirements for water quality effluent from these facilities.

.3 *The Explosive Use Act* provides controls for surface blasting other than for mining purposes.

.4 *The Nunavut Wildlife Act* provides for the protection of wildlife and wildlife habitats as well as regulated harvest of selected species.

.5 *The Nunavut Environmental Protection Act* provides for protection of the environment from the discharge of contaminants, clean up of contaminants and unsightly premises. In addition, the powers of inspectors as well as offences and penalties are defined. The Act applies only to situations not authorized by other Canadian Acts in the Nunavut. The following guidelines under the Nunavut Environmental Protection Act may be applicable to the cleanup of the FOX-M site:

- Guideline for the Management of Waste Asbestos;
- Guideline for the Management of Waste Antifreeze;
- Guideline for the Management of Waste Batteries;
- Guideline for the Management of Waste Paint;
- Guideline for the Management of Waste Solvents; and
- Guidelines for the General Management of Hazardous Waste in Nunavut.

.6 The Spill Contingency Planning and Reporting Regulations outline requirements for filing of a contingency plan and for reporting of spills.

.7 *The Nunavut Fire Prevention Act* provides for regulation of, among other things, the decommissioning of fuel lines and fuel tanks.

.8 The Nunavut Territorial Archaeological Sites Regulations, pursuant to the *Nunavut Act*, protects archaeological sites in Nunavut from disturbance and prohibits the removal of archaeological specimens, except under permit.

.9 *Safety Act*: Occupational Health Regulations outline the health and safety standards to be maintained at workplaces to ensure the health and safety of persons.

.10 Guidelines for Removal of Materials Containing Friable Asbestos outline guidelines to be used to remove friable asbestos.

3.4 TUNGAVIK FEDERATION OF NUNAVUT

Activities associated with the Due Diligence clean up of FOX-M in Nunavut will require the provision of a Land Use Permit. Requirements governing access and use of Inuit owned lands are provided in the document "*Nunavut Land Claims Agreement*".

3.5 OTHER

Transportation and disposal of hazardous wastes is to be conducted by licensed waste handlers, in compliance with the appropriate legislation.

3.6 PERMITS

The Owner will acquire and pay for all necessary permits, approvals and authorizations associated with the handling, transport and disposal of hazardous material. The Contractor will be required to comply these permits, approvals and authorizations. A partial list of these requirements is presented in Table 3.1.

Table 3.1: List of Authorizations for Specific Clean Up Activities

Authorization	Authority	Activity to Which Authorization Applies	Contact Number	Minimum Turnaround Time*
Archaeological Research Permit	Nunavut Land Claims Agreement Act, Inuit Heritage Trust	Investigation of archaeological sites, mitigation, monitoring.	(867) 979-0731	3 weeks
Authorization for Works or Undertakings Affecting Fish Habitat	Fisheries and Oceans Canada (Iqaluit)	Stream crossing, culverts, drainage, siltation and erosion control, effluent discharge.	(867) 979-8002	1 week
Transportation Permits	Transportation of Dangerous Goods Act	Shipping.		Advance notification 30 days
Transportation Permits	International Air Transport Association Dangerous Goods Regulations	Air transport.		Advance notification 30 days
Fishing Licenses	Department of Sustainable development	Recreational fishing.	Any Sustainable Development office	None
Firearms Acquisition Certificates/ Firearms License (course required)	RCMP	Use and storage of firearms.	Any RCMP detachment	6 weeks

* Minimum turnaround time is defined as the normal time required to process an application following receipt by the issuing authority.

4.0 General Environmental Protection Measures

4.1 GENERAL

The lands associated with the FOX-M, Hall Beach site have distinctive biophysical characteristics associated with arctic environments. Potential impacts related to the clean up of the site include degradation of the permafrost regime, disturbance of existing vegetation, uncontrolled erosion, point source contamination, and disruption of terrestrial and wildlife populations, as well as human health impacts. The procedures and requirements provided in this section are intended to be protective of these ecosystem components.

4.2 SITE OPERATIONS

.1 Equipment and Vehicle Use and Maintenance

.1 Restrict vehicle and mobile equipment travel at the site to established roads, stream crossings and work pads unless specifically exempted by the Engineer. Recreational use of vehicles, including all terrain vehicles (ATVs) is NOT permitted off of the existing road network.

.2 Overland movement of equipment and vehicles is not allowed where damage to the vegetation or underlying soils may occur.

.3 Following heavy rains, vehicle and heavy equipment use outside of road and work pad areas is not permitted until the soil has drained sufficiently to prevent excessive rutting, and until authorized by the Engineer.

.4 Mobile equipment and vehicle operators shall yield the right-of-way to wildlife where safe to do so. Do not operate vehicles in a manner that harasses any species of wildlife.

.5 Perform vehicle and equipment servicing in designated areas only, where special care can be taken to contain, handle and dispose of maintenance fluids, parts, and waste.

.6 Conduct fuelling and lubrication of equipment in a manner that avoids spillage of fuels, oils, greases and coolants. When refuelling equipment, use leak-free containers and reinforced rip- and puncture-proof hoses and nozzles. Remain in attendance for the duration of the refuelling operation and ensure that all storage container outlets are properly sealed after use.

4.3 ROAD CONSTRUCTION AND MAINTENANCE

.1 Existing roads and trails provide access to most sources of aggregate. The 1984 DIAND report "Land Use Guidelines: Access Roads and Trails" shall be followed so that road and trail maintenance shall emphasize preservation of the permafrost regime, vegetation patterns, existing surface drainage patterns, water quality and stream flows.

.2 Avoid any archaeological resources during clean up operations. Do not site roads within 30 metres of any other ecologically sensitive areas. Ice-rich soils, especially peatlands, are also to be avoided during road construction.

