1. BACKGROUND INFORMATION

1.1 Proponent Identification Information

Defence Construction Canada

(on behalf of the Director General Environment, Department of National Defence)

Place de Ville, Tower B

112 Kent Street, 17th Floor

Ottawa, ON K1A 0K3

Contacts regarding this submission for the DEW Line Clean Up Project are provided in Table 1-1.

Table 1-1: Project Contacts

Defence Construction Canada		
Project Manager: Lt. Col. Daniel Paquet	(T) 613-998-9523	(F) 613-998-1061
Associate Project Manager: Nahed Farah	(T) 613-998-7917	(F) 613-998-1061
UMA Engineering Ltd.		
Environmental Scientist: Eva Schulz	(T) 403-270-9220	(F) 403-270-0399

1.2 Lead Authorizing Agencies

The lead agency for this project is the Department of National Defence, represented by the Director General of Environment. The management of this project is being provided by Defence Construction Canada. These agencies will be responsible for obtaining all permits except in those cases where the clean up contractor is required to do so by legislation.

1.3 Environmental Assessment Process

The environmental assessment, undertaken under Environmental Assessment and Review Process Guidelines Order (EARPGO) and updated in accordance with the requirements of Canadian Environmental Assessment Agency (CEAA), in support of this project, has used a process in which potential environmental impacts are assessed on the valued ecosystem components identified during the initial scoping exercise.

The following sections provide a summary of the activities that were undertaken during the completion of the environmental assessment.

1.3.1 Scoping

As a self-directed environmental assessment, the initial step was to conduct a series of social and ecological scoping exercises designed to:

- Determine the temporal and spatial boundaries of the assessment; and
- Focus the analysis on the environmental issues directly related to the clean up project itself (i.e., identification of valued ecosystem components).

In scoping the project, clean up activities to be assessed were identified. Possible additional activities were examined using the Canadian Environmental Assessment Agency's "Principal Project/Accessory" test, which is used to determine if other activities demonstrate an interdependence, linkage and/or geographical/ecological proximity with the primary clean up.

The assessment scope included a determination of the environmental effects to be assessed and the effects that are to be considered in making decisions regarding the project. The following is an outline of the scope of the project and of the assessment:

Project: Clean Up of the DYE-M, Cape Dyer DEW Line Site

EA Trigger: Funding from Department of National Defence

Scope of the project - principal project: physical clean up of the DYE-M, Cape Dyer DEW Line site, including: demolition of facilities, removal of waste materials (including hazardous), and contaminated soil removal, debris disposal, and construction of landfills and hydrocarbon treatment facilities.

Accessory physical works: mobilization and demobilization of contractor's equipment and personnel, and temporary construction camp set-up.

Other undertakings in relation to the physical work: None.

Scope of the assessment: The environmental assessment is to consider the effects of all project related activities (i.e. those related to the clean up of the site) and associated physical works on both biophysical (terrestrial, aquatic) and socio-economic assessment factors.

The following factors were identified for assessment:

- Evaluation of environmental effects of the project, including those relating to cumulative effects that are likely to result from carrying out this project.
- Project undertakings performed in conjunction with other projects/activities that have been or will be carried out in the region.
- The relative levels of significance.
- Public comments.
- Mitigation measures deemed to be technically and economically feasible.

Interested parties were identified and consulted during the development of the project definition process including:

- 'Expert' federal departments (Environment Canada, Indian and Northern Affairs Canada, Fisheries and Oceans Canada);
- 'Other' federal departments (DND, Defence Construction Canada, Parks Canada);
- Aboriginal organizations (Nunavut Tunngavik Incorporated, Nunavut Planning Commission); and
- Community leadership of the elders from Qikiqtarjuaq, Pangnirtung, Clyde River and the general public.

Section 4 of this report provides a detailed outline of the Public Consultation process.

1.3.2 Assessment of Environmental Effects

The initial step following the scoping exercise was to determine the possible environmental effects of the project. This assessment involves providing a detailed overview of the project, a description of the existing environment (including inventories and ecological processes) and the identification of project-environment interactions.

The aim of describing the project was to clearly outline the constituent components and activities that were to occur on each of the DEW Line sites. Activities include mobilization, project layout and design, plans and scheduling, specifics related to each of the activities (i.e., how would contaminated soil be identified, excavated, transported and disposed of), operating procedures, control procedures and demobilization plans. Detailed data concerning each of the activities (i.e., material volumes) were included with this description.

