Site Photographs
Site: PIN-3, Lady Franklin Point

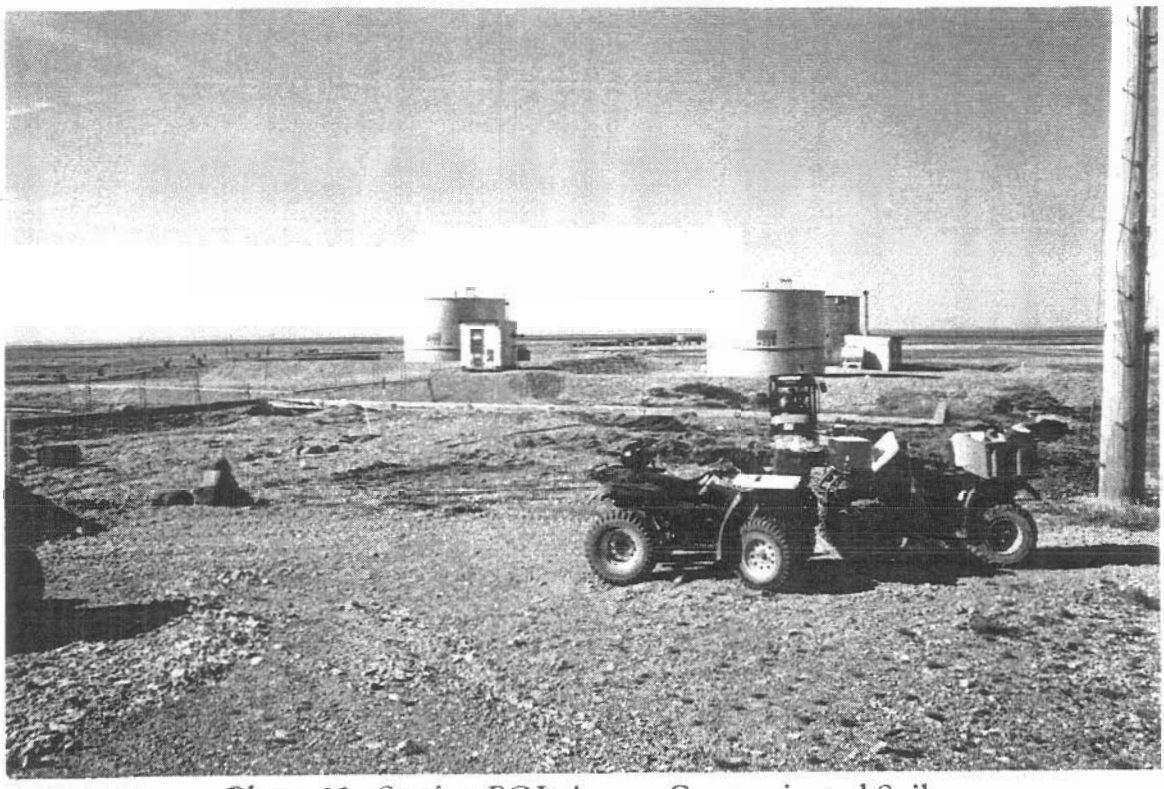

Photo 13 –Station POL Area – Contaminated Soils

Photo 14 – Sewage Lagoon Area – Contaminated Soils

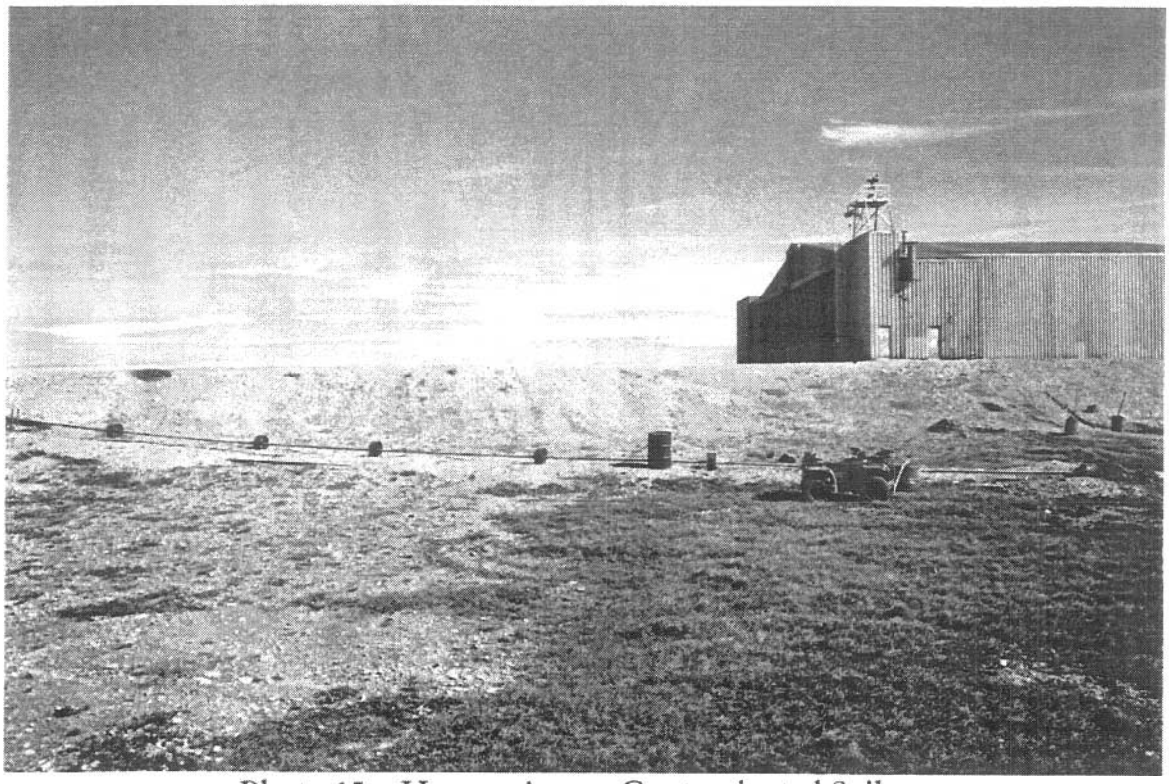

Photo 15 – Hanger Area – Contaminated Soils

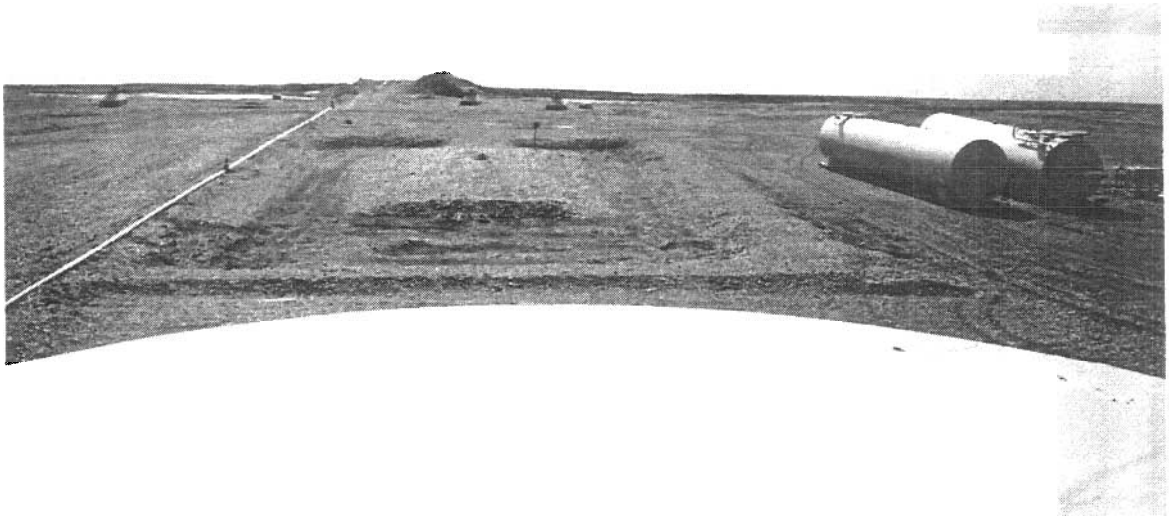

Photo 16 – Beach POL Area – Contaminated Soils

Site Photographs
Site: PIN-3, Lady Franklin Point

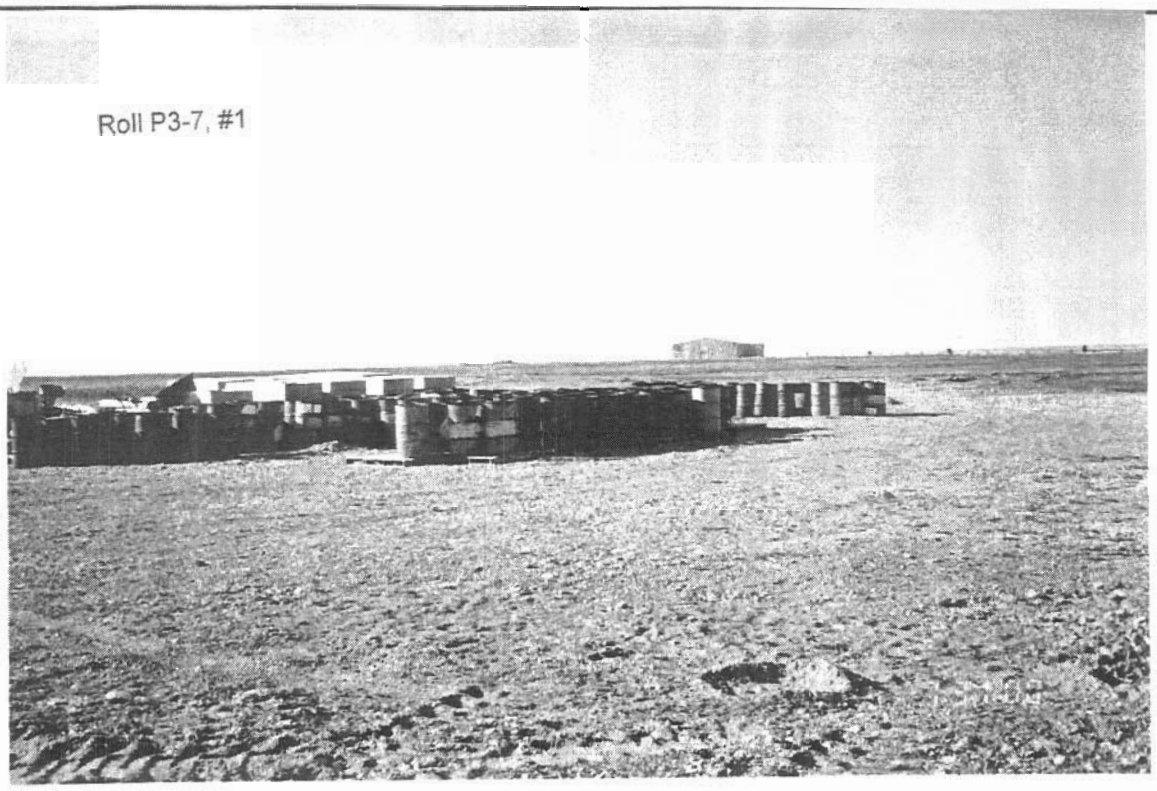

Photo 17 – Debris at Beach Landing Area

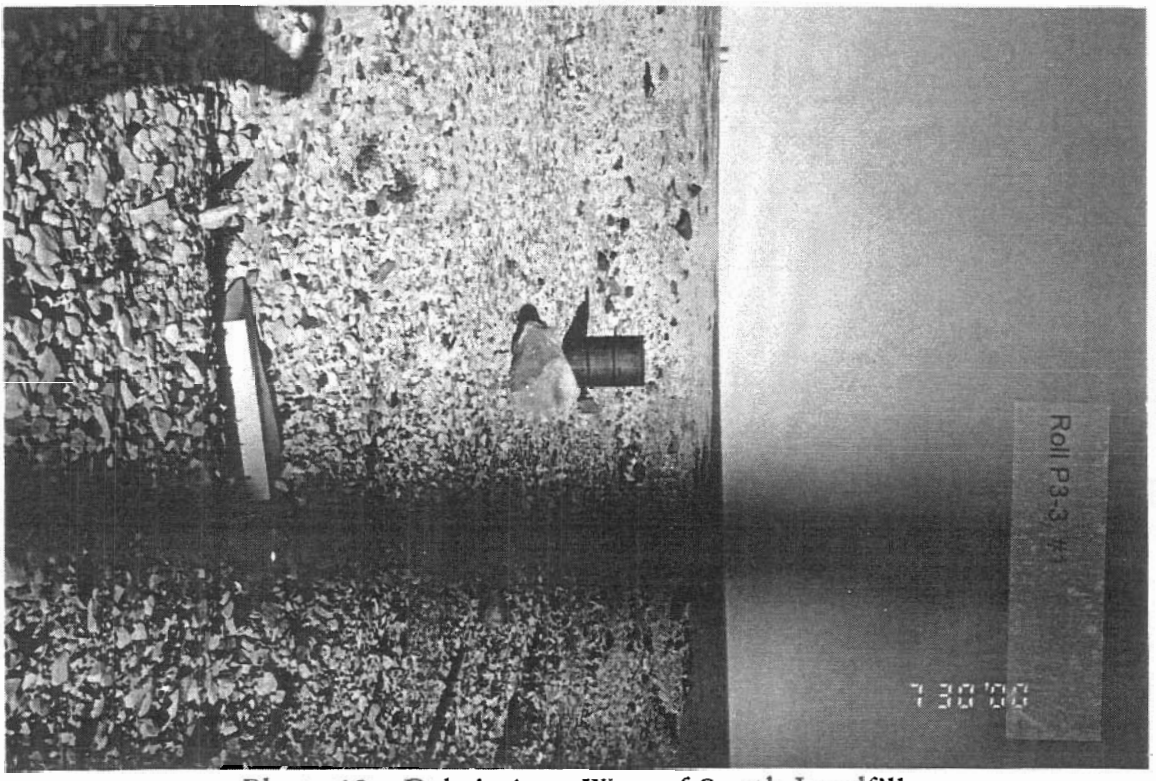

Photo 18 – Debris Area West of South Landfills

Site Photographs
Site: PIN-3, Lady Franklin Point

Photo 19 – Debris Area 200 m West of Module Train

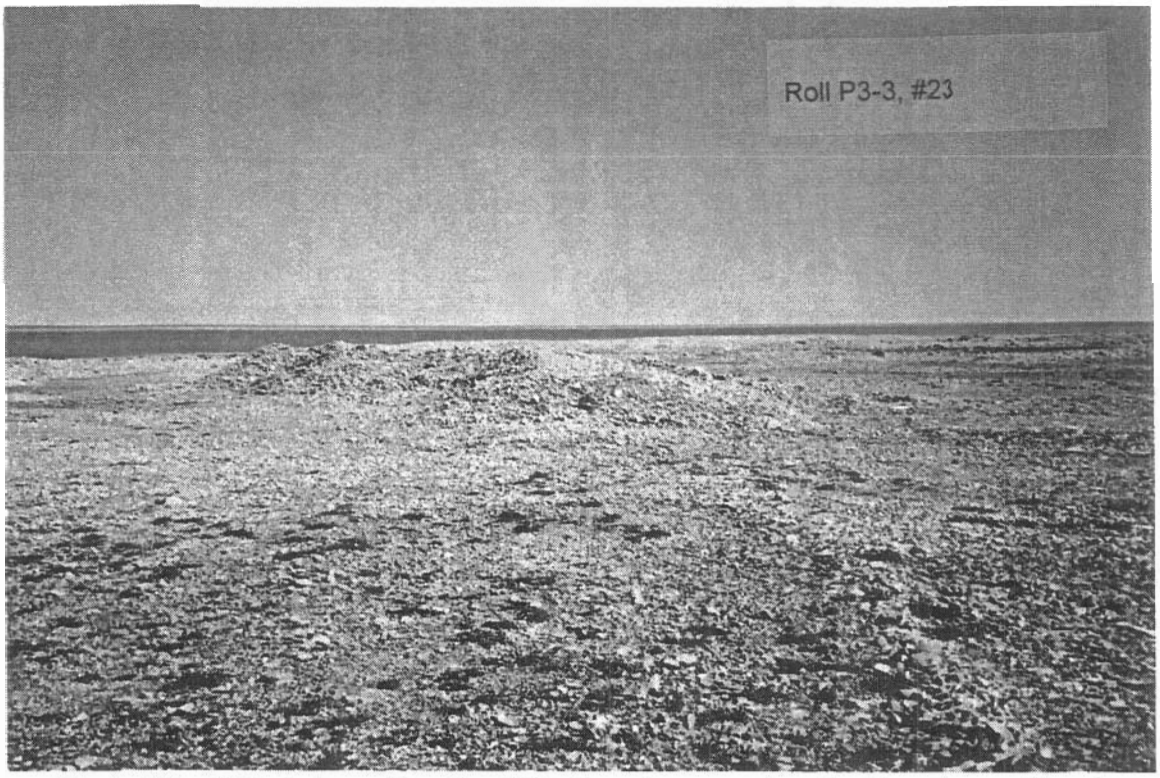

Photo 20 – Debris Area North of Station Area on Austin Bay Access Road

Site Photographs
Site: PIN-3, Lady Franklin Point

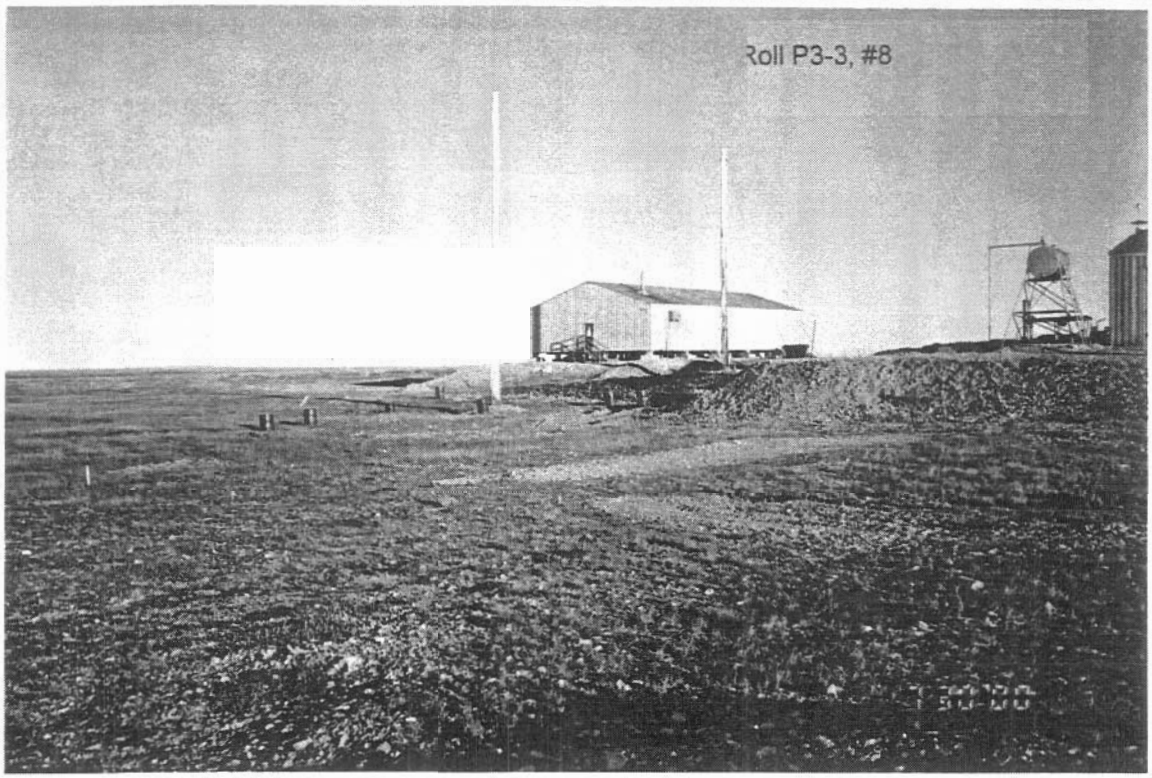

Photo 21 – Debris Area North of Garage near Toe of Gravel Pad

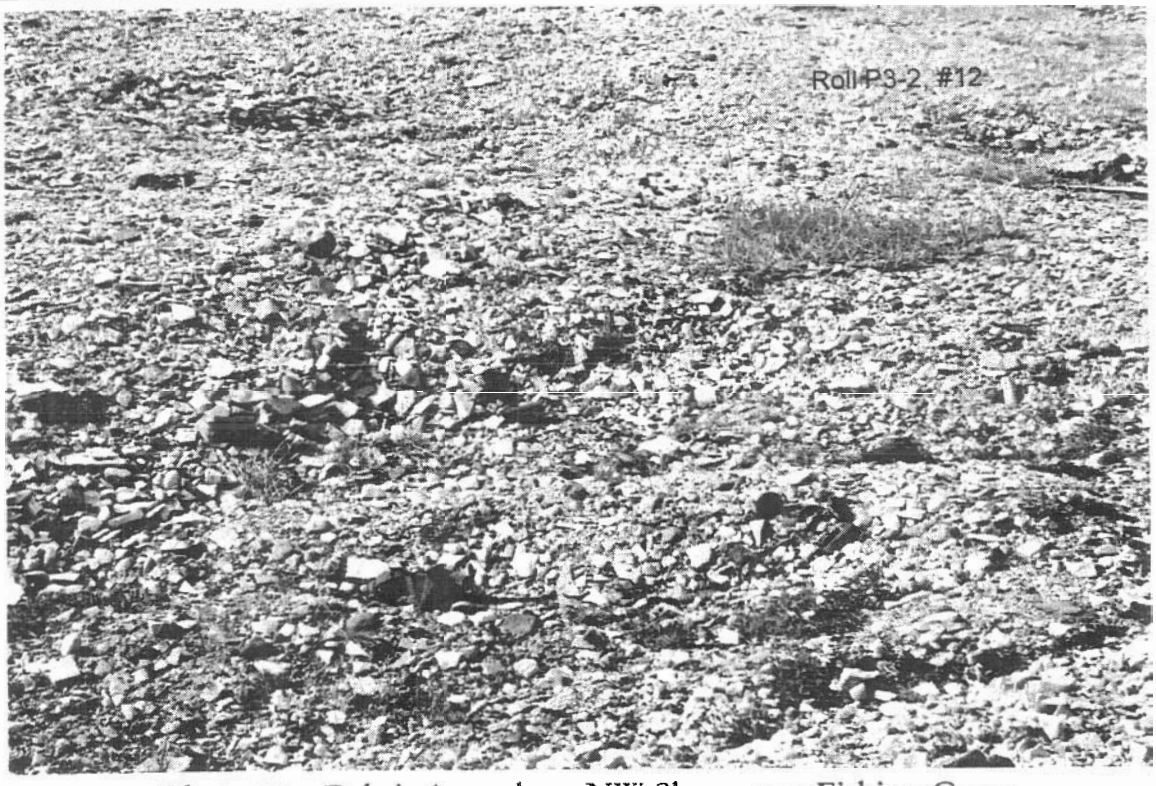

Photo 22 – Debris Area along NW Shore near Fishing Camp

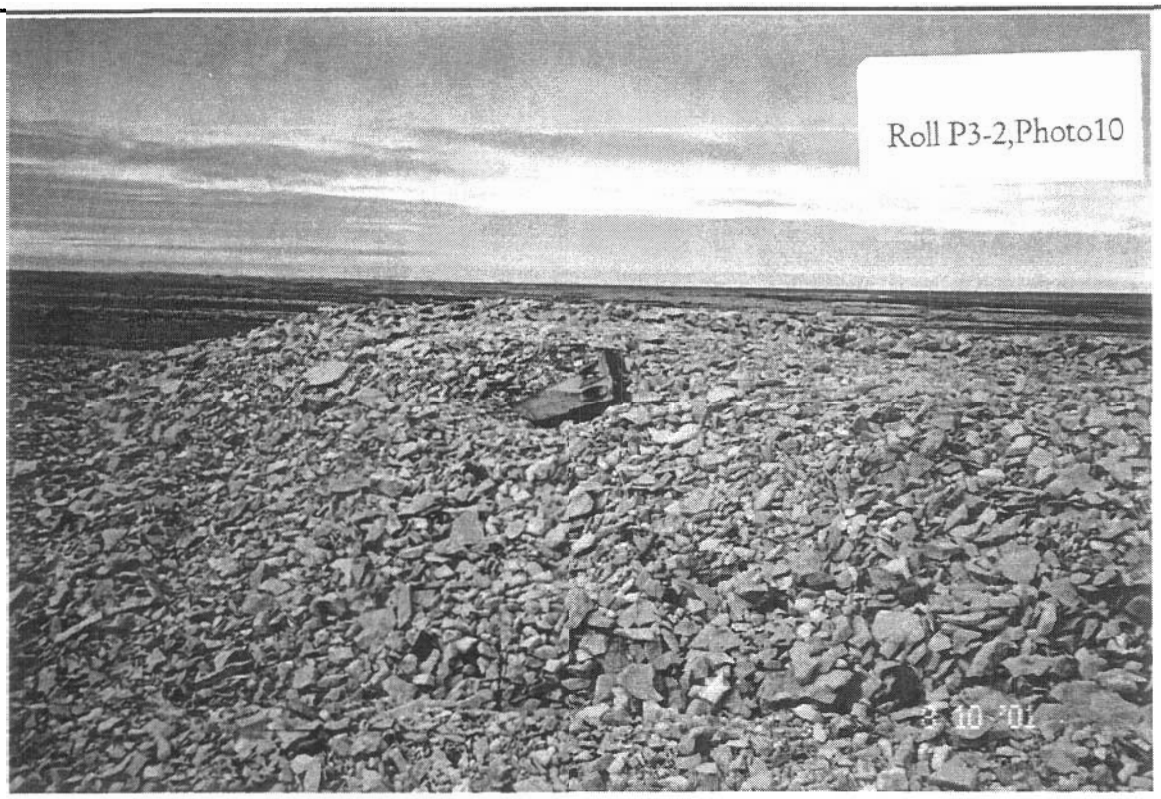

Photo 23 – Partially Buried Debris East of Existing North Landfill

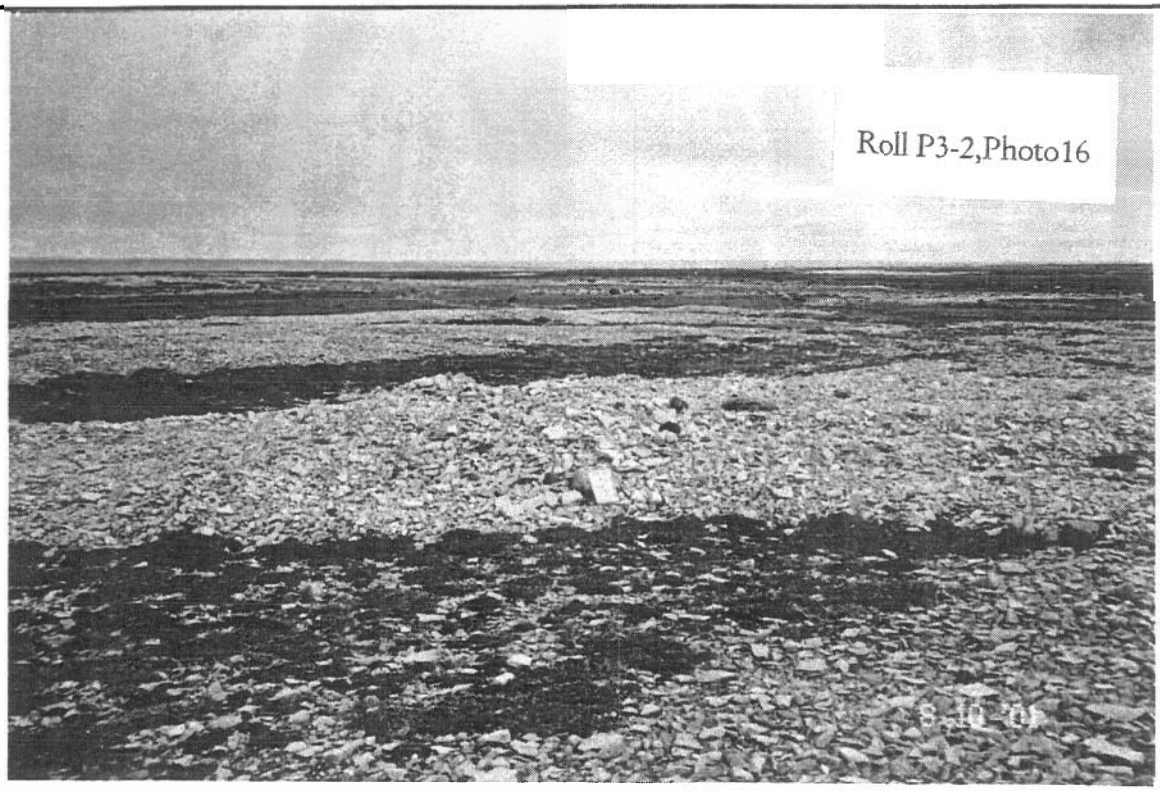

Photo 24 – Partially Buried Debris 300 m North of Existing North Landfill

Site Photographs
Site: PIN-3, Lady Franklin Point

Roll P3-2,Photo20

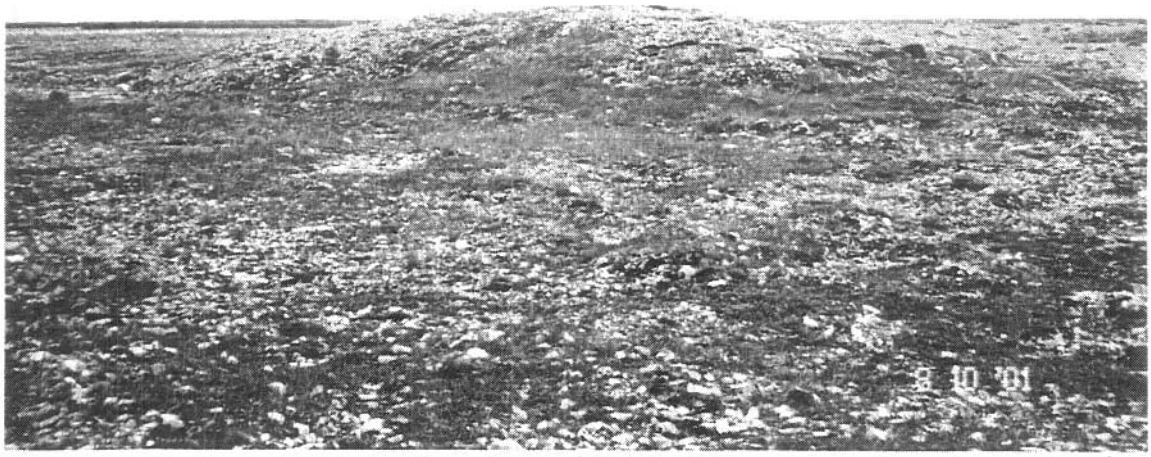

Photo 25- Buried Debris 40 m West of TBM 402 on Austin Bay Access Road

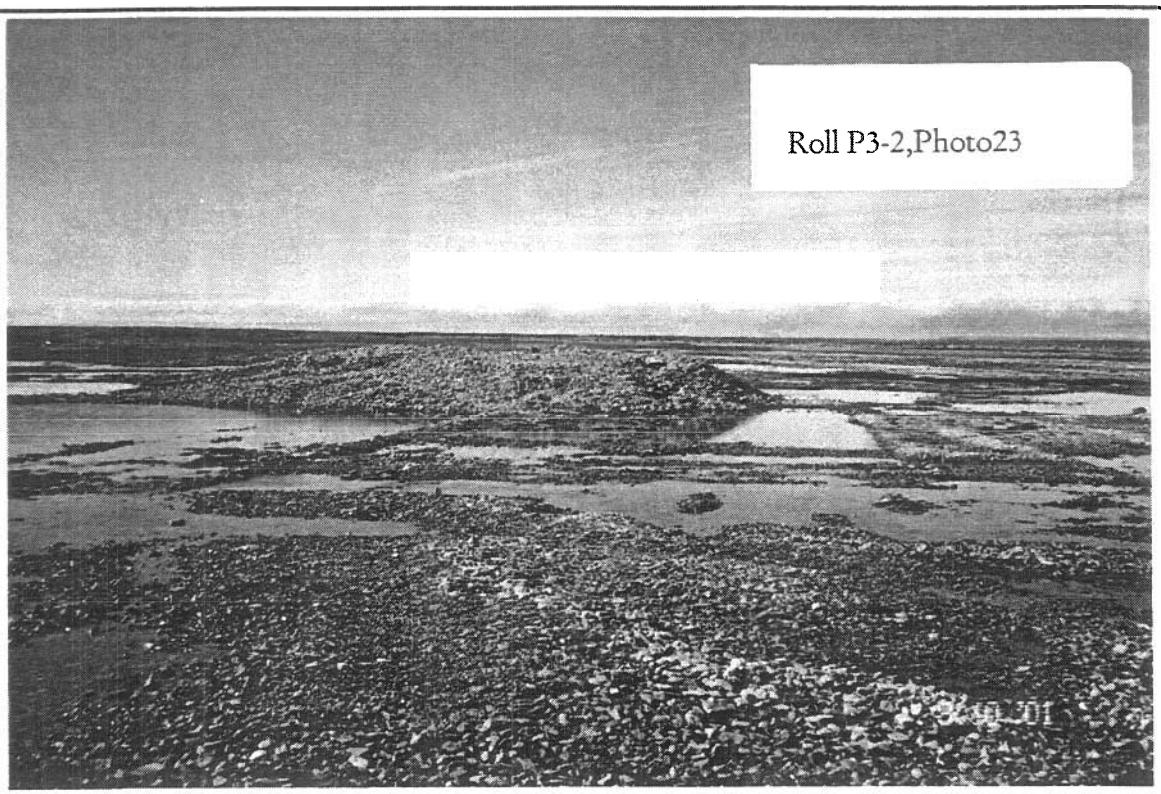

Photo 26 – South Buried Debris Area at Austin Bay Beach

Site Photographs
Site: PIN-3, Lady Franklin Point

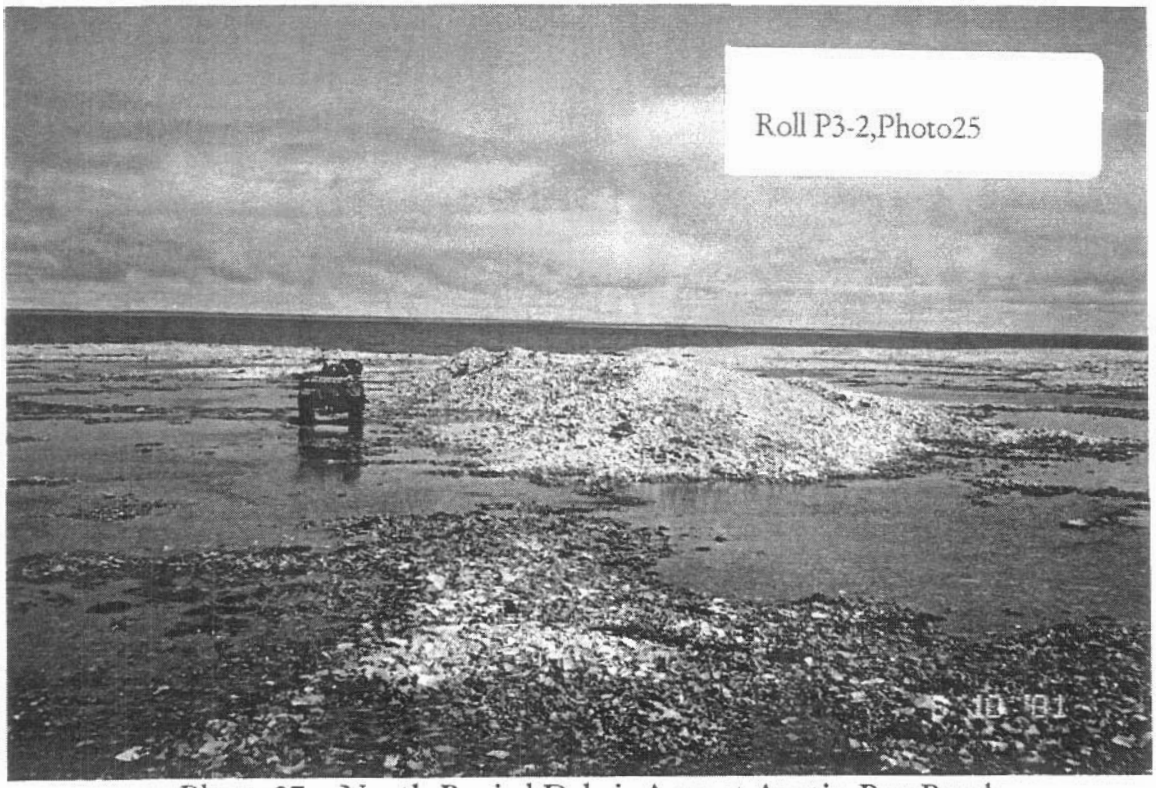

Photo 27 – North Buried Debris Area at Austin Bay Beach

Photo:

Photo

APPENDIX E
ENVIRONMENTAL PROTECTION PLAN

Department of National Defence

PIN-3: Lady Franklin Point DEW Line Site Environmental Protection Plan

Prepared for

Department of National Defence

Prepared by

UMA Engineering Ltd.

In association with

The SGE Group Inc.

January 2002

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List of Tables

List of Acronyms

CCME	Canadian Council of Ministers of Environment
CEPA	Canadian Environmental Protection Act
DCC	DEW Line Clean Up Criteria
DCL	Defence Construction (1951) Ltd.