4.4 STREAM CROSSING AND DIVERSION

.1 Adhere to all government regulations, licensing requirements/procedures and inspections regarding the protection of water quality and stream integrity to prevent destruction of spawning areas. Obtain Authorization from Fisheries and Oceans Canada for any works or undertakings affecting fish habitat including alterations, diversions, or crossings.

.2 Prevent siltation of waterways and disruption of streambeds, using the following procedures:

.1 Minimize activities adjacent to watercourses.

.2 Install cofferdams, silt barriers, or other suitable barriers.

.3 Do NOT operate equipment in waterways.

.4 Do NOT use streambeds for borrow material.

.5 Do NOT dispose of excavated fill, waste material or debris in waterways.

.6 Avoid concentrations of fish during activities adjacent to waterways.

.7 Do NOT ford streams at or immediately upstream of locations containing concentrations of fish.

4.5 BORROW PIT AND QUARRY DEVELOPMENT AND OPERATION

.1 Environmental protection measures are for the purpose of minimizing the impact of development and extraction activities on surface drainage patterns, water quality, soil erosion, and in some cases, wildlife or fish.

.2 Minimize the number of borrow pits opened by using existing borrow pits, roads and building pads where feasible. Use of alternative sources is subject to the approval of the Engineer.

.3 Avoid all archaeological resources during the siting of borrow area. Comply with all terms and conditions of the Quarry Permit, including recontouring/reclaiming and site clean up prior to site abandonment.

.4 Locate borrow area at least 30 metres from the nearest water body providing potential fish habitat, and other sensitive resources. In consultation with the Engineer, mark out a 30 metre buffer zone prior to commencement of gravel quarrying operations.

.5 Strip organic overburden, if present, and stockpile separately for use in restoring the borrow area.

.6 Following excavation, recontour the area to restore natural drainage patterns and work overburden into the recontoured borrow area to prevent erosion. Provide drainage and run-off control using diversion ditches and sediment filters, as required, to prevent sediment-laden run-off from reaching water bodies.

.7 During aggregate extraction, control vehicle and equipment operations in areas adjacent to the borrow pit to minimize the extent of disturbance.

.8 Stockpile aggregate on ice-poor, well drained ground such that surface drainage is not impeded. Locate the stockpile area a minimum of 30 metres from archaeological resources, water bodies, and other sensitive resources.

.9 If archaeological features or artifacts are encountered during borrow pit operations, notify the Engineer, avoid the area of the find, and restrict activities to other areas of the pit until further instructions are received. (See Section 5.0.)

.10 Development of additional borrow areas that are not identified on site plans will be at the discretion of the Engineer and shall meet all siting criteria and permit requirements as discussed above.

4.6 HAZARDOUS WASTE MATERIAL PROCESSING AREAS

.1 Develop a hazardous waste material processing area for the processing of hazardous materials in accordance with Section 02090 of the Contract Specifications.

.2 Locate the hazardous waste material processing area a minimum of 30 metres from the nearest archaeological site or water body, on ice-poor, well drained soil, and as close to the location of work as is practicable.

.3 Control movement of vehicles and equipment between the hazardous material processing area and work site to prevent the spread of potentially hazardous material along roadways.

4.7 CONTAMINATED SOILS

.1 DEW Line Clean Up Criteria (DCC) have been established as remediation criteria for soil contaminated with inorganic elements and PCBs.

.2 Cleanup of hydrocarbon contaminated soil at FOX-M is based on an overall risk management approach, and a preliminary evaluation criteria of 2500 ppm TPH.

.3 Locations of contaminated soil are shown on the Drawings. Soils exceeding the DCC and hydrocarbon criteria are to be removed as detailed in the Contract Specifications and Drawings.

.4 Minimize disturbance to adjacent areas during excavation of contaminated soils.

.5 Avoid spillage of material during transportation between the excavation site and the stockpile/treatment location. Cleanup any spillage to the satisfaction of the Engineer.

.6 Following excavation of Tier II contaminated soil and hydrocarbon contaminated soil, decontaminate excavation equipment as detailed in Section 02066 of the Contract Specifications.

.7 All workers are to wear appropriate protective clothing/equipment when handling contaminated soil as directed in Section 02066 of the Contract Specifications.

.8 A program of sampling and confirmatory testing of specific contaminated areas will be carried out by the Owner as outlined in the Contract Specifications.

.9 A hydrocarbon contaminated soil storage area for the secure storage of Type B hydrocarbon contaminated soils is to be constructed.

4.8 DISPOSAL OF SITE DEBRIS

.1 Collect, sort and dispose of hazardous and non-hazardous site debris in accordance with Section 02090 of the Contract Specifications.

.2 Workers are to wear appropriate protective clothing when handling potentially hazardous waste material as directed in Section 02090 of the Contract Specifications.

.3 Minimize off-road activity during collection of site debris.

.4 Avoid releasing any hazardous waste materials into the environment during the handling of hazardous waste materials. Invoke the emergency response plan (Section 7.0) and take appropriate action in the event of a spill or other emergency situation.

4.9 DEMOLITION OF BUILDINGS AND STRUCTURES

.1 Carry out demolition, sorting and disposal of hazardous and non-hazardous demolition waste in accordance with Section 02060 of the Contract Specifications.

.2 Remove all residual debris from the site down to grade. Demolish structures to the top of concrete foundation level. Dispose of non-hazardous demolition debris as directed in the Contract Specifications and Drawings. Regrade gravel pads and other foundations to restore natural drainage patterns and to match adjacent topography.

4.10 MARINE VESSEL MOVEMENTS

.1 Marine vessels can adversely affect wildlife. Sea mammals and flocks of waterfowl are to be avoided by all shipping.