During the scientific studies described above, the site teams collected the relevant information concerning the existing environmental components of the study area. This information included a description of the physical, biological and social characteristics of the study area.

Using the information that was obtained on the project and the existing environmental setting, the assessment study determined interactive links between these two components. Particular concern was focused on the location, sensitivity, seasonal presence and abundance of these components. Also included in the assessment of environmental effects were possible impacts relating to socio-economic factors (heritage, culture, archaeological, employment and business opportunities), land use and human health.

During the assessment stage, conclusions were made as to the type of impact (i.e. level of adversity) and its level of significance, based on scientific judgement and comments received during public consultation sessions.

1.3.3 Identification of Mitigation Options

The third stage of the assessment process was to undertake the identification of mitigation measures that would result in a reduction or elimination of potential environmental effects associated with the clean up of each of the sites. In the case of this project, all potential effects were addressed, not simply those deemed to be significantly adverse. Mitigative actions now form part of the overall project design and planning documentation, which resulted in the preparation of an Environmental Protection Plan (EPP) in Section 9. The requirement for on-site personnel to adhere to these mitigative measures is contractual in nature as the EPP forms part of the clean up construction contract.

1.4 Regulatory Overview

1.4.1 Introduction

The clean up will comply with all applicable environmental laws, regulations and requirements of Federal, Territorial, and other regional authorities, and any permits, approvals and authorizations that may be required under this Contract. The Contractor is subject to and must comply with those permits and approvals obtained on behalf of and by DND to conduct this work. Through all project phases, the project will work in close cooperation with regulatory authorities and DND will enforce compliance.

1.4.2 Federal Acts, Regulations and Guidelines

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:

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 PCB Storage Regulations.

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.

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.

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.

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

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.

The **Species At Risk Act** aims to protect wildlife at risk from becoming extinct or lost from the wild, with the objective of helping the numbers recover. The act covers all wildlife species listed as being at risk nationally and their critical habitats.

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.

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.

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:

- 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.
- The **Territorial Quarrying Regulations** establish the 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.

The **Nunavut Land Claims Agreement Act** provides for the use, management and conservation land, water, and resources of Nunavut.

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.

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.

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

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

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.

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.

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.

Freshwater Intake End-of-Pipe Fish Screen Guideline provides instructions for the protection of anadromous and resident fish where freshwater is extracted from fish-bearing waters.

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.

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.

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.

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.

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.

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.

Technical Guidance on the Land Treatment of Petroleum Hydrocarbon Contaminated Soils at Federal Government Facilities or on Federal Crown Land (Environment Canada, 1993) provide information on the required design parameters for landfarms.

1.4.3 Nunavut and Northwest Territory Acts, Regulations and Guidelines

In addition to the Federal and Territorial Acts and Regulations identified in Section 1.4.2, the clean up of the DYE-M site in Nunavut is governed by the following:

Guidelines for the Discharge of Domestic Wastewater in Nunavut, by the Nunavut Water Board, outline requirements for water quality effluent from these facilities.

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

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

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 DYE-M site:

- Contingency Planning and Spill Reporting
- Disposal Guidelines for Fluorescent Light Tubes
- Guideline: Dust Suppression
- 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
- Guidelines for the General Management of Hazardous Waste in Nunavut

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

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

The **Pesticides Act and Regulations** specifies the requirements for use, storage, handling and disposal of pesticides.

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.

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

Guidelines for Removal of Materials Containing Friable Asbestos outline the procedures for the removal of friable asbestos.

1.4.4 Required Authorizations

The following is a list of permits required for the clean up of the DYE-M site:

Land Use Permit: As per the Territorial Land Use Act and Territorial Land Use Regulations, a Class A Land Use Permit, issued by the Department of Indian and Northern Affairs Canada (INAC), will be required for the activities associated with the clean up of DYE-M. Contact: INAC, Land Administration, Iqaluit, NU, (867) 975-4283.

Quarry Permit: As per the Territorial Land Use Act and Territorial Quarrying Regulations, a Quarry Permit, issued by the Department of Indian and Northern Affairs Canada (INAC), will be required for the activities associated with the clean up of DYE-M. Contact: INAC, Land Administration, Iqaluit, NU, (867) 975-4283.

Water Use License: As per the Nunavut Land Claims Agreement Act, a water use license, issued by the Nunavut Water Board, will be required for camp operations and construction activities associated with the clean up of the DYE-M site. Contact: Nunavut Water Board, Gjoa Haven, NU, (867) 360-6338.