DEW Line	Distant Early Warning Line
DIAND	Department of Indian Affairs and Northern Development
DND	Department of National Defence ("Owner")
EARP	Environmental Assessment and Review Process
EPP	Environmental Protection Plan
GNWT	Government of the Northwest Territories
ILA	Inuvialuit Lands Administration
IRC	Inuvialuit Regional Corporation
IMDGC	International Marine Dangerous Goods Code
LRR	Long Range Radar
LSS	Logistic Support Site or Station
MOU	Memorandum of Understanding
MSDS	Material Safety Data Sheets
NFC	National Fire Code
NWS	North Warning System
NWT	Northwest Territories
PAP	PCB Amended Painted
PCB	Polychlorinated biphenyl
PMO	Project Management Office
POL	Petroleum, Oils and Lubricants
SRR	Short Range Radar
TDGA	Transportation of Dangerous Goods Act
TPH	Total Petroleum Hydrocarbons
WHMIS	Workplace Hazardous Materials Information System

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 construction and clean up activities at the PIN-3, Lady Franklin Point site as identified during the Environmental Screening Process. These screenings and all available environmental and engineering information were used to prepare this EPP. Although the *Canadian Environmental Assessment Act* is now in effect, this project was initiated under the *Federal Environmental Assessment Review Process* (EARP) and is subject to the requirements of that process, including environmental screenings.

.2 The EPP is to be implemented by the Contractor through appropriate actions and the application of contingency plans. The EPP is 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 construction of a work camp, environmental clean up, demolition activities and closure of those portions of the DEW Line site not required as part of the North Warning System (NWS). (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 PIN-3, Lady Franklin Point 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 RATIONAL

.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 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 LRR sites, including PIN-3, are remotely operated and personnel are only on site for short periods for maintenance and inspection.