.2 To minimize disruption to hunting and fishing activities, restrict vessel traffic to within traditional shipping lanes, where they exist. Avoid marked fishing gear that may be encountered near shore.

.3 Inform all marine vessel operators of all applicable EPP requirements when scheduling arrangements are made or at other appropriate periods prior to the arrival of the vessel at the site.

4.11 AIRCRAFT MOVEMENTS

.1 It is anticipated that commercial aircraft will be used to transport personnel and various construction materials and equipment to and from the site.

4.12 HANDLING OF HAZARDOUS WASTE MATERIALS

.1 Treat and dispose of hazardous waste material, including hazardous barrel contents, in accordance with Section 02090 of the Contract Specifications.

.2 Store hazardous and non-hazardous waste materials in accordance with Section 02090 of the Contract Specifications. Ensure each storage area is separated from the nearest water body by a 30 metre buffer zone; at beach storage areas consideration must be given to the reach of sea ice and storm tides.

.3 Packaging

.1 The *Transportation of Dangerous Goods Act* (TDGA) Dangerous Goods Regulations govern the packaging and shipment of hazardous goods within Canada. If shipping out of Canada, Canadian regulations and regulations of the destination country both apply. Requirements of the International Marine Dangerous Goods Code (IMDGC)

must be addressed in international waters (e.g. near Greenland).

.2 Any material classified as hazardous by the TDGA must be accompanied by the appropriate TDG shipping documents. The documents are to state the shipper, the receiver and all carriers involved in the transport of the shipment. Non-hazardous materials are also to be accompanied by a document indicating ownership and responsibility of the receiver.

.3 Package all hazardous material in accordance with the Transportation of Dangerous Goods Regulations.

.4 For TDG classification 9.3, dangerous goods in quantities larger than 5 kilograms or 5 litres, and for wastes that contain more than 500 grams of PCB mixture (a mixture with PCB concentration >50 ppm), the following procedures apply:

.1 Complete a waste manifest for each shipment, specifying a unique reference number and DND's waste generator number, to accompany the shipment to the final destination. The Department of Sustainable Development administers the manifesting system in Nunavut and is responsible for issuing the generator numbers.

.2 Document on the manifest the origin and destination of the shipment.

.3 All manifests are to be reviewed and signed by the Engineer prior to submission.

.5 Test any waste of unknown TDGA hazard to determine whether any transport hazard exists according to the regulations. Package any substance that is considered hazardous under the TDGA in accordance with the regulations and the national standard Performance Packaging for Transportation of Dangerous Goods. The TDGA regulations specify the packaging requirements for dangerous or hazardous goods according to risk.

.4 Labelling

.1 Label and placard packages according to class and division of the hazardous item. A label or placard design is unique to each classification. A partial list of these requirements is presented in Table 4.1.

.2 Label all packages on at least two sides and write the name of the hazardous substance beside the label. Placard large containers as defined by the class and division with the TDG product identification number clearly displayed. The product

identification number is indicated by the substance name in the regulations.

Table 4.1: TDGA Classification and Packaging Requirements for Specific Substances

Substance	Class/Packing Group	Packaging/Shipping Criteria
Petroleum Distillates, N.O.S. These types of petroleum hydrocarbons will include the majority of the liquid hydrocarbons to be removed from the site. (TDG)	3 III (3.3 III for Marine Vessels) - flammable liquids with a flashpoint between 23°C and 61°C, and a boiling point greater than 35°C (e.g. diesel, kerosene, lube oil). Packing Group III is the lowest risk for this class.	- by cargo vehicle or vessel, can be transported in standard large containers/barrels on land.
Hydrocarbons in Soils Flammable Solids N.O.S. (TDG)	4.1 III/II - flammable low (III) or medium (II) risk as tested. Criterion is how readily ignited the substance is. Assume most hydrocarbon contaminated soils are low risk.	- as above for cargo vehicles or vessels.
Tank Bottoms Sludges Waste Type 78 (TDG)	6.1, 4.1 II - a TDG defined waste type which is more poisonous (6.1) than flammable (4.1) but both risks must be labelled. The risk is medium (Packing Group II) for this substance.	- cargo vehicle or vessel only, shipment must be registered. - should be packaged in sealed, leak proof containers.
Polychlorinated Biphenyls (TDG)	9.3 I - hazardous waste with a high risk to human health (Packing Group I). This is for anything containing PCB mixtures (any item containing PCBs in concentrations greater than 50 ppm).	- cargo vehicle or vessel only, shipment must be registered. - any item containing PCB mixtures and intended for disposal must be contained in a combination packaging where the inner package is made of earthenware, plastic or metal and is leak-proof, and the outer packaging is a drum or box made of steel, aluminum, plywood, fibre or plastic. There must also be sufficient absorbent between the inner and outer packagings to prevent any liquid from escaping (if liquid is present) from the outer packaging.
Miscellaneous Degreasing Solvents, Waste Type 1 (TDG)	6.1 II - a poisonous liquid waste with a medium risk for this class.	- cargo vehicle or vessel only. - should be packaged in sealed, leak-proof containers for ground transport.