In addition, the successful contractor may require a number of other permits or licences. These permits or licences pertain to the operation and maintenance of the contractor's camp or owing to his/her status as an employer. Examples of these permits include those related to the possession of firearms, day-to-day camp operation and federal/territorial labour codes. A partial list of these and other requirements is presented in Table 1-2.

There is no requirement anticipated for either the project management office or the contractor to obtain research or archaeological permits, as scientific or archaeological research activities in support of the clean up requiring such permits was completed in 1990/1991.

Table 1-2: List of Authorizations for Specific Clean Up Activities

Authorization	Authority	Activity to Which Authorization Applies	Contact Number	Minimum Turnaround Time*
Land Use Permit (for Crown Lands)	Indian and Northern Affairs Canada	All land use activities on Crown Land	867-975-4283	3 months
Quarry Permit (for Crown Lands)	Indian and Northern Affairs Canada	Granular material extraction activities on Crown Land	867-975-4283	3 months
Water Use Licence	Nunavut Water Board	All water use activities	867-360-6338	4 months

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 months
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.

1.5 Previous Environmental Assessments

As a federal proponent, the Department of National Defence is required to conduct an environmental assessment for the clean up of each DEW Line site. As a planning tool, the assessments were drafted in 1994 by the Department of National Defence under the auspices of the Environmental Review Process Guidelines Order (EARPGO). These assessments have been preceded by extensive on-site environmental and engineering investigations completed by the Environmental Sciences Group (ESG) at Royal Military College and UMA Engineering Ltd. (UMA). The initial investigations, which took place from 1989 to 1994, were used to provide a baseline study of the existing environment (both biological and physical) and ecological pathways and possible

transport mechanisms that will exist during the clean up. Studies of socio-economic aspects, including a detailed archaeological survey of the sites, were completed during this time.

Subsequent changes to overall project planning have been re-assessed over time and the assessment document updated. The Environmental Screening Report was updated for 14 of the 15 DEW Line sites in Nunavut (Project Management Office DEW Line Clean Up, 1998). This report was submitted with the Project Description of the Fifteen DEW Line sites in the Nunavut Settlement Area to the Nunavut Impact Review Board (NIRB) in June 1998 (Project Management Office DEW Line Clean Up, 1998b).

Between 1997 and 2002, further investigations were conducted at DYE-M to delineate contaminated areas and obtain environmental and engineering information required to finalize the clean up plans. This information has been reviewed and the Project Description and Environmental Screening Report updated in this document to include relevant new information.

1.6 Contract Award Procedures

The following steps outline the contract award procedures:

- A tender package is produced which includes **ALL** of the work to be completed at the site. The tender package will include instructions for the Contractor to attain Minimum Inuit Content (MIC) in his/her workforce, as well as a Minimum Inuit Employment Content (MIEC), as specified in the DND/NTI Economic Agreement.
- The tender award will go to the most competitive bidder, who fulfills all of the requirements as stated in the tender package.
- Once the contract is awarded, the successful Contractor can begin plans to start the clean up work.

2. SITE DESCRIPTION

2.1 Location

DYE-M is one of the 21 DND DEW Line sites to be cleaned up as part of the DEW Line Clean Up Project. Figure 1 in Appendix I is an NTS Map segment showing the location of the DYE-M site, as well as the property boundaries and land ownership.

DYE-M (66° 39' N, 61° 21' W) is located on the easternmost point of Baffin Island of the Nunavut Territory. The station is about 15 km inland from the Sunneshine Fiord shore. The Upper Site facilities are located atop a summit, approximately 20 km east-northeast of the Airstrip and Lower Camp Area. The Upper Site is connected by road to the Lower Site, where POL storage, vehicle maintenance, and airstrip facilities were located. The Lower Site also includes the beach area facilities, which consist of POL storage facilities, and open storage areas.

2.2 History

The DYE-M site was constructed in the 1950's as part of the DEW Line, which provided radar surveillance of the northern approaches to the North American continent. In March 1985, Canada and the United States agreed to modernize the North American Air Defence System by closing the remaining 21 DND DEW Line sites by the early 1990's, and build the North Warning System (NWS).

In 1992, the DEW Line Clean Up Protocol was developed by the Environmental Sciences Group (ESG) of the Royal Military College of Canada and reviewed and approved by federal and territorial environmental officials. The protocol includes procedures for dealing with contaminated soil, waste oil, landfills, wastewater, debris and hazardous materials. In 1998, the Environmental Provisions of the Cooperation Agreement between DND and Nunavut Tunngavik Inc. (NTI) were implemented

to provide the approach necessary to restore the sites to an environmentally safe condition and prevent the migration of contaminants into the Arctic food chain.

