The environmental investigation identified soils contaminated with hydrocarbons, Tier I PCBs and Tier I and II metals. There is significant hydrocarbon surface staining within this dump and the source appears to be from the disposal and release of waste oil. Leaking, partially buried 10-gallon barrels were observed on the edge of the station pad near the garage.

The proposed remediation strategy for the Garage Dump is to remove sources of hydrocarbon contamination, collect and dispose of the surface debris and cap the stained area with fill. Local areas with elevated hydrocarbon concentrations, along with the leaking 10-gallon barrels will be removed as hydrocarbon sources. The proposed capping of the landfill will involve extending the Station Pad over the landfill areas to promote sheet drainage. It is estimated that 5000 m^3 of granular fill will be required to cap this stained area.

4.5.2.3 House Dump

The House Dump is located on the east side of the summit near the remnants of the Inuit House. The dump consists of a small pad among the bedrock outcrops with scattered domestic waste, including metal and wood, and a couple of barrels. There is no specific area where there is significant concentrated debris, although the geophysical survey indicated that there is one small area of surface debris comprised of barrels covering an area of approximately 100 m^2. There were no contaminated soils found in the dump area.

This dump is considered a debris area and proposed remediation would fall under the general site clean-up methodology and would include removal and disposal of all surface debris. The barrels will be collected and disposed of in the NHW Landfill.

4.5.2.4 Mid-Station Dump

The Mid-Station area is located approximately 450 m to the east of the Upper Station area within an elevated u-shaped saddle on the north side of the access road. It consists of concentrated debris including barrels, domestic waste and miscellaneous wood and metal. There is no soil cover over the landfill and there is little soil mixed in with the debris. The geophysical survey conducted in this area shows concentrated debris at two discrete locations, including Lobe A which consists of barrel caches on the gravel pad and Lobe B, which is the actual dumpsite. The surface area of the landfill is estimated at 2000 m^2 with an average depth estimated at 1.5 m.

The environmental investigation identified soils contaminated with hydrocarbon and PAHs in the northwest corner of the gravel pad to about 25 m downslope of the pad. There is no reported contamination with PCBs, metals or hydrocarbons.

The gravel pad located at the dump site has been identified as the only potential NHW Landfill site near the Upper Station and is expected to be used because of its closeness to most of the demolition and debris clean up areas. Barrel caches on the pad will be removed to allow for construction of the NHW Landfill and contaminated soils will be excavated and removed from the area downgradient of the pad area.

The dump is situated over a steep slope which will preclude remediation by covering of the landfill because the cover would be subject to settlement depressions and/or slope movement. Plans are for Lobe B of this landfill to be excavated in its entirety and its non-hazardous waste components disposed of in the adjacent NHW Landfill. If hazardous debris or contaminated soils are discovered during remediation these will be containerized and disposed of at an off-site disposal area.

4.5.2.5 Original Dump

The Original Dump is located along the access road, approximately 1 km southeast of the Upper Station area. This area of the site is comprised of rock outcrops, bedrock-derived boulders and some native surficial soils. This dump contains scattered debris including barrels, domestic waste, miscellaneous metal and wood. There is no specific concentration of debris although the geophysical survey did find a small barrel cache covering an area of 100 m^2. There were no contaminated soils identified in this area.

This area is considered a debris area and proposed remediation falls under the general site clean up methodology including removal and disposal of all surface debris. The barrels will be collected and disposed of in the NHW Landfill.

4.5.3 Disposal of Site Debris

In addition to the Main, Garage, House, Mid-Station and Original Dumps, there were numerous other isolated areas of debris. These debris areas have been designated as: Beach Area containing Barrel Dumps 1, 2 and 3, a Vehicle Dump and POL aboveground storage tank (AST) area; River Area located between Water Lake and Beach; Water Lake Area containing Barrel Dump 1, East Side, West Side and Vehicle Dump; Access Road from Dump #7 to Intersection and Mid-Station to Upper Site; Mid-Station Area including the Heli-Pad, Barrel Dump #s 1 through 8, Quonset Building #s 1 through 4; and Upper Station containing Garage exterior, Paint Shed Area, Warehouse Exterior, Module Train Exterior, Main Dump, Quonset Building, Antenna Base Area, Inuit House Area, Fuel Storage Area and Garage Dump.

All of the site debris will be sorted and classified as hazardous or non-hazardous debris. Hazardous materials will be shipped off-site for disposal and non-hazardous material will be placed in the NHW Landfill.

Any material that contains asbestos will be double bagged and disposed of in the NHW Landfill. PCB-painted material will be segregated, containerized and disposed of off-site at a licensed disposal facility.