Substance	Class/Packing Group	Packaging/Shipping Criteria
Batteries, Wet, Acid Filled[6] (TDG)	8 III - corrosive substances contained in equipment or part of an item are considered low risk (Packing Group III).	- should be packaged in sealed, leak-proof containers for ground transport, or air transport.
Compressed Gases: i) Flammable Gases (TDG)	2.1 X - any pressurized or liquified gas which is ignitable at normal atmospheric pressure when in a mixture of 13% or less in air by volume.	- any compressed gas should be contained in cylinders according to the standards in the CSA document Cylinders, Spheres, and Tubes for the Transportation of Dangerous Goods.
ii) Non-Flammable, Non-Poisonous, Non-Corrosive Gases (TDG)	2.2 X - any pressurized or liquified gas which does not meet the criteria of divisions 2.1, 2.2 or 2.4.	
iii) Poison Gas (TDG)	2.3 X - any pressurized or liquified gas that has an LC50 value less than 5,000 mL/m^3 at normal atmospheric pressure by reason of toxicity.	
iv) Corrosive Gases (TDG)	2.4 X - any pressurized or liquified gas that has an LC50 value less than 5,000 mL/m^3 at normal atmospheric pressure by reason of corrosion effects on the tissues of the respiratory tract.	
Radioactive Material, N.O.S. (TDG)	7 X - any product, substance or article with activity greater than 74 kBq/kg.	- must be packaged and handled according to the Transport Packaging of Radioactive Materials Regulations.

Note:

1. Standard documentation applies for all of the above, except any item with "waste" in the name must have a waste manifest as well as a standard shipping document. (Ground and sea transport only.)
2. Special notification is needed for any PCB mixture transport.
3. These items may be shipped by a licensed TDG shipper only.
5. Packing Group X indicates special packaging required.
6. Wet acid filled batteries can be transported as described or alternatively they can be neutralized. Neutralization would make the batteries a "waste" under TDG and would require them to be manifested.

4.13 WORK SITE CLEAN UP AND ABANDONMENT

.1 Remove all temporary buildings, fuel barrels, vehicles, equipment and surplus materials from the site following completion of work.

.2 Stabilize all large earthwork slopes. Gravel access roads required for operation and maintenance may remain.

.3 Regrade all disturbed areas to restore natural drainage patterns.

5.0 Protection Measures for Valued Environmental Components

5.1 GENERAL

.1 This section describes the required protection measures for the valued environmental components identified at the FOX-M, Hall Beach site. Comply with all requirements described in this section.

5.2 HUMAN HEALTH AND SAFETY

.1 Potential hazards to human health and safety are present at the FOX-M site in the form of hazardous materials and contaminated soil, hazardous local terrain and unpredictable weather conditions. Hazardous material and contaminated soil have the potential to enter water bodies and the food chain, and thereby affect vegetation, fish, wildlife and the health of people who travel, hunt and fish in these areas. Contaminated soil is to be excavated and disposed of in accordance with Section 02066 of the Contract Specifications. Site debris may present a physical hazard to people travelling through these locations. Hazardous surface debris scattered at specific site locations is to be collected and disposed of in accordance with Section 02090 of the Contract Specifications.

.2 Take all necessary precautions when handling and transporting hazardous materials and contaminated soil to ensure that the materials do not come into contact with site personnel. Site workers shall wear protective clothing as directed in Section 02090 of the Contract Specifications when handling hazardous materials.

.3 All site personnel working on or in the vicinity of clean up operations must be trained in, made aware of, and adhere to the requirements of the Workplace Hazardous Materials Information System (WHMIS) program.

.4 Outdoor recreation activities of site personnel have the potential to adversely affect nearby fish, wildlife and heritage resources. Subject to camp rules and the requirements of territorial fishing licenses and regulations, staff may be permitted to leave the site for recreational purposes. However, recreational use of vehicles, including ATV's, is NOT permitted off of the existing road network. Normal precautions for Arctic travel include: provision for rapidly changing weather conditions; tactics for possible bear and other wildlife encounters; filing a trip plan; first aid kit, survival kit and insect repellent.

.5 Personal firearms are not permitted in the construction camp. However, the Contractor's Site Superintendent shall keep sufficient weapons (one for backup or replacement) for defence in the event of a bear encounter that threatens human safety. When not in use, all weapons shall be locked as per all applicable legislation and access controlled by the Site Superintendent.

5.3 LOCAL RESOURCE USE

.1 The coastal marine waters in the area of the FOX-M site are used for fishing and hunting, including traditional hunts of sea mammals. A potential concern involves physical conflicts between ship traffic and fishing nets, near shore pollution incidents during ship-to-shore transfer of fuel and equipment, shore-to-ship transfer of hazardous materials, shoreline terrain damage during beach landing area preparation, and landfill excavation.

.2 Clean up activities and related shipping shall not interfere with local resource use in excess of levels normally encountered by established local activities and shipping. Restrict vessel traffic to traditional shipping lanes where they exist to minimize disruption to hunting and fishing activities. Vessel operators are to avoid marked fishing gear that may be encountered near shore.

5.4 SURFACE WATER AND FISH HABITAT

.1 The following applies to work adjacent to waterways:

- .1 Prevent siltation of water bodies supporting fish by the use of berms or silt fences as required, and by minimizing activities adjacent to watercourses.
- .2 Do NOT operate equipment in waterways.
- .3 Do NOT use streambeds for borrow material.
- .4 Do NOT dispose of excavated fill, waste material or debris in waterways.
- .5 Survey areas immediately upstream and for 100 m downstream of proposed work areas to determine presence of concentrations of fish.
- .6 Avoid concentrations of fish during culvert removals and work adjacent to waterways.
- .7 Do NOT ford streams at or immediately upstream of locations containing concentrations of fish.
- .8 Restrict blasting to above water and more than 100 m from concentrations of fish.
- .9 Where possible, conduct in-stream work during low flow periods.

.2 Obtain authorization from Fisheries and Oceans Canada for alterations or crossings of any water body constituting fish habitat. (See Section 3.0.)

5.5 PERMAFROST SOILS

.1 Ice-rich soils are common in areas that are maintained by extensive vegetation cover, and are thus susceptible to permafrost degradation. The top layer provides a protective thermal barrier that prevents permafrost degradation. These soils are susceptible to erosion due to their fine texture and hilly topography. Erosion removes the thermal protection and causes permafrost degradation. Vehicle and equipment traffic, and soil excavation can disturb the surface layer and degrade the permafrost.