The DEW Line Clean Up (DLCU) focuses on closing out the former DEW Line sites, including the remediation of chemically contaminated soils, the stabilization of landfill areas and the demolition/disposal of surplus infrastructure and debris. A monitoring program will be carried out after the clean up has been completed.

2.3 Project Activities

The purpose of the proposed project activities is to provide remedy for previous activities that occurred as a result of the operation of the former DEW Line site. Specifically, clean up activities are to prevent the release of physical debris and/or contaminants into the environment, including the adjacent marine environment.

In general, during the construction phase of the clean up, existing facilities no longer required for the operation of the NWS will be demolished. The demolition wastes will be segregated into hazardous and non-hazardous materials and disposed of appropriately. Contaminated soils identified during the previous field investigations will be excavated and properly disposed of in on-site engineered landfills or at off-site facilities. Scattered surface debris and partially buried debris on the site will also be collected and disposed of. New landfills will be constructed to contain the non-hazardous contaminated soil and demolition waste generated during the clean up. Existing landfills within the site will be remediated, as required. Disturbed areas will be physically restored to a stable condition shaped to match the existing terrain. A more detailed description of the work program is provided in Section 5.

2.4 Schedule

DYE-M underwent a number of detailed site investigations between 1997 and 2002, and is scheduled for clean up beginning in 2004 as part of the DLCU Project, with completion expected in 2011. The contractor will mobilize to the site in August 2004, by barge or sealift and set up a temporary construction camp.

- Clean up activities are expected to continue through to 2011, depending on the contractor's approach and weather conditions.
- The expected duration of annual clean up activities on site will generally be from July to October. During the winter months, work will cease and equipment and facilities on site will be winterized. It is expected that the contractor's workforce and accessory personnel will mobilize to and from the site from nearby northern communities.
- Completion of the clean up and demobilization of the contractor's facilities and equipment is anticipated for October 2011.
- Long term monitoring of the landfills will begin upon completion of clean up (2012) and will continue for a 25-year period. After 25 years, the monitoring requirements will be re-evaluated.

2.5 Previous Clean Up Activities

2.5.1 Beach Refuel Area Remediation

In 1997, the environmental investigation performed for the Department of National Defence's DEW Line Clean Up Program at DYE-M discovered hydrocarbon contamination of soil at the Beach POL storage facility. Due to the proximity of the contamination to the Arctic Ocean, the facility owner, North Warning System Office (NWSO), initiated source removal of the hydrocarbon

contaminants from two gravel pads at the Beach POL facility to minimize further migration of hydrocarbons into the arctic ecosystem.

In August 2001, excavation of petroleum contaminated soil from the Beach POL and construction of a landfarm to treat the impacted soil commenced at DYE-M. The project concluded for the season in September 2001 and resumed in late July 2002. Contaminated soil excavation, landfarm construction and regrading of the Beach POL were substantially completed in September 2002. As-built survey and record drawings were not completed in 2002 due to weather conditions.

Presentations were made to document the results of the clean up at the Beach Refuel area to Indian and Northern Affairs Canada, Environment Canada and the Government of Nunavut on February 6, 2003. The slopes were not excavated due to health and safety constraints, and this was agreed to by all parties and endorsed during the 2002 field season. Post-construction monitoring will be carried out at the Beach POL to monitor migration of residual contamination on the slopes of beneath the pads, and beneath the toe of a newly constructed tank farm. Additional monitoring is also required in conjunction with landfarm operation. The monitoring wells that were installed during the clean up are to be monitoring as part of the due diligence commitment to Environment Canada (K. Reimer, 2003).

2.5.2 Due Diligence Clean Up

A representative of Environment Canada visited the DYE-M site in August 2001, and subsequently wrote an Inspector's Direction letter regarding the presence of soil contaminated with PCBs in excess of the CEPA criteria (50 ppm) at the Lower Site Landfill. In response to this letter, Defence Construction Canada, on behalf of the Department of National Defence, delineated, excavated and containerized the PCB contaminated soils (>50 ppm) at the Lower Site Landfill in August 2002. Confirmatory soil samples were collected from the base of the excavation, which showed that all PCB contaminated soils above 50 ppm had been removed. The excavated soils were placed in

approved containers, labelled in accordance with the PCB Storage Regulations and placed within the secure, registered Temporary PCB Storage Area. The materials will be transported from the site when the full site clean up has been completed.