Where debris that is partially buried is removed, the landscape will be reshaped where necessary and any holes will be backfilled with granular material and graded to match the natural topography.

Table 4-2 summarizes the non-hazardous demolition and debris areas at the FOX-C site and Table 4-3 the hazardous demolition and debris areas. There is approximately 6455 m^3 of non-hazardous debris on the site and 170 m^3 of hazardous debris.

Table 4-2: Summary of Non-hazardous Debris at FOX-C

Debris Area	Approximate Volume (m^3)	Description
Beach Area Barrel Dumps # 1, 2 and 3	155	920 empty barrels, cement powder, heavy equipment, miscellaneous wood and metal
Beach Area Vehicle Dump	71	Three D4 Dozers, D6 Dozer, D2 Dozer, Tracked Bombardier, 3 generators, 35 empty barrels, creosote timber, miscellaneous wood and metal.
Beach Area POL ASTs Area	30	75,000 L tanks (2) and piping, scattered wood debris, rubber hose and fittings, 40 barrels, propane tank
River Area between Water Lake and Beach	467	450 barrels, domestic waste
Water Lake Barrel Dump #1	31	250 empty barrels, scattered wood debris
East Side of Water Lake	82	Cable spools, fire extinguishers, heavy metal, 200 empty barrels, cement powder, heavy equipment, miscellaneous wood and metal
West Side of Water Lake	1	6 Barrels
Water Lake Vehicle Dump	62	Two tracked Bombardiers, two generators, D3 Dozer, cement mixer, steel cable, rubber hose, 70 barrels, cable spool, miscellaneous wood and metal
Access Road from Dump #7 to Water Lake Access Road	63	250 barrels, wooden sleds, dragline bucket, miscellaneous wood and metal
Mid-Station Area – Heli-Pad	56	360 barrels, 4 compressed gas cylinders, scattered wood debris
Mid-Station Area – Mid-Station Dump	3300	
Mid-Station Area – Barrel Dump #'s 1 through 8	810	5170 barrels, various 10 gallon barrels, cable spools, rubber hoses, cable spools, piping, fire extinguishers, dozer tracks, dozer blades, miscellaneous wood and metal
Quonset Building #'s 1, 2, 3 and 4	218	4 wooden Quonset huts, canvas, snow fencing, heaters, shelving, steel cables, fire extinguishers, piping, dozer tracks, dozer blades, steel hoist, rubber tires, aluminum tubing and pipe fittings, cement powder, rubber hoses, heavy equipment, 50 barrels, plywood, miscellaneous wood and metal
Access Road – Mid-Station to Upper Site	33	150 barrels, miscellaneous wood and metal
Upper Station – Garage Exterior	29	D8 Dozer, tracked bombardier, heavy equipment parts, ladder, rubber hose, 10 barrels, miscellaneous wood and metal
Upper Station – Garage Interior	70	Structural Steel, glass wool insulation, metal decking, interior cladding, interior shelving, tracked bombardier, compressed gas cylinders, HVAC system, shelving, generator units, day tanks, asbestos insulation
Upper Station – Paint Shed Area	46	Shed, dozer parts, strapping, pipe fittings, spool, wire, truck, fuel tank, compressed gas cylinders, miscellaneous wood and metal
Upper Station – Warehouse Exterior	25	Hoist, dozer tracks, bombardier tracks, heavy chain, cables, to 1080 L ASTs, 20 barrels, compressed gas cylinders, miscellaneous wood and metal
Upper Station – Warehouse Interior	20	Structural Steel, aluminum cladding, shelving units, domestic waste, glass wool insulation, furniture, beds and desks, asbestos insulation, asbestos floor tile
Upper Station – Module Train Exterior	7	Rubber hose, miscellaneous wood and metal

Table 4-2: Summary of Non-hazardous Debris at FOX-C		
Debris Area	**Approximate Volume (m^3)**	**Description**
Module Train – Interior	185	Glass wool insulation, plywood, wood studs, aluminum cladding, day tanks, wood support structures, glass, HVAC metal, water tanks, generators (2), electrical equipment, cabinets and furniture, compressed gas cylinders (6), asbestos pipe wrap, asbestos insulation, asbestos floor tile
Dump / Outfall Area	18	40 barrels, cable, domestic waste, rubber hose, pipe, miscellaneous wood and metal
Upper Station – Antenna Base Area	400	135 m antenna structure, concrete support blocks, cables, tractor cab, electrical equipment, small antenna, miscellaneous wood and metal
Upper Station – Inuit House Area	75	Cement Mixer, 2 generators, pump, 200 barrels, house remains, stove, miscellaneous wood and metal, creosote timbers
Upper Station – Fuel Storage Area	160	Two 75,000 L POL tanks, piping, metal pumphouse, pump, water tank, 25 barrels. rubber bladder. rubber hose. miscellaneous wood and metal
Garage Dump	10	Canvas, 10 gallon barrels on pallet in fill, steel cable, 40 barrels, miscellaneous wood and metal