.2 Minimize disturbance to permafrost soils by restricting vehicle and heavy equipment traffic to existing roads and designated work areas unless approved by the Engineer.

.3 Minimize activity in areas adjacent to work areas.

.4 Do NOT operate vehicles or heavy equipment off-road following heavy rain or melting snow until the soil has dried sufficiently to prevent excess rutting.

.5 Install appropriate drainage and erosion control structures along access roads, where required.

.6 Implement the following procedures during site clean up operations to minimize disruption of permafrost:

.1 Site facilities such as work camps and storage areas such that they do not impede surface drainage or result in ponding. Construct gravel pads or use other appropriate methods to protect ice-rich soil from thermal or physical damage.

.2 Minimize extent of disturbance during excavations.

.3 Promptly backfill excavated areas with granular fill as indicated on the Contract Drawings and Specifications.

.4 Minimize the development of new borrow areas.

.5 Do NOT store materials directly on unprotected ground.

.6 Regrade disturbed areas to restore natural drainage patterns.

.7 Repair rutting that impedes local drainage or exposes permafrost in ice rich soils to the satisfaction of the Engineer.

5.6 COASTAL MARINE RESOURCES

.1 The coastline, adjacent to FOX-M, is used by marine mammals and seabirds for feeding, migration and breeding. Typical species that may be found in the area of FOX-M include

ringed seals, bearded seals, harp seals, narwhal, bowhead whale, beluga whales, and walrus.

.2 Seabirds are also vulnerable to disturbance during the nesting period. Seabird species that may be encountered include: Glaucous Gull, Herring Gull, Thayer's Gull, King Eider, and Common Eider.

.3 Marine mammals and flocks of seabirds must be avoided by all shipping. Where feasible, ships shall maintain a minimum distance of 1 km from known seabird colonies.

.4 During transfer of fuel to land-based storage tanks, equip the hoses or pipes with properly functioning and approved check valves to prevent backflow of fuel in the case of failure. Attend all fuel transfer operations at all times. In the event of a spill of fuel, implement the appropriate contingency plan as detailed in Section 7.0 of this EPP.

5.7 TERRESTRIAL RESOURCES

.1 Polar bears, lemmings, arctic hare, and arctic fox have been reported seasonally or year round at FOX-M. Birds, including ravens, loons, Arctic terns, snow buntings and plovers have been observed in the area. Raptors such as snowy owl, gyrfalcons, peregrine falcons and rough-legged hawks are known to occur in the area. Raptors are especially sensitive to disturbances. There is concern over human/wildlife contact, which could include harassment by project personnel causing disruption of activities such as calving, breeding, nesting and rearing, all of which may take place on the site proper.

.2 Prevent avoidable conflicts with wildlife using the following procedures:

.1 EMPLOY A DEDICATED WILDLIFE MONITOR(S) AT ALL TIMES.

.2 Require all on-site personnel to be familiar with the contents of "Safety in Bear Country".

.3 Do NOT feed, injure or harass wildlife.

.4 Ensure that clean up activities do NOT interfere with wildlife movement through the area.

.5 Do NOT disturb birds nesting on site.

.6 Vehicle, vessel and aircraft movements shall conscientiously avoid all known concentrations of wildlife or areas known to be frequented by important species or concentrations of wildlife.

.7 Do NOT attempt to chase, catch, divert, follow or otherwise harass wildlife by

aircraft, vehicle, and boat or on foot.

.8 Control refuse and make inaccessible to bears and other scavengers.

.9 In the event of unanticipated or unavoidable contact with mammals, act in accordance with the contingency plan (Section 7.0). Familiarize all individuals working at or visiting the site with this plan as part of their orientation to the work site.

.10 Equipment and vehicles shall yield to wildlife, where possible.

.11 Domestic or wild pets are not allowed in camps with the exception of controlled watchdogs.

.12 Project personnel shall not be permitted to possess personal firearms. The only firearms allowed on site shall be for protection from bears and shooting of animals exhibiting aberrant behaviour. The firearms shall be controlled by the Contractor's Site Superintendent.

.13 Report vehicle collisions with wildlife, encounters with troublesome animals, and/or the presence of potentially troublesome animals to the Engineer and to the District Wildlife Officer.

.3 Disruption of avifauna during the nesting period can result in reproductive failure. For this reason, concentrations of nesting birds should be avoided during this period. Raptors should be avoided because of their comparatively low abundance and their position at the top of the food web. Impacts on these species can be minimized by scheduling disruptive activities outside of the nesting period and by discouraging nesting at work areas.

.4 The arrival of avifauna at specific locations in the Arctic is influenced by weather conditions and other factors. Inclement weather or a delayed spring melt may delay arrival by several weeks. In general however, the chronology of arrival, nesting, and departure is relatively consistent between years.

.5 Typically within two weeks of arrival, nesting commences and continues for one to two months until the young leave the nest. Following this, the birds feed in preparation for the fall migration and depart by mid to late September.

.6 The migration and breeding chronology of major groups of birds is shown in Table 5.1. Schedule work to minimize impacts on these species.

Table 5.1: Approximate Nesting and Breeding Chronology for Birds Observed Near DEW Line Stations

Group or Species	Arrival	Nesting Period		Length of Breeding Season	Departure
		From	To		
Raptors	Mid-May to Early June	Early June	Late August	65-75 days	Late September
Waterfowl	Late May to Early June	Early to Mid-June	Mid to late July	25-38 days	Early September
Shorebirds	Late May to Early June	Early June	Early to late July	20-25 days	Late August

5.8 HERITAGE RESOURCES

.1 DEW Line sites are often located in areas which have been seasonally settled or visited by Inuit over the past 1,000 years; by their Palaeo-Eskimo predecessors for as many as three thousand years before the Inuit; and by Europeans and Eurocanadians over the past four centuries. Archaeological sites and recent camps and cemeteries exhibiting evidence of the presence of former occupants have been found on or adjacent to all of the DEW Line stations. Many of the sites have been disturbed by previous DEW Line activities. The traditional and scientific value of heritage resources is greatly diminished if they are disturbed or moved. Archaeological sites in Nunavut are protected by law, and disturbance of archaeological sites and collection of archaeological specimens is prohibited except under the terms of an archaeological research permit.