The Environment Canada Inspector re-visited the DYE-M site in August 2002, after the work had been completed. In addition to Environment Canada, there were representatives from the North Warning System Office, and the Environmental Sciences Group. It was concluded that no further due diligence work was required in this area. The remainder of the Lower Site Landfill will be cleaned up as part of the overall DYE-M clean up.

In addition to the removal of PCB contaminated soils at the Lower Site Landfill, an investigation of the decommissioned DEW Drop Facility, located at the Upper Site, was conducted to determine if there was any equipment still containing PCBs. The investigation included the sampling and testing of eight representative capacitors and three 205 litre barrels (labelled coolant and antifreeze). No PCBs in excess of the CEPA criteria of 50 ppm were detected in any of the samples collected from the capacitors, and no PCBs were detected in the barrel samples. This area will be cleaned up as part of the overall clean up of DYE-M.

3. PROJECT PLANNING

3.1 Rationale for the Project and Primary Goals

The process of biomagnification is defined as positively sloped variation in concentrations through increasingly higher trophic levels of the food chain. The process of biomagnification is particularly important in Arctic organisms, where, as a result of their dependency on a high fat content in their diets, they are extremely sensitive to contamination inputs. Given the nature of the Arctic ecosystems, it is important that past anthropogenic activities, such as the operation of the DEW Line, not continue to cause any significantly adverse affects on any one level of the Arctic food chain. Specifically:

- The limited availability of species at any given trophic level leaves little opportunity for another species to offset the effects of the loss of another.
- Negative biological effects (i.e. plant loss) may lead to physical disturbances, such as damage to permafrost.
- These sites pose a risk to human and animal health and safety through the presence of physical hazards.

The aim of the DEW Line Clean Up Project is to decommission those facilities used by the former DEW Line, which have been declared surplus to the requirements of the new North Warning System, and to restore the sites to an environmentally safe condition. Environmental restoration includes the setting of remediation objectives that are designed to preclude the continued migration of contamination (and hence biomagnification) into the Arctic ecosystem/food chain. To accomplish this, remediation will include:

- The excavation of soils in cases where parameters exceed those that have been set for the project (i.e., believed to cause significant input into the lower levels of the food chain, for example, higher plants and detritus); and
- The remediation of landfills, which may serve as a source of water contamination and may enter the lower levels of the marine food chain (i.e., algae).

In anticipation of the close out of the existing DEW Line system, DND sponsored a five year environmental and engineering study of the 15 DND DEW Line sites in Nunavut (UMA, 1991 and ESG, 1993). The purpose of this study was to ascertain the baseline condition and to propose realistic clean up objectives and strategies. The protection of the food chain from DEW Line contaminants was established as the aim of the clean up. These studies confirmed that physical restoration would involve considerable quantities of materials such as gravel and demolition items, including limited quantities of hazardous materials such as waste oil, batteries and asbestos. Conclusions reached by independent analyses indicated that inorganic elements (principally copper, lead and zinc) and polychlorinated biphenyls (PCB's) pose the greatest threat to the biophysical environment.

3.2 Evaluation of Alternatives to the Project

The DEW Line facilities at these locations are no longer required by the Department of National Defence. Therefore, they pose both a safety hazard and a potential long-term source of contaminant input to the sensitive Arctic environment and, as such, must undergo a clean up process that will preclude further input into the environment and the food chain.

As a project strictly dedicated to the clean up of these military establishments, the range of alternatives to this project is limited in nature. The alternatives to the clean up of these sites that can be identified have been rejected or implemented in a limited fashion based on either military operational requirements and/or environmental reasons. The alternatives are as follows:

Commercial or other government use of the facilities: This alternative involves the sale of those facilities no longer required by the Department of National Defence to commercial interests. Two possibilities are present, namely on-site commercial development or sale of the capital assets themselves and movement off-site. The federal government's continuing operational requirements of these sites (i.e. most sites remain part of the North Warning System) preclude the on-site option from being followed.

No clean up action (Null alternative): The second alternative involved examining the environmental impact of maintaining the status quo at the sites. It was quickly realized that failure to address the environmental problems identified during the site investigations could lead to the following:

- Placing the Arctic environment/food chain at risk;
- Possible future legal liabilities for the federal government; and
- Greater clean up costs in the future.

DEW Line Clean Up: This alternative involves cleaning up the sites to the criteria established as the DEW Line Clean Up Protocol and agreed to in the DND-NTI Cooperation Agreement, Environmental Provisions. The clean up includes remediation of contaminated soil, remediation of landfills, removal of debris, demolition of surplus buildings and facilities and grading of the site to as natural a state as practical. The clean up objectives in the agreement are considered to be protective of human health and the environment. As such, this is the preferred clean up alternative.