.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 Following the environmental investigations, engineering site investigations were conducted to obtain the information required to develop clean up design drawings and specifications, and included surveys of contaminated areas, characterization of debris and landfill areas, investigation of proposed landfill development areas and identification of granular borrow sources.

.5 The environmental and engineering surveys at the PIN-3 site were carried out over the period of 1989 to 1994 and documented the environmental implications and potential effects of the clean up work. An environmental and engineering site investigation was carried out in 2000 and 2001 with the objectives of more accurately delineating known contaminated areas, and verifying overall site conditions.

.6 In 2001, a Co-operation Agreement between DND and NTI was signed, which specifically relates to the cooperation between DND and the Nunavutmiut for the restoration and clean up of the DEW Line sites, and related activities occurring at sites located within Nunavut.

.7 Specific to the PIN-3, Lady Franklin Point site, the primary clean up requirements are as follows:

- demolition and disposal of all site infrastructure no longer required for the operation of the NWS SRR site including containerization of materials with PCB Amended Paint (CEPA levels);
- excavation and disposal of contaminated soils;
- collection and disposal of debris;
- closure of four existing landfills;
- excavation of two landfills;
- development of one landfill for the disposal of non-hazardous demolition wastes;
- development and operation of a hydrocarbon contaminated soil treatment area; and
- development of a new landfill for the disposal of all Tier II contaminated soils.

2.2 PROJECT ACTIVITIES

.1 The clean up activities at PIN-3 are based on the DEW Line Clean Up Protocol outlined in the DND-NTI Cooperation Agreement, which targets contaminated soil, landfills, demolition and exposed debris for cleanup. The following sections describe the major activities to be performed in the clean up of the PIN-3 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 major clean up activities include the following:

- mobilization;
- establishment of a construction camp, including:
  - access and supply routes,
  - water supply,