.2 Obtain a generic pamphlet from the regulatory authorities for use at the site, which illustrates typical site and artifact types, and describes procedures to follow in the event of encountering an archaeological site.

.3 In the event that heritage resources are discovered during clean up activities, the following procedures apply:

.1 Report discovery of archaeological site or artifacts immediately to the Engineer.

.2 Do NOT disturb archaeological sites or artifacts discovered and cease work in that area until appropriate authorities are notified.

.3 Report all archaeological finds in accordance with Section 7.4 of this EPP.

.4 Do NOT resume activities in the vicinity of the find until confirmation and direction from appropriate authorities is received.

.4 Reports of archaeological sites found shall include:

.1 the identity of the person making the discovery;

.2 description of the site location, including topography, landmarks, etc.;

.3 the nature of the activity resulting in the discovery;

.4 description of the archaeological site, including size, features, or details visible, supplemented by sketches or photographs;

.5 actions currently taken to protect the archaeological features; and

.6 extenuating circumstances.

.5 All personnel are to be discouraged from visiting archaeological and other heritage sites.

6.0 Environmental Inspection

6.1 GENERAL

.1 As part of its overall commitment to a strategy of environmental protection and quality assurance, the Owner intends to employ a dedicated environmental inspection staff to monitor its own compliance with the EPP and all applicable laws, regulations, permits, guidelines and standards.

.2 The environmental inspection staff will be a part of the DEW Line Clean Up Project Management Office (PMO). The PMO has been formed as per the Terms of Reference of the Memorandum of Understanding between the Director General Environment and Defence Construction Canada (DCL).

.3 The Owner will be represented at the site by the Engineer who will report to the DCL Contract Manager. Environmental inspection staff at each site will report to the Engineer.

.4 The Contractor will maintain regular contact with the environmental inspection/ Quality Assurance team. This will include, but is not limited to:

- attendance at regular meetings as scheduled with the inspector;
- immediately reporting concerns over any aspect of this EPP; and
- immediately reporting any spills or other event that may have an effect on human or environmental health and/or safety.

7.0 Contingency Plans

7.1 GENERAL

.1 The following generic contingency plans present the prescribed course of action to be followed in the case of unanticipated events during clean up such as fuel or chemical spills, potentially dangerous wildlife encounters, and the discovery of heritage resources. The plans will enable persons in a particular contingency situation to maximize the effectiveness of the environmental protection response and meet all regulatory requirements for reporting to the appropriate authorities.

.2 Submit to the Engineer for approval detailed spill contingency plans for the site. Identify response capabilities by detailing response times, and types and volumes of spills to which the Contractor can respond. The following information is required as a minimum:

.1 a description of pre-emergency planning;

.2 personnel roles, lines of authority and communication;

.3 emergency alerting and response procedures;

.4 evacuation routes and procedures, safe distances and places of refuge;

.5 emergency phone numbers;

.6 directions/methods of getting to the nearest medical facility;

.7 emergency decontamination procedure;

.8 emergency medical treatment and first aid;

.9 emergency equipment and materials;

.10 emergency protective equipment;

.11 procedures for reporting incidents;

.12 spill response and containment plans for all materials that could potentially be spilled; and,

.13 Material Safety Data Sheets for all fuels and chemicals stored on-site.

7.2 FUEL AND HAZARDOUS MATERIAL SPILLS

.1 The objective of the fuel-related contingency plan is to protect the environment and human health by minimizing the impacts of spill events through clear and concise instructions to all personnel.

.2 A variety of fuels and other materials may be in use at the FOX-M site during clean up. The greatest volumes of potential contaminants will likely involve Arctic diesel fuel. Other substances such as acids, solvents, lubricants, hydraulic fluid, antifreeze, fuel additives and engine coolants also pose potential environmental and safety hazards. For simplicity, POL and minor chemical spills will be considered together. As chemicals are usually stored and transferred in barrels of 205 litres or smaller capacity, any spill quantity is likely to be small.

.3 Based on the potential hazardous materials identified for disposal, Emergency Response Plans (ERPs) are not required during transport under the TDG regulations. If materials identified for disposal are listed on Schedule XII of the TDG regulations and are in volumes exceeding those specified in that schedule, register an ERP with the Director General of the Transport of Dangerous Goods Directorate. The ERP is to contain information such as the nature and risks of the particular dangerous good and contact names and numbers for emergency assistance.

.4 If a spill or a dangerous occurrence is discovered during transport in excess of those volumes listed in Part 9, Table 1 of the TDG regulations, the person who has management or control of the goods at that time must immediately notify the Emergency Authority in the province where the occurrence took place. The appropriate authorities are listed in Part 9, Table 2 of the TDG regulations. The person must also notify his/her employer, the owner of the vehicle on which the goods were carried, and the owner (consignor) of the dangerous goods. The person's employer is then required to issue a written report to the Director General within 30 days of the occurrence in the form detailed by the TDG regulations.

.5 The most common pollution incidents will probably involve spills of arctic diesel or aircraft fuel onto land or water resulting from:

- human error during transfer operations between holding tanks;
- rupture of lines, tanks, valves, dykes or barrels from deterioration or damage;
- seepage from fittings or valves;
- accidental spills during POL transport via vehicle or aircraft; and
- equipment failure.