3.3 Initial Investigations

During the radar upgrade program in the early 1990's, prior to the start of the DEW Line Clean up, a number of environmental and engineering investigations were conducted at the DEW Line sites. The objectives of these studies were as follows:

- To identify the nature and extent of chemical and other types of contamination at the sites;
- To determine the possible impact of these contaminants on the Arctic ecosystem, particularly to the food chain; and
- To develop practical environmental clean up strategies appropriate for the Arctic.

The investigations included:

- An initial environmental clean up study of the DEW Line sites in Canada carried out on behalf of the United States Air Force by a consortium of Canadian consultants: The objectives for this study included: identifying and investigating areas impacted by past waste disposal practices and spills; determining and evaluating remediation alternatives for the waste disposal and spill area and; developing disposal options for debris arising from the demolition of DEW Line structures. This study provided information on the presence of hazardous materials, the biophysical environment, facility details, and the existing landfills.

- An environmental study of 10 of the 21 sites carried out in 1989/90 by the Environmental Sciences Group (ESG) at Royal Roads Military College for the Canadian Department of National Defence: This study provided a detailed physical and chemical inventory of the stations and considered the impact of chemical contaminants on the Arctic ecosystem. This study provided information on the debris found on site, contents of landfills, fuel spills and patterns of contaminant dispersal and impact from use of 205 litre drums.

- Two studies designed to assess the impact of the historically common practice of disposing debris into the ocean through the ice were carried out in 1994 and 1995 by a consortium of several Canadian government departments. These studies concluded that there were no significant chemical effects arising from the presence of debris on the ocean floor.

- During the final site investigations conducted in 1996 at BAR-3, Tuktoyaktuk and PIN-M, Cape Parry, the DND investigation team discovered that the paint on many of the buildings contained PCBs in excess of 50 ppm. Materials containing such concentrations of PCBs are

regulated under the Canadian Environmental Protection Act. Currently, these materials are packaged and being stored temporarily at the clean up sites in accordance with the Storage of PCB Materials Regulations.

3.4 DEW Line Clean Up Protocol

The purpose of the DEW Line Clean Up project is to:

- Demolish and remove existing facilities that are not required for the operation of the North Warning System;
- Remove contaminated soils from the Arctic food chain;
- Stabilize existing landfills;
- Clean up surface debris; and
- Physically restore the site to as natural a state as practical.

3.4.1 Protocol Development

In cooperation with several federal departments (Environment Canada, Fisheries and Oceans Canada, Indian and Northern Affairs Canada) and the Government of the Northwest Territories (Renewable Resources and Health departments), DND initially drafted the General Protocol for DEW Line Clean Up in 1991. This protocol served as the basis for the DND/NTI Agreement signed September 1998 on environmental provisions for the clean up of these sites (Appendix III). At the time of implementation there were no established environmental standards for the Arctic. As a result, existing federal guidelines, such as the Interim Canadian Environmental Quality Criteria for Contaminated Sites (1991), were modified to reflect both the sensitivity of the Arctic food chain to ecological processes such as biomagnification and the close dependence of the Inuit on the land for food. In addition, a barrel specific protocol (Section 5.6) has been prepared that outlines the process for dealing with barrels and barrel contents found on the DEW Line sites.

3.4.2 Criteria

The protocol outlined in the DND/NTI Agreement was developed from the results of the biophysical, socio-economic, and engineering site assessments (mediated through the DND/NTI Environmental Working Group - EWG). The DEW Line Clean Up Protocol documents contaminant clean up criteria and specific physical actions that are to be undertaken, specific to the DEW Line sites. These criteria have been developed based on existing federal and provincial criteria in conjunction with studies that show the functional relationships and/or pathways for biological uptake from soil. The resulting protocol defines two concentration tiers of soil contamination. Soil substrates containing Tier I concentrations may be placed in an appropriate on-site landfill while those soils in excess of the Tier II standard are to be disposed of in a manner that provides additional measures to segregate these contaminants from the Arctic ecosystem. Soils exceeding federal legislative limits (i.e., Canadian Environmental Protection Act and Chlorobiphenyl Regulations) will be disposed of off-site at a licensed disposal or destruction facility.