  - waste management,
  - fuel handling and storage,
  - equipment and vehicle use, storage and maintenance;
- excavation of contaminated soil;
- excavation and treatment of hydrocarbon contaminated soils;
- collection of site debris;
- collection and containerization of hazardous waste material;

- disposal of non-hazardous waste materials;
- demolition of existing facilities;
- containerization of demolition debris containing PCB-amended paint;
- closure of existing landfills;
- development of new landfills;
- development of granular borrow areas;
- site grading; and
- demobilization.

.3 Construction Camps

.1 Siting

.1 The construction camp shall meet all requirements of Section 01591 of the Contract Specifications.

.2 Locate the construction camp and/or associated storage areas in areas of previous disturbance to minimize damage to previously undisturbed areas.

.2 Access

.1 Access to the PIN-3 site is provided by charter aircraft and barge.

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

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

.3 Water Supply

.1 The existing water supply locations may be used as a potable water source, providing the water withdrawal rate by the Contractor does not adversely affect fish habitat. If required, an alternative water supply is to be located, tested and approved in accordance with the Water Use License.

.2 Routinely monitor water quality to ensure that it meets or exceeds the Guidelines for Canadian Drinking Water Quality. The results of analyses of the samples collected from the water supply lakes are provided in Section 01591 of the Specification.

.4 Waste Management

.1 Provide waste management for all facilities operated by the Contractor.

.2 Only domestic and human wastewater shall be collected and disposed of in a wastewater treatment system. This excludes items such as waste oil and liquids containing hazardous material. The wastewater shall be disposed of in accordance with the appropriate discharge criteria provided in Section 01560 of the Contract Specifications.

.3 Dispose of non-hazardous solid wastes, generated as part of the operation of the construction camp, on site in the Non-Hazardous Waste Landfill.