.6 A person in control of a substance at the time of a spill shall report the spill via the appropriate spill response line. Quantities of substances that represent "a spill" are listed in Schedule B of the Nunavut Spill Contingency and Reporting Regulations. Advise the Engineer of all spills.

.7 In the event of a spill, protection of human health and safety is paramount. Contamination of personnel involved in clean up is a real possibility as is contamination of the surrounding workplace and environment.

.1 The individual discovering a spill shall:

.1 Warn people in the immediate vicinity and evacuate the area if necessary.

.2 Identify the spilled material if possible, and take all safety precautions before approaching it.

.3 Attempt to immediately stop the leakage and contain the spill, if safe to do so.

.4 Report to the Engineer the spill location, type of material, volume and extent, status of spill (direction of movement), and prevailing meteorological conditions.

.5 In the event of a shoreline spill, provide information about beach location, contaminated area, beach characteristics, presence of wildlife and archaeological sites which might be threatened.

.2 Both the Contractor and the Engineer have specific responsibilities in responding to a spill event. These are described as follows:

.1 Contractor's Responsibilities:

.1 Ensure response crew members are appropriately trained.

.2 Practice spill prevention by performing regular maintenance on all POL systems, and by using proper methods for the handling of POL products.

.3 Provide personnel, materials, and equipment necessary for adequate response to POL and hazardous material spills.

.4 Establish communications and verbally report all spills to the Engineer as soon as practical.

.5 Isolate and eliminate all ignition sources.

.6 Ensure safety and security at the spill site.

.7 Stop or reduce discharge, if safe to do so.

.8 Make every effort to contain the spill by dyking with earth or other barriers on land and containment booms on water.

.9 Assess potential for fuel/chemical recovery.

.10 Deploy on-site crews to mobilize pumps, empty 200 L drums, hand tools and absorbents to the spill site.

.11 Request assistance, if required, from DND (through the Engineer) and the Canadian Coast Guard.

.12 Hire additional assistance, if required, from northern residents, local communities, and commercial spill response firms.

.13 Follow all guidelines and regulations for disposal of spilled materials, associated debris, contaminated soil and water as established by appropriate government agencies.

.14 Assess potential terrain and wildlife disturbance, erosion and archaeological site disturbance in any areas to be affected by clean up operations and contact relevant authorities.

.15 Document all events/actions.

.16 Report the spill to the Spill Report Line and follow up with a written spill report. This report shall summarize the initial report information; confirmation of spill volume; actions taken; future remediation/monitoring requirements; and a sketch map and/or photographs of the spill area.

.17 For spills on water, immediately mobilize additional containment and clean up equipment in consultation with the Coast Guard, Environment Canada and Fisheries and Oceans Canada if on-site equipment is inadequate. Close isolation valves to stop fuel flow, if

required. Deploy light weight booms and oil absorbent materials to protect environmental resources along the coastline, as applicable. Track progress of spill, if of unknown origin, and report spills as described in Clause 7.2.7.6 below.

.2 Engineer's Responsibilities:

.1 Commit resources, as required, to respond to and clean up a spill.

.2 Supervise containment, clean up and restoration operations.

.3 Document all events/actions.

.4 Notify appropriate government agencies using the contact list.

.3 The final decision on clean up methods will be made by Environment Canada at the time of the notification of the spill.

.4 The selected clean up methods shall:

.1 minimize danger to persons and wildlife;

.2 minimize danger to property;

.3 minimize water pollution;

.4 minimize the area and degree of disturbance to land and water surrounding the spill during clean up; and

.5 minimize environmental impacts of the spill.

.5 The following general clean up procedures shall apply.

.1 Wear protective clothing as required for handling spills.

.2 Contain spills on soil or rock by constructing earthen dykes using available material. If soil is not available, place sorbent material or boom in path of spill. As the sorbent barrier becomes saturated, continually replace it. Fuel or liquids lying in pools, trenches or in specially constructed troughs are to be removed with pumps, buckets or skimmers.

.3 If ground is snow covered, create snow dykes and line with polyethylene liner for containment and recovery of ponded fuel.

.4 For spills on water, deploy containment booms and recover as much fuel as possible with a work boat and skimmer if the area has less than 1/10 ice cover. If the area is ice infested, burn any fuel spills using igniters.

.5 Apply sorbents, if necessary.

.6 Assess potential for disturbance of wildlife, fish, and archaeological sites by spill or clean up operations and notify the relevant authorities.

.7 Notify environmental authorities to discuss disposal and clean up options.

.8 Conduct required clean up operations.

.9 Assess and appropriately treat any areas disturbed by clean up activities.

.10 Ensure the site has been completely restored and leave the site only when all work is finalized.

.6 Report spills immediately on the 24 Hour Spill Report Line (867) 920-8130 (NWT; Nunavut Spill line not yet in place). Prepare a written spill report and submit it to the Engineer and the supervisor of the Spill Report Line who shall forward copies to DIAND and Environment Canada.

.7 Include the following specific information when reporting a spill:

.1 report date and time of spill;

.2 location and map coordinates (if known) and direction of spill movement;

.3 party responsible;

.4 product identification and quantity spilled;

.5 conditions at the spill site including weather, depth of snow cover, proximity of spill to bodies of water, wind speed and direction, and wave height (for marine spills);

.6 cause of spill;

.7 whether the spill has terminated or is continuing;

.8 extent of contaminated area;

.9 factors affecting spill recovery;

.10 containment measures;

.11 response actions to date;

.12 request for assistance;

.13 hazards and dangers;

.14 comments and recommendations;

.15 name of the person reporting the spill; and

.16 name of the person to whom the spill is reported.