3.4.3 Environmental Working Group

In 1997, the Department of National Defence and Nunavut Tunngavik Incorporated (NTI) agreed to form an Environmental Working Group (EWG). The EWG is comprised of scientific and technical experts representing both the Inuit (NTI) and DND. The purpose of the EWG is to examine environmental issues related to the DEW Line Clean Up Project and to provide recommendations to a joint DND/NTI Steering Committee consisting of senior management from both organizations. Specific tasks that have been assigned to the EWG include:

- Development of a landfill risk evaluation matrix;
- Evaluation of, and recommendations for, a post-construction/remediation landfill monitoring program;
- Identification of hydrocarbon clean up requirements;

- Establishment of confirmatory testing protocols; and
- Preparation of a list of items suitable for landfilling at the DEW Line sites.

3.5 Final Investigation and Delineation

Prior to the clean up of each site, the Department of National Defence undertakes a final site assessment. The aim of the site visits is several-fold, including:

- To fully delineate the extent of contaminated areas in order to prepare accurate construction drawings;
- To confirm the structural and environmental status of buildings and other facilities that are to be demolished;
- To re-confirm the baseline environmental conditions at the site prior to implementation;
- To examine existing landfills and identify new landfills to confirm details pertaining to the required remediation strategy; and
- To identify areas suitable for the construction of two Non-Hazardous Waste Landfills and two Tier II Soil Disposal Facilities.

The initial site investigation at DYE-M was carried out in 1992. The final environmental and engineering investigations were conducted in 1997, 2000, 2001 and 2002

4. PUBLIC CONSULTATION PROCESS

As part of the DEW Line Clean Up project, public consultations were carried out in communities across the north since August 1992. In 1992 and 1993, teams from the Department of National Defence and other federal departments conducted a broad range of public consultation sessions to consult the local residents about the project and to obtain input regarding specific concerns about the work.

4.1 Inclusion of Traditional Knowledge

One of the guiding principles of the DEW Line Clean Up project is to ensure the meaningful participation of local residents in both the planning and execution phases. One-way of ensuring this is to incorporate traditional knowledge into the site clean up plans. An Inuit representative who is familiar with both the DEW Line site and traditional use of the area is chosen by the relevant Regional Inuit Association to be on-site during the site investigation phase prior to the clean up. The Inuit representative works closely with the EWG to identify Inuit use of the area, wildlife patterns and related past activities, and occurrences that may have had an impact on landfills (i.e., dumping, hazardous waste storage, natural occurrences). This traditional and local knowledge is used to refine clean up activities by including unknown issues or adjusting environmental protection plans.

Additionally, DND and the NTI establish a community DEW Line Clean Up committee to facilitate the flow of local knowledge to the EWG prior to and during each site visit. To accomplish this goal, the EWG visit local communities most affected by each DEW Line site and conduct one on one interviews with a number of residents, the Hamlet Administrative Officer and/or Mayor, the local HTA and other relevant community organizations.

In the summer of 1997, during the delineation investigations for DYE-M further consultation was conducted to ensure local knowledge was collected and incorporated into the final delineation investigations. Local knowledge is important for uncovering location(s) of contamination that had not been previously assessed, as well as information required for completing the Landfill Risk Evaluation Matrix for each landfill site. Involvement of the local community and Inuit representation (Nunavut Tunngavik Incorporated (NTI) technical representative) included:

- Discussions with long time residents and community officials, including Hamlet Assistant Senior Administrative Officer and Chairman of Hunters and Trappers Association; and
- Site visit by NTI technical representative with a local community representative.

The local community was able to provide much information on past disposal practices. Concerns and comments were gathered and incorporated into the delineation investigation plans and the clean up plans.

The NTI technical representative and the local representative were on site during portions of the delineation work. During this time the NTI technical representative was able to observe the site and note any technical concerns that may have been overlooked by the DND investigation team.

4.2 Initial Public Consultation

DND has sought to integrate the views of all interested stakeholders, including individuals or groups, into the decision making process for the DLCU Project. The approach to public involvement in environmental assessments for this project includes two major elements:

- Adequate public notification; and
- Appropriate public consultation.

Public consultation has been used to involve the public in the environmental assessment process through dialogue between northern residents and the project representatives. This dialogue has proved useful in identifying public concerns, needs and values before final decisions on courses of action were made.

The purpose of public notification is to provide information regarding report preparation, community meetings, environmental assessment results, site activities and upcoming decisions. Public notification has been used mainly for notifying the public of the results of previous environmental assessments.

Public consultation meetings were held in those communities in the vicinity of DEW Line sites. Briefings to government officials were also held in Iqaluit, Cambridge Bay and Yellowknife. Advertisements and information packages were provided in English as well as Inuktitut. Minutes were recorded at each of the meetings and action items passed on to the responsible agencies.

