Environmental Protection Plan
For the Clean Up of
FOX-M, Hall Beach
DEW Line Site

Prepared by

UMA Engineering Ltd.

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1. 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 FOX-M 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 construction and operation of a work camp, clean up and demolition activities, and closure of those portions of the DEW Line site not required as part of the North Warning System (NWS) (Section 2);

.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);

.3 a description of the general environmental protection measures required to minimize or avoid potential adverse effects (Section 4);

.4 a description of protection measures required for specific valued environmental components at the FOX-M site (Section 5);

.5 details related to environmental inspection responsibilities and procedures (Section 6); and

.6 contingency plans describing emergency actions and reporting requirements (Section 7).

.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. 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. FOX-M is a both an LRR site, as well as a Logistics Support Site (LSS). The LSS sites, including FOX-M, are 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 the FOX-M site 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 in 1997, 2000 and 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.

.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.

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2.2 Project Activities

.1 The clean up activities at the FOX-M site 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 clean up. The following sections describe the major activities to be performed in the 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 major clean up activities include the following:

1. Mobilization of all personnel, equipment, support facilities and materials required to complete the work.
2. 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.
3. Excavation of Tier I, Tier II, Type A and B hydrocarbon contaminated soil, and hazardous contaminated soil.
4. Disposal and treatment of contaminated soil, excluding hazardous soils.
5. Containerization of hazardous soils.
6. Demolition of buildings, including asbestos removal, building materials coated with PCB-amended and lead-based paint, creosote treated poles, related utilities, communication equipment and other ancillary facilities.
7. Collection, sorting and disposal of site debris.
8. Packaging and containerization of hazardous waste material.
9. Disposal of non-hazardous waste materials.
10. Disposal of contents, cleaning, demolition and disposal of POL, mogas and diesel storage tanks.
11. Transportation of all containerized hazardous soil and waste materials to the Temporary Storage Area.
12. Leachate containment and regrading of two areas of one existing landfill for closure.

13. Development and closure of a new Non-Hazardous Waste (NHW) Landfill and a Tier II Soil Disposal Facility.
14. Development and closure of a hydrocarbon soil treatment facility.
15. Development of granular borrow areas.
16. General site grading.
17. 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 FOX-M site is provided by scheduled and 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, located near the beach landing area, and/or in the vicinity of the Station Area, 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 Municipal water supply may be used as a potable water source, providing that the water withdrawal rate by the Contractor does not adversely the community supply. If required, an alternative water supply is to be located, tested and approved in accordance with the Water Use License and the Land Use Permit.

.2 Routinely monitor water quality to ensure that it meets or exceeds the Guidelines for Canadian Drinking Water Quality.

.4 Waste Management

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

.2 Only domestic and human waste 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 wastewater 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 NHW Landfill.

.4 Domestic non-hazardous waste may be incinerated and disposed of in the NHW Landfill.

.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 (ATV) 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. These criteria target specific inorganic elements and PCBs, and are designed to be protective of the Arctic ecosystem. Soils contaminated at levels above DCC Tier I but less than DCC Tier II criteria are to be landfilled on site in the NHW Landfill. Soils containing contaminants equal to or exceeding DCC Tier II criteria are to be landfilled in the DCC Tier II disposal facility.

.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 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 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 clean up as indicated on the Drawings and Contract 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 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 and treatment/disposal of hydrocarbon contaminated soils 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 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 50 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 waste materials 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.

.7 Disposal of Non-Hazardous Materials

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

.8 Demolition of Existing Facilities

.1 Dismantle facilities such as buildings, antennae, and fuel storage tanks not required as part of the NWS operations 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 Some facilities to be demolished have been identified as being contaminated with PCBs (coated with PCB amended paint) up to and greater than 50 ppm with

consideration of the substrate. 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 (PAP) materials and transfer containers to the Temporary Storage Area.

.5 Dispose of non-hazardous materials in a suitable on-site landfill. Place and compact material in the landfill as described in the Contract Specifications and Drawings, to minimize landfill settlement.

.9 Landfill Closure

.1 The FOX-M site has one large landfill area that was 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 Sections 2.2.6 and 2.2.7.

.3 Portions of the landfill will be leachate contained, as shown on the Drawings.

.4 Other areas of the landfill are to be graded and covered with granular fill to the minimum dimensions as indicated on the Drawings.

.10 Landfill Development

.1 Develop a new landfill at the FOX-M site for the disposal of non-hazardous waste materials generated during the clean up.

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

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

.11 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.

.12 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, including sewage outfalls;
- 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 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 LSS facilities including buildings, grounding grids, helipad, satellite ground terminals, fuel storage tanks, fuel lines and communications/fibre optic cables, as described in the Contract Specifications and Drawings;
- areas susceptible to permafrost degradation (refer to Section 5.7).

.13 Demobilization

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

3. 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 *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.

.8 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.

.9 The *Territorial Lands Act* provides the authority for administering and protecting lands under the direct control of the Minister of Indian and Northern Affairs Canada (INAC) (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.

.10 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.

.11 *Nunavut Waters and Nunavut Surface Rights Tribunal Act* provides the Nunavut Water Board with the power to issue water use licences. The Water Board evaluates the possibility of detrimental effects occurring because of the use of water or a deposit of waste in water on other users.

.12 *Canada Labour Act* and Regulations under which 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 clean up of the FOX-M 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 clean up 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 Tunngavik Federation of Nunavut

Activities associated with the clean up of the FOX-M site in Nunavut will require the provision of a Water Use Licence, Land Use Permit and Quarry 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
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. GENERAL ENVIRONMENTAL PROTECTION MEASURES

4.1 General

The lands associated with the FOX-M 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 FOX-M site, the Contractor will 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 LSS 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 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.

.3 Storage and Handling of Fuel and Other Hazardous Substances

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

.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).

.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 FOX-M may be used as a potable water source providing such use does not adversely affect community requirements.

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

.3 Provide a standard chlorination or iodisation unit for treatment of potable water, and test potable water for bacteria as required by the appropriate public health ordinances.

.4 Obtain a Water Use Licence from the Nunavut Water Board for the development of alternative water supply sources, as required, and comply with all conditions of the licence.

.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 existing site landfills 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 to reduce scattering of debris.

.3 The Contractor, in consultation with the Engineer, will determine acceptable options for sewage disposal. Each construction camp shall provide at minimum primary sewage treatment, with a minimum retention time of 24 hours prior to discharge. Discharge of sewage waste water shall meet the criteria outlined in Section 01560 of the Contract Specifications.

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 Establishment of new roads off site is subject to the terms of a Land Use Permit and 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 road bed with a sufficient thickness of fill to prevent terrain damage. Install culverts to maintain natural cross drainage and prevent ponding. These culverts shall be removed from such roads and drainage restored 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 required, is to be acquired 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.

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 areas opened by using existing borrow areas, 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.)

.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 any 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 Clean up 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. Clean up any spillage to the satisfaction of the Engineer.

.6 Following excavation of DCC 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 landfarm facility for the treatment of Type B hydrocarbon contaminated soils is to be constructed.

4.8 Hydrocarbon Contaminated Soils

.1 The requirements for remediation of hydrocarbon contaminated soil at the FOX-M 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 disposal/treatment facility 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 treatment facility for the remediation of Type B hydrocarbon contaminated soils will be constructed at the FOX-M site, as detailed in the Contract Specifications and Drawings.