7.3 WILDLIFE ENCOUNTER

.1 Polar bear occurrences have been reported in the vicinity of the FOX-M site. Bears are a potential hazard to workers at all times and the situation can be aggravated by the presence of any substance that a bear perceives to be food.

.2 EMPLOY DEDICATED WILDLIFE MONITORS AT ALL TIMES DURING CLEAN UP OPERATIONS.

.3 Be familiar with bear deterrent procedures and ensure that at least one designated staff member is competent with the camp firearms. Be familiar with the GNWT "Safety in Bear Country" manual and make available a reference copy at the site office.

.4 Operators of vehicles and equipment shall make every effort to avoid encounters with large mammals. Congregations of animals near food or garbage are a potential problem that can be overcome by proper disposal of food wastes. Concentrations of scavenging animals such as wolves, foxes and bears increase the risk of diseases, particularly rabies, and danger to personnel. The following precautions and actions are to be taken at each site:

.1 The killing of wildlife for any reasons at variance with the Wildlife Act and regulations is an offence. Coordinate procedures for handling wildlife problems and incidents with the regional Government of Nunavut (GN) wildlife office.

.2 Advise personnel to maintain watch for bears and immediately report any sightings to the Engineer. Immediately notify all personnel of the sighting. If the threat of attack is considered significant, assign a full time wildlife monitor to the specific areas or activities at risk.

.3 Use vehicles, noisemakers and, if necessary, a firearm to frighten the bear away from the site.

.4 Shoot a bear only if the bear returns repeatedly, refuses to leave or directly threatens human safety. Killing is considered a last resort and, if at all possible, contact the appropriate wildlife officer and alert them to the problem. If a bear is to be shot, assign the task only to a person familiar with and competent with the camp firearm. Wounded or otherwise aggravated bears can be extremely dangerous.

.5 Report the death of a bear to the Engineer and the appropriate GN wildlife officer who will issue instructions as to disposal of the carcass and the formal reporting procedures to be followed.

.6 Due to the possibility of rabies, shoot any animal that bites a human and retain the carcass intact pending instructions from the appropriate wildlife officer. If possible, notify the wildlife officer before any drastic action is taken. Seek medical advice from the appropriate medical facility for treatment of animal-inflicted wounds.

7.4 HERITAGE RESOURCES

.1 Avoid all archaeological sites at the FOX-M site during clean up activities.

.2 Unrecorded archaeological sites containing such remains as habitation structures, hunting blinds, food caches and graves, and objects such as tools, utensils and butchered animal bone may be inadvertently discovered and disturbed during clean up activities. All site personnel are prohibited from knowingly disturbing any archaeological or other heritage site or collecting any artifacts. Removing artifacts is a criminal offence.

.3 In the event of finding heritage resources:

.1 Cease site work immediately in the area; do NOT remove any artifacts or other associated objects from the site unless their integrity is threatened in any way.

.2 Mark the site's visible boundaries and avoid the area during clean up activities.

.3 Report the discovery of the site immediately to the Engineer and the Department of Culture, Language, Elders and Youth of the Nunavut Territorial Government by phone or fax and comply with any site protection instructions issued. Do not engage in any archaeological excavation activities.

.4 Prepare reports of any discovery for the respective regulatory authority and DND/PMO indicating:

- the identity of the person making the discovery;
- the nature of the material;
- the nature of the activity resulting in its discovery;
- the location of the find including a description of the site location, topography, landmarks, etc.
- a description of the archaeological site including size, features or details visible, supplemented by sketches or photographs;
- protection measures instituted;
- the present location of any heritage material removed for safekeeping; and
- extenuating circumstances.

7.5 KEY CONTACT LIST

.1 24 Hour Spill Report Line

.1 In the event of a spill, contact the 24 Hour Spill Report Line and provide with all the relevant details.

- Telephone: (867) 920-8130 Fax: (867) 873-6924

.2 Environment Canada, as lead agency shall then be contacted by officials to ensure the appropriate response. The lines are staffed 24 hours a day and can also be used to coordinate a response in the event of a non-spill emergency outside of normal working hours.

.2 Other Contacts

.1 In the event of a non-spill emergency (e.g. related to wildlife, fisheries, heritage resources, etc.) contacts are provided in Table 7.1 and Sections 7.2 and 7.3. If any clean up or associated operations adversely affect the North Warning System operations, Major A.D. Cameron should be contacted immediately.

.3 PMO Contacts

All significant events should be reported to the Project Management Office in Ottawa. Key contacts are as follows (Fax number is 613-998-1061):

- Contract Manager – Shawn Helmerson (613) 998-4511
- Environmental Officer – Suzanne Bélanger-Fontaine (613) 991-9358
- Deputy Project Manager – Scott Munn (613) 990-9641

Table 7.1: Contacts

Resource	Location	Phone No.
Environment Canada, Environmental Protection Branch	Yellowknife Contact: Laura Johnson – Manager	867-669-4700
	Iqaluit Contact: Sid Bruinsma – Manager	867-975-4636
Indian and Northern Affairs Canada (INAC)	Inuvik Region District Manager – Rudy Cockney	867-979-3361
	Iqaluit Region District Manager – Dan Elliot	867-979-4405
Renewable Resources Officer Stations – Baffin Region	Iqaluit	867-979-5017
	Hall Beach	867-928-8819
GN Environmental Protection	Iqaluit; contact Earle Baddalo	867-975-5910
INAC Land Use	Iqaluit – Michael Immaroitok/Carl McLean	867-979-4405
Department of Fisheries and Ocean	Iqaluit – Jordan de Groot	867-979-8002
Department of Sustainable Development	Iqaluit -	867-975-5902
Canadian Wildlife Service	Yellowknife	867-669-4700
Dept. of Culture, Language, Elders and Youth	Iqaluit	867-975-5500