4.2.1 1992 Program

Nine communities were visited in 1992 including: Broughton Island; Clyde River; Igloolik; Hall Beach; Taloyoak (formerly Spence Bay); Kugaruuk (formerly Pelly Bay); Gjoa Haven; Kugluktuk (formerly Coppermine); and Cambridge Bay.

The primary objectives of the initial meetings were to:

- Provide general information to the community regarding the status and schedule for the project;
- Provide information regarding the process for closure and cleanup of the DEW Line;
- Present environmental information regarding the DEW Line Clean Up (DLCU) Protocol adopted for the project;

- Provide general information regarding the demolition/disposal of facilities;
- Obtain information regarding public concerns through discussions at the meetings and through questionnaires; and
- Obtain information regarding local labour and contracting capabilities to assist in developing implementation strategies.

A report prepared by the project management team outlined the information provided to the public and summarised questions/concerns that arose during the meetings.

There were a variety of questions and concerns were raised regarding all aspects of the project; however, almost half of the questions and concerns dealt with employment opportunities and environmental impact and protection. There is a serious desire among the people in the communities to obtain training and to be involved in the clean up of the sites. The issue of environmental impact and protection was expressed as a concern about the short and long-term impact on the food chain. Perhaps the most serious concerns expressed centred on previous disposal practices, particularly ocean dumping.

The appearance of the sites, particularly those adjacent to communities, was also a concern raised during the meeting. The proposed cleanup protocol was generally accepted to be the most practical.

In general, the meetings were well attended, the project team was well received and discussions were wide-ranging and lively. People seemed to appreciate the initiative taken by DND to inform the communities regarding the DLCU project and the public provided valuable insights. In some cases the community expressed unrealistic expectations regarding the economic impact of a one- time project and it was important to correct these.

4.2.2 1993 Program

The same nine communities in the Nunavut Settlement Area visited in 1992 were revisited in May and June 1993. The objectives for this second round of meetings were as follows:

- Update the communities on the current status of the project;
- Present information on the site investigations and the 80% Design Submission for ten DND DEW Line sites studied in 1992;
- Provide clean up protocol information on the remaining 11 DND DEW Line sites surveyed in 1993;
- Present information on the plans for the 21 DEW Line sites; and
- Request suggestions and ideas regarding community concerns with the cleanup plans.

The questions and concerns raised by the public were similar in nature to those expressed during the 1992 meetings. Community members were predominantly concerned about employment, business and training opportunities as well as environmental protection and impact to the food chain.

Generally public concern on the aforementioned issues was alleviated through these consultation sessions.

4.2.3 1994 Program

In 1994, public consultation focused on the involvement of both the territorial government and the recently formed Inuit organisations. Two meetings were held in late 1994 with Nunavut officials in Cambridge Bay (Kitikmeot Inuit Association/Nunavut Tunngavik Incorporated joint meeting and Nunavut Planning Commission).

4.2.4 1996 Program

In 1996, the DLCU project resumed its public consultation program by holding public meetings at those communities closest to the sites undergoing clean up in 1996. Within the Nunavut Settlement Area, the communities of Broughton Island and Clyde River were invited to participate in a public meeting discussing upcoming DEW Line Clean Up activities at the FOX-4 Cape Hooper DEW Line site (approximately 160 km west of Broughton Island).

4.2.5 1997 Program

The DLCU project office followed up on the 1996 community visits in cases where there was local interest to do so. Both Clyde River and Broughton Island hosted a public information session. These meetings focused on providing planning details as to the upcoming work at the FOX-4 site. Community interest continued to be high, especially in the area of employment opportunities, environmental protection and salvage opportunities.

4.2.6 Pre-Construction Public Consultation

Another meeting in the nearest local community is typically planned for 2-3 months prior to the start of the construction work to review the program with the local people. Due to the size of the clean up and the estimated manpower requirements for the DYE-M site, it is anticipated there will be community meetings at Qikiqtarjuaq, Pangnirtung, and Clyde River.

4.3 DND/NTI Project Steering Committee

As part of the Agreement between the Department of National Defence and Nunavut Tunngavik Incorporated (Appendix II), there are to be regularly scheduled meetings between these two organizations. These meetings, which will involve senior management from both organisations, are

designed to provide a regular forum to discuss the clean up program within the Nunavut Settlement Area and to resolve concerns relating to environmental and/or socio-economic issues.