.4 Domestic non-hazardous waste may be incinerated and residue disposed of as described above.

.5 Fuel Handling and Storage

.1 Transport fuel to the site and store in approved facilities, as described in Section 4.2, at the construction camp, storage compound or existing fuel storage facilities, if available.

.6 Equipment and Vehicle Use, Storage and Maintenance

.1 Transport equipment and vehicles to the site, store in approved locations, use only for contracted work, and maintain as required.

.2 Limit vehicle use, other than for contracted work, to the existing road network. No recreational use of vehicles, including all terrain vehicles (ATVs), is permitted off the existing road network.

.4 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. Soils contaminated at levels above DCC Tier I but less than DCC Tier II Criteria are to be landfilled on site. Soils containing contaminants equal to or exceeding DCC Tier II Criteria are to be containerized for off-site disposal at a licensed disposal facility. These criteria are designed to be protective of the Arctic ecosystem.

.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

.5 Excavation and Treatment/Disposal of Hydrocarbon Contaminated Areas

.1 A risk management approach has been used in the development of the clean up requirements for hydrocarbon contaminated areas at the PIN-3, Lady Franklin Point DEW Line site. A preliminary evaluation criterion of 2500 ppm Total Petroleum Hydrocarbon (TPH) concentration in the soil is used. On this basis, specific areas have been targeted for remediation as indicated on the Drawings and in the Specifications.

.2 For the purposes of this project, Type A and Type B hydrocarbon contaminated soil have been defined as follows:

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

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

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

.5 All work related to the excavation and treatment/disposal of hydrocarbon a contaminated soil is to be completed in accordance with Sections 02066 and 02067 of the Contract Specifications.

.6 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 Northwest Territories 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 these hazardous materials are presented in Table 2.2.

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

Table 2.2: Hazardous Waste Material Disposal Requirements

Hazardous Material	Disposal Requirement
• batteries • heavy metal-contaminated organic liquids: o Cadmium > 2 ppm o Chromium > 10 ppm o 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.
• asbestos	Double bag and dispose offsite at an engineered landfill in accordance with Sections 02081 and 02209 of the Contract Specifications.
• fuel tank bottom sludges • fuels, lubricating oils, alcohols and glycols	Off-site licensed treatment/disposal facility or on-site incineration in accordance with Sections 02090 and 01546 of the Contract Specifications.
• liquids and solids containing organic compounds with PCB concentration > 50 ppm (excepting PCB Amended Painted Materials)	Off-site licensed treatment and disposal facility; e.g. Alberta Special Waste Management System Facility - Swan Hills, Alberta.

.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 explosives expert. If fire or heat threatens the area of the potentially explosive material, all personnel will move to a distance of at least 1000 m 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 Transport hazardous materials in accordance with the Transportation of Dangerous Goods Regulations, as applicable.

.6 Conduct all work related to hazardous materials in accordance with Section 02090 of the Contract Specifications.

.7 Disposal of Non-Hazardous Materials

.1 Non-hazardous materials collected or generated during the cleanup are anticipated to include wood, metal, empty barrels, creosote treated timbers, power cables, and concrete. Dispose of these materials on site in the Non-Hazardous Waste Landfill, in accordance with Section 02209 of the Contract Specifications.

.8 Demolition of Existing Facilities

.1 Dismantle facilities such as buildings, billboards, antennae, and fuel storage tanks not required as part of the NWS operations at PIN-3 in accordance with Section 02060 of the Contract Specifications.

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

.3 Some facilities to be demolished have been identified as being PCB contaminated up to and greater than 50 ppm with consideration of the substrate (PCB contaminated paint). Workers are to wear appropriate personal protective equipment when handling these materials, as directed in Section 02060 of the Contract Specifications.

.4 Containerize PCB-Amended painted materials and transfer containers to the Temporary Storage Area.

.5 Dispose of non-hazardous materials, and asbestos in a suitable on site landfill. Double-bag asbestos materials prior to placement in the landfill as described in Sections 02081 and 02090 of the Contract Specifications.

.9 Landfill Closure

.1 The PIN-3 site has four identified landfill areas that were used for the disposal of domestic waste, abandoned machinery and equipment, structural remains, barrels and other material.

.2 Remove surface debris from within the immediate area of the landfill. Debris will be disposed of as described in Clauses 2.2.6 and 2.2.7. Closure of three of the four existing landfills will include placement of granular fill over the landfill and grading of the area to restore natural drainage, as detailed in the Contract Drawings and Specifications.

.3 Install a leachate containment system, consisting of a synthetic liner system that is keyed into the underlying permafrost at the Main Landfill and the Tier II Disposal Facility.

.4 The South Beach Landfill and the north lobe of the Main Landfill are to be excavated.

.10 Landfill Excavation

.1 Excavate the South Beach Landfill and the north lobe of the Main Landfill at the PIN-3 site in accordance with Section 02240 of the Contract Specifications.

.2 Transport excavated material to a hazardous materials processing area. Classify debris as hazardous or non-hazardous, and dispose of in accordance with the Specifications. The Owner will analyze potentially contaminated soil for classification purposes. Handle and transport contaminated soil as outlined in Section 02066 of the Specifications.

.11 Landfill Development

.1 Develop one new landfill at the PIN-3 site, in the designated areas as indicated on the Drawings, for the disposal of non-hazardous wastes materials generated during the cleanup of the PIN-3 site.

.2 Develop a new landfill, DCC Tier II Disposal Facility, in the area designated on the Drawings, for the disposal of DCC Tier II contaminated soils.

.3 Construct the new landfills in accordance with Section 02209, 02498, and 02499 of the Contract Specifications.

.12 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.

.13 Site Grading

.1 Site grading operations are to focus on shaping and grading disturbed areas to blend in with natural contours. Disturbed areas include:

- contaminated soil excavation areas;
- existing landfill areas;
- debris areas;
- areas disturbed during demolition operations;
- granular borrow areas; and
- any area disturbed during the establishment and operation of the construction camp, equipment storage and maintenance facilities.

.2 During grading operations, restore natural drainage where feasible. This applies to areas which 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 including grounding grids, helipad, satellite ground terminals, fuel storage tanks, fuel lines and communications and fibre optic cables, as designated in the Contract Specifications and Drawings.
- areas susceptible to permafrost degradation (refer to Section 5.7).

.14 Roads

.1 Remove culverts from existing access roads, if required, as directed in Section 02060 of the Contract Specifications and excavate trenches across roads to maintain drainage.

.15 Demobilization

.1 Following the completion of clean up activities, remove all equipment, remaining fuel, supplies, the construction camp from the site.

3.0 Regulatory Overview

3.1 INTRODUCTION

.1 The Contractor shall comply with all applicable environmental laws, regulations and requirements of Federal, Territorial, and other regional authorities, and will acquire and comply with such permits, approvals and authorizations as may be required. The Contractor is subject to and must comply with those permits and approvals obtained on behalf of and by DND to conduct this work. The Contractor, through all project phases, shall 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, negative alteration or disturbance, or 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 the 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 benchmarks 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 TERRITORIES ACTS, REGULATIONS AND GUIDELINES

.1 In addition to the Federal and Territorial Acts and Regulations identified in Section 3.2, the clean up of the PIN-3 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 Nunavut. The following guidelines under the Nunavut Environmental Protection Act may be applicable to the cleanup of the PIN-3 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 the NWT.

.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 *Northwest Territories Act*, protects archaeological sites in the Northwest Territories 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 clean up of PIN-3 in the Nunavut may require the provision of Land Use Permits and Quarry Licenses if they occur outside the DND reservation as shown on the Contract Drawings. Under the terms of the permits and licenses, a variety of user fees are specified. Requirements governing access and use of land are provided in the document "*Nunavut Land Claim 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 Contractor involved in the site clean up process will be required to acquire and pay for all necessary permits, approvals and authorizations associated with the Contractor's site operations, and with the handling, transport and disposal of hazardous material. A partial list of these requirements is presented in Table 3.1.

Table 3.1: List of Authorization for Clean Up Activities

Authorization	Authority	Activity to Which Authorization Applies	Contact Number	Minimum Turnaround Time*
Archaeological Research Permit	Northwest Territories Act, Northwest Territories Archaeological Sites Regulations (must be applied for by qualified archaeologist)	Investigation of archaeological sites, mitigation, monitoring.	(867) 920-8084	3 weeks
Authorization for Works or Undertakings Affecting Fish Habitat	Fisheries and Oceans Canada (NWT)	Stream crossing, culverts, drainage, siltation and erosion control, effluent discharge.	(867) 920-6640	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 Renewable Resources	Recreational fishing.	Any Renewable Resources office	None
Firearms Acquisition Certificates	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

4.1 GENERAL

The lands associated with the PIN-3, Lady Franklin Point 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 Construction Camp

.1 At the PIN-3 site, the Contractor will likely establish a construction camp on the site.

.2 Locate the camp site in an area with minimal vegetative ground cover. A potential construction camp site has been identified on the Construction Drawings.

.3 Locate the construction camp in an area that is as close as practical to the main area(s) of clean up and where possible, on an existing gravel pad or former borrow area.

.4 Do not impede surface drainage, and maintain a distance of at least 30 metres from the nearest water body.

.5 Avoid ice-rich substrates, where possible.

.6 Protect permafrost by construction of gravel pads and /or elevation of heated buildings on wooden supports

.7 Avoid areas containing archaeological resources.

.8 Do not interfere with LRR activities, and comply with provisions of the Site Use Restrictions (SUR).

.2 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 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 which 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, operators shall use leak-free containers and reinforced rip- and puncture-proof hoses and nozzles. Operators are to be in attendance for the duration of the refuelling operation and are to ensure that all storage container outlets are properly sealed after use.

.3 Storage and Handling of Fuel and Other Hazardous Substances

.1 Locate fuel storage facilities as designated by the Engineer and such that there is no interference with the LRR activities.

.2 Store fuel in self-dyking containers, or position over an impervious liner and surround by an impervious dyke of sufficient height to contain not less than 110% of the capacity of the tank.

.3 Avoid sites that slope towards waterways or other environmentally sensitive areas; exhibit ponding or flooding; or have high groundwater tables, excessive seepage, or ice-rich (thaw-sensitive) soils. Avoid archaeological resources.

.4 Smoking is prohibited within 7.5 metres of the fuel storage facility. Provide appropriate signage as detailed in Section 01546 of the Contract Specifications.

.5 Inspect fuel storage facilities at least once each week for the duration of the project. Make available fire-fighting equipment for immediate access at each fuel storage facility.

.6 Store all barrels containing fuel and/or other hazardous materials in an elevated position either on their side with bungs facing the 9 and 3 o'clock position or on pallets, upright, banded and encased in overpack containers.

.7 All barrels shall be individually identified. The label shall be to industry standards and shall provide all information necessary for health and safety, and environmental purposes. Make available, to all personnel, Material Safety Data Sheets for all materials maintained in the construction camp.

.8 Treat all waste petroleum products including used oil filters as hazardous material, and handle and dispose of following the requirements detailed in Section 02090 of the Contract Specifications. Do not use waste oil for dust suppression. Report all fuel spills to the Engineer and, as provided by legislation, to the applicable government authorities, as indicated in Section 7.0.

.9 Conduct regular inspections of all machinery hydraulic, fuel, and cooling systems. Repair leaks immediately.

.10 Pre-assemble and maintain emergency spill equipment including at least two fuel pumps, empty 200 litre barrels and absorbent material sufficient to clean up a 1,000 litre spill at all permanent fuel storage sites and work camps (see Contingency Plans, Section 7.0).

.11 Remove all barrels, redundant fuel storage facilities and associated materials and equipment from the site at the conclusion of the work.

.4 Water Management

.1 The existing water supply at PIN-3 may be used as a potable water source providing such use does not adversely affect fish habitats.

.2 Treat potable water where required to protect human health. The camp water supply shall be remote from sources of contamination.

.3 Provide chlorine or iodine treatment of potable water, if required, and test potable water for bacteria as required by the appropriate public health ordinances.

.4 The Owner shall obtain a Water Use Licence from the Nunavut Water Board for the development of alternative water supply sources, as required. The Contractor is required to comply with all conditions of the license.

.5 Water withdrawals must not endanger fish or draw down the water level so as to adversely affect fish habitat. Water withdrawal rates are not to exceed 10% of existing stream flow or 10% of total water body volume.

.6 Equip all water intake hoses with screens with a mesh size of 2.5 millimetres or less to prevent the intake of fish.

.5 Domestic Waste Management

.1 Dispose of all kitchen wastes and other non-hazardous wastes in the non-hazardous waste landfill unless otherwise specified. The landfill selection is to be determined jointly by the Contractor and the Engineer. The location is not to interfere with NWS Operations.

.2 Temporarily store kitchen wastes in metal, animal-proof containers to prevent scavenging of waste by wildlife and reduce scattering of debris.

.3 The Contractor, in consultation with the Engineer, will determine acceptable options for sewage disposal, that are in compliance with Water Use License. Each construction camp shall provide at minimum primary sewage treatment, with a minimum retention time of 24 hours prior to discharge. Discharge of sewage wastewater shall meet the criteria outlined in Section 01560 of the Specifications, and those outlined in the Water Use License.

4.3 ROAD CONSTRUCTION AND MAINTENANCE

.1 Existing roads and trails provide access to most sources of aggregate, potable water and/or landfill locations. Road and trail maintenance shall emphasize preservation of the permafrost regime, vegetation patterns, existing surface drainage patterns, water quality and stream flows.

.2 Establishment of new roads off site is subject to approval of the Engineer.

.3 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 Prepare the roadbed with a sufficient thickness of fill to prevent terrain damage. Install culverts to maintain natural cross drainage and prevent ponding. Remove these culverts from such roads and restore drainage at the end of the clean up operations.

.5 Monitor access roads for signs of erosion and take remedial action where necessary. Do NOT use oil for dust control. Dust suppression, if directed by the Engineer, is to be effected with water only.

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.

.3 When removing culverts, the following procedures are to be followed to minimize disruption to streambeds and potential fish habitat:

.1 Schedule removal of culverts to avoid concentrations of fish if such concentrations exist.

.2 Install or construct cofferdams of non-erodible material, silt barriers, or other suitable methods to control siltation downstream of the work area.

.3 Reshape site to conform to grade of adjacent stream bank following removal of the culvert.

.4 Use riprap or other suitable methods, if required, to stabilize the bank at the worksite.

.5 Remove all silt controls following completion of work, and ensure the grade of the streambed is restored.

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, vegetation and, in some cases, wildlife or fish.

.2 Comply with all terms and conditions of the Quarry Permit, including recontouring/ reclaiming and site clean up prior to site abandonment.

.3 Minimize the number of borrow pits opened by using existing borrow pits and aggregate stockpiles where feasible. Use of alternate sources is subject to approval by the Engineer.

.4 Avoid all archaeological resources during the siting of borrow areas. Borrow areas are to be located at least 30 metres from the nearest water body providing potential fish habitat, and other sensitive resources.

.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 MATERIAL PROCESSING AREAS

.1 A hazardous material processing area shall be developed for the processing of hazardous materials in accordance with Section 02090 of the Contract Specifications.

.2 Locate the hazardous material processing area a minimum of 100 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 contaminated soil with inorganic elements and PCBs.

.2 Cleanup of hydrocarbon contaminated soil at PIN-3 is based on an overall risk management approach, and a preliminary evaluation criteria of 2500 ppm TPH.

.3 Locations of contaminated soil are delineated on the Drawings, and the levels of contamination are provided in the Contract Specifications. Soils exceeding the DCC criteria are to be removed as detailed in the Contract Specifications and Drawings.

.4 Minimize disturbance to adjacent areas during excavation.

.5 Avoid spillage of material during transportation between the excavation site and the container/disposal location.

.6 Following excavation of DCC Tier II 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.

4.8 HYDROCARBON CONTAMINATED SOILS

.1 The requirements for remediation of hydrocarbon contaminated soil at the PIN-3 site were developed using a risk management approach. Locations of hydrocarbon contaminated soil are indicated on the Drawings and levels of hydrocarbon contamination are provided in the Contract Specifications. Hydrocarbon contaminated soil areas designated for clean up are to be excavated and treated/ disposed of as detailed in the Contract Specifications and Drawings.

.2 Minimize disturbance to adjacent areas during excavation.

.3 Avoid spillage of material during transportation from the excavation site and the treatment location.

.4 Following excavation of hydrocarbon contaminated soil, decontaminate excavation equipment as detailed in the Contract Specifications.

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

.6 A landfarm facility for the treatment of Type B hydrocarbon contaminated soil will be constructed at the PIN-3 site, as detailed in the Contract Specifications and Drawings.

.7 Locate the landfarm in an area with minimal vegetative ground cover. A potential landfarm site has been identified on the Construction Drawings.

.8 Locate the landfarm in an area that is as close as practical to the main areas of hydrocarbon contaminated soil excavation, and where possible, on an existing gravel pad of former borrow area.

.9 Do not impede surface water drainage and maintain a distance of at least 100 metres from the nearest water body.

.10 The minimum distance between the landfarm and construction camp, Engineer office, and site laboratory is 500 metres. Locate facilities accordingly.

.11 Avoid areas having an overall slopes greater than 6%.

.12 Avoid areas containing archaeological resources.

.13 Do NOT interfere with LRR activities and comply with provisions of the Site Use Restrictions (SUR).

.14 Construct and operate the landfarm in accordance with Section 02067 of the Specifications.

.15 A program of sampling and analytical testing of the hydrocarbon contaminated soil in the landfarm will be carried out by the Owner as outlined in the Specifications.

.16 All workers to wear appropriate protective clothing/equipment when handling hydrocarbon contaminated soils as indicated in Section 02066 of the Specifications.

.17 Avoid releasing any contaminated soil or contact water into the environment during the transport, handling, treatment and/or disposal of hydrocarbon contaminated soils.

4.9 LANDFILL CLOSURE AND DEVELOPMENT

.1 Cover landfills with granular fill material to provide a minimum cover thickness as indicated on the Contract Drawings. Regrade the landfill areas to restore natural drainage patterns and topography.

.2 Install geo-synthetic liner systems where indicated on the Contract Drawings. Cover landfills with granular fill material to provide a minimum cover thickness as indicated on the Contract Drawings. Regrade the landfill areas to restore natural drainage patterns and topography

.3 Construct new landfills for the disposal of non-hazardous wastes generated during the cleanup of the PIN-3 site.

.4 Provide drainage controls such as diversion ditches and sediment filters, as required, to prevent runoff from reaching water bodies during closure, remediation and construction of landfills.

.5 Conduct all earthworks in accordance with Section 02209 of the Contract Specifications.

.6 Install monitoring equipment as indicated on the Drawings or as directed by the Engineer in accordance with Section 02510 of the Contract Specifications.

4.10 LANDFILL EXCAVATION

.1 Excavate the South Beach Landfill and the north lobe of the Main Landfill to the lines and dimensions as indicated on the Contract Drawings and in accordance with Section 02240 of the Specifications.

.2 Provide drainage controls such as diversion ditches and sediment filters to prevent runoff/leachate from reaching water bodies during excavation.

.3 Transport excavated material to the hazardous material processing area, for classification and sorting.

.4 Handle, containerize and label hazardous material in accordance with Section 02090 of the Contract Specifications.

.5 Dispose of non-hazardous debris in an on-site landfill in accordance with Section 02209 of the Contract Specifications.

.6 Handle and containerize or landfill contaminated soil as described in Section 02066 of the Contract Specifications.

.7 All workers to wear appropriate protective clothing/equipment when handling hazardous or potential hazardous materials as directed in Section 02240 of the Contract Specifications.

.8 Avoid releasing any hazardous materials or contaminated soil into the environment during the transport, handling or sorting of excavated waste materials. Invoke the emergency response plan (Section 7.0) and the appropriate action in the event of a spill or other emergency situation.

4.11 DISPOSAL OF SITE DEBRIS

.1 Collect, sort and dispose of hazardous and non-hazardous site debris in accordance with Section 02219 of the Contract Specifications.

.2 Test contents of intact barrels and dispose of as described in the Contract Specifications, Section 02090.

.3 Handle and dispose of asbestos according to the methods described in the Contract Specifications, Section 02081.

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

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

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

4.12 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 All residual debris from the site is to be removed down to grade. Structures are to be demolished to the top of concrete foundation level. Remove creosote treated timber pile foundations. Non-hazardous demolition debris shall be disposed of as directed in the Contract Specifications and Drawings. Gravel pads and other foundations are to be regraded to restore natural drainage patterns and to match adjacent topography.

4.13 MARINE VESSEL MOVEMENTS

.1 It is anticipated that marine vessels will be used for the transport of equipment and materials to and from the PIN-3 site. Under certain circumstances, 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, vessel traffic shall be restricted to traditional shipping lanes, where they exist. Vessel operators are to 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.

4.14 AIRCRAFT MOVEMENTS

.1 It is anticipated that fixed wing chartered aircraft will be used to transport personnel, perishable supplies and various construction materials and equipment to and from the site.

.2 Where concentrations of birds or mammals are known to be near construction sites, charter pilots shall be advised to maintain an altitude of at least 500 metres and preferably 1,000 metres, above ground or water, when passing over these areas. Low-level flights to observe or photograph wildlife shall not be permitted.

.3 Inform all charter aircraft pilots of all applicable EPP requirements when scheduling arrangements are made or at other appropriate periods prior to the arrival of the aircraft at the site.

4.15 HANDLING OF HAZARDOUS MATERIALS

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

.2 Based on analytical test results, incinerate barrel contents as appropriate, with equipment capable of incinerating glycols and hydrocarbon/water solutions.

.3 The incineration crew is to be equipped with material and equipment necessary for the safe and efficient execution of the work.

.4 Store hazardous materials in accordance with Section 02090 of the Contract Specifications and ensure that 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.

.5 Packaging and Shipping

.1 The *Transportation of Dangerous Goods Act* (TDGA) and the *International Air Transport Association* (IATA) 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 Resources, Wildlife and Economic Development administers the manifesting system in the NWT 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.

.4 Deliver the manifest to the initial carrier and forward to the relevant government agencies within two days of sending the shipment.

.5 On receipt of the dangerous goods, the receiver shall send a copy of the manifest to the sender, the carrier of the shipment, and the relevant government agencies within two working days.

.6 The Contractor is responsible for submitting the signed TDG shipping documents and waste manifests to the relevant parties as detailed in the TDG Regulations.

.7 Notify provincial and territorial governments of any shipments of PCB mixtures which pass through their borders.

.8 Notify Transport Canada, Prairie and Northern Region-Marine (613-991-6006) of any shipments of PCB mixtures which are occurring by sea.

.5 Test any waste of unknown TDGA hazard to determine whether any transport hazard exists according to the regulations. Package any substance which 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.

.6 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

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.

Substance	Class/Packing Group	Packaging/Shipping Criteria
Poisonous Solids, Flammable, N.O.S. (IATA)	6.1, 4.1 II - as above.	
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, aluminium, plywood, fibre or plastic. There must also be sufficient absorbent between the inner and outer packaging to prevent any liquid from escaping (if 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.
Batteries, Wet, Acid Filled (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.	

Substance	Class/Packing Group	Packaging/Shipping Criteria
iii) Poison Gas (TDG,	2.3 X - any pressurized or liquified gas that has an LC50 value less than 5,000 mL/m³ 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/m³ 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.
4. Packing Group X indicates special packaging required.
5. 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.

4.16 EXPLOSIVES

.1 BLASTING SHALL NOT OCCUR UNLESS SPECIFIC PERMISSION IS GRANTED BY THE NORTH WARNING SYSTEM, DND, THROUGH THE SITE ENGINEER. The use of explosives is potentially dangerous to human and animal health. The following procedures apply:

.1 Obtain all necessary permits and licenses.

.2 Handle, transport, store, and use explosives and all other related hazardous material in accordance with all applicable laws, regulations and orders of regulating authorities.

.3 Electric detonation methods are prohibited.

.4 Restrict use of explosives to authorized and certified/licensed personnel who have been trained in their use.

.5 Minimize defacement of landscape features and other surrounding objects controlling the scatter of blasted material beyond the cleared working area.

.6 Minimize shock or instantaneous peak noise levels.

.7 Prevent scatter from blasting from reaching fuel or hazardous substance storage locations. A minimum distance of 300 metres in rocky terrain, and 1,000 metres in the presence of metal is required.

.8 Do NOT conduct blasting in the vicinity of concentrations of wildlife.

.9 Restrict blasting to above water and a minimum of 100 metres from concentrations of fish.

.10 Comply with all provision as detailed in the Site Use Restrictions.

4.17 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 Remove all waste materials from the site following completion of the work.

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

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

.5 Remove culverts under roads and airstrip as directed in Section 02060 of the Contract Specifications. Breach and stabilize road embankments at culvert locations so the overland flow of surface runoff and the passage of fish are not impeded.

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 PIN-3, Lady Franklin Point 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 PIN-3 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. Site debris may present a physical hazard to people travelling through these locations. All surface debris scattered throughout the site is to be collected and disposed of in accordance with Section 02219 of the Contract Specifications and Drawings.

.2 Take all necessary precautions when handling and transporting hazardous waste materials and contaminated soil to ensure that the materials do not come into contact with site personnel or local residents. Site workers shall wear protective clothing as directed in the Contract Specifications when handling hazardous and contaminated 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, terms of the Land Use Permit, Water Use License, 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 ATVs, 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 which threatens human safety. When not in use, all weapons shall be locked as per all applicable legislation and access controlled by the Site Superintendent.

.6 Store all food (including country foods) as to preclude the attraction of wildlife. At minimum, store all foods in properly refrigerated areas that are indoors within the construction camp.

5.3 LOCAL RESOURCE USE

.1 The coastal marine waters in the area of the PIN-3 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, and shoreline terrain damage during beach landing area preparation.

.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. To minimize disruption to hunting and fishing activities, restrict vessel traffic to traditional shipping lanes where they exist. Vessel operators are to avoid marked fishing gear that may be encountered near shore.

.3 Schedule annual meetings with local associations to discuss these issues and to minimize any potential problems. This will include consultation to confirm the scheduling and locations of hunting and fishing activities. Assign a local contact person to answer questions and address concerns of local residents or resource users.

5.4 LOCAL ECONOMY AND CONTACT WITH LOCAL RESIDENTS

.1 Maximize employment and business opportunities in the north, in accordance with the guidelines in the Contract Specifications. Provide communication with the local communities of Kugluktuk and Cambridge Bay to keep them informed of contracts and significant project developments for which local businesses and individuals may be qualified to work.

.2 Schedule regular meetings with the local community of Kugluktuk to discuss ongoing work and to address any community concerns. Briefing meetings with all camp personnel are required to discuss and explain camp rules which must be established.

5.5 AESTHETIC VALUE

.1 It is anticipated that the clean up activities will have an overall positive effect on the aesthetic value of the PIN-3 site in that redundant buildings and structures will be demolished, and all disturbed areas (landfills, debris piles, sewage outfalls and borrow pits) will be restored as closely as possible to their original appearance. Construction personnel are to ensure that their activities do not contribute to any additional degradation of the local environment.

5.6 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.

.10 When removing culverts:

- slope banks to conform to grade of adjacent stream bank as applicable; and
- if required, stabilize bank using erosion resistant material.

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

5.7 PERMAFROST SOILS

.1 Ice-rich soils are common in areas that are maintained by extensive vegetation cover, and 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.

5.8 COASTAL MARINE RESOURCES

.1 The coastline adjacent to the PIN-3 station is used by marine mammals and seabirds for feeding, migration and breeding. Typical species found in the area of PIN-3 include: bearded and ringed seals, arctic tern and sabine's gull.

.2 Seabirds are also vulnerable to disturbance during the nesting period.

.3 Where concentrations of birds and mammals are known to be near construction sites, advise chartered aircraft pilots to maintain an altitude of at least 500 metres and preferably 1,000 metres above ground or water when passing over these areas. Low-level flights to observe or photograph wildlife shall not be permitted. Inform charter aircraft pilots of all applicable EPP requirements when scheduling arrangements are made or at other appropriate periods prior to the arrival of the aircraft at the site.

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

.5 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.

5.9 TERRESTRIAL RESOURCES

.1 Muskoxen, Peary caribou, Arctic fox, Arctic hare, and other wildlife have been reported seasonally or year round at PIN-3. Birds, including sandpipers, plovers, and a variety of ducks have been observed in the area. Raptors such as snowy owl, golden eagles, gyrfalcons, rough-legged hawks and peregrine falcons are known to occur in the region. 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 BEAR 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, 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 Except in the vicinity of the airfield, advise charter aircraft pilots not to fly at elevations lower than 500 metres above ground or water.

.12 In the event that wildlife are spotted from the air, aircraft shall not make descents for observation or photography.

.13 Domestic or wild pets are not allowed in camps with the exception of controlled watch dogs.

.14 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.

.15 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