Source: UMA Engineering Ltd. (2005)

Table 4-3: Summary of Hazardous Debris at FOX-C		
Debris Area	**Approximate Volume (m^3)**	**Description**
Beach Area – Vehicle Dump	1	Oil, fuel, air filters
Beach Area – POL ASTs Area	1	Propane tank contents
Water Lake Area – East Side	7	Blasting caps, miscellaneous air, oil and fuel filters, painted hut materials
Access Road from Dump #7 to Water Lake Access Road	9	10 partially full barrels, large diameter metal culverts (galvanized steel), blasting caps
Mid-Station Area – Heli-Pad and Mid-Station Dump	6	20 full-to-partially full barrels
Mid-Station Area – Barrel Dump #'s 1 to 8	21	130 full-to-partially full barrels
Mid-Station Area – Quonset Building #'s 1, 2, 3 and 4	3	PCB-Amended paint on plywood, filter canisters; air, oil and fuel filters
Upper Station Area – Garage Exterior	1	4 lead acid batteries
Upper Station Area – Garage Interior	30	PCB-Amended paint on plywood and cladding, generator units fuel / oil, lead acid starter batteries (8), thermometers and gauges
Upper Station Area – Paint Shed Area	11	22 cans of paint, 2 cans of paint thinner, fuel in fuel tanks on skid
Upper Station Area – Warehouse Exterior	1	Fuel in fuel tanks
Upper Station Area – Warehouse Interior	10	PCB-Amended paint on plywood
Upper Station Area – Module Train Interior	60	PCB-Amended paint on plywood, concrete floors and water tanks, lead acid starter batteries (14), thermometers, fuel in day tanks
Upper Station Area – Dump / Outfall Area	3	Air, oil and fuel filters, 2 partially full barrels

Table 4-3: Summary of Hazardous Debris at FOX-C		
Debris Area	Approximate Volume (m^3)	Description
Upper Station Area – Inuit House Area	1	PCB-Amended paint on plywood
Upper Station Area – Garage Dump	5	200 leaking 10 gallon barrels

Source: UMA Engineering Ltd. (2005)

4.5.3.1 Barrel Disposal Requirements

The contents of the barrels must first be determined before the correct disposal method can be determined. A representative number of barrels containing product will be sampled and analyzed. If a barrel is found to only contain rust and sediment, they will be treated as empty barrels.

Where a barrel contains only water (with less than 2 percent glycols or alcohols) the contents of the barrel will be transferred to an open vessel and organic material will be removed by agitation with a pillow or segment of oil absorbent material. Once the organic content has been removed, the water can then be discarded onto ground a minimum distance of 30 m from natural drainage courses.

Where a barrel is found to contain water and glycols and/or alcohols or organics, and contains less than 2 mg/L PCBs, 100 mg/L chlorine, 2 mg/L cadmium, 10 mg/L chromium, and 100 mg/L lead it may be disposed of by on site incineration. Alternatively, these contents may be disposed of off-site at a licensed facility. The solid residual material resulting from incineration will be tested for leachate extraction and material that is found to be non-leachate toxic will be disposed of as contaminated soil. Material that is found to be leachate toxic will be treated as hazardous waste and disposed of off-site at a licensed disposal facility.

Where a barrel is found to contain greater the 2 mg/L PCBs, 1000 mg/L chlorine, 2 mg/L cadmium, 10 mg/L chromium or 100 mg/L lead it will be disposed of at an off-site licensed facility. Contents may be combined with compatible material for shipping purposes.

Where barrels are buried in the river, they will be collected using precautions to ensure that product is not released into the river and to ensure that disturbance of river sediments is minimized.

Empty barrels will be disposed of in the NHW Landfill after being shredded or crushed and cleaned. Crushing of the barrels will reduce their volume by a minimum of 80 percent.

4.5.3.2 Demolition of Facilities

The demolition, removal and disposal or containerization of all facilities as shown in demolition drawings contained in Appendix A are included as part of the clean up of the FOX-C facility. The demolition of facilities will include the activities described below (UMA 2005).

- All contents of buildings identified for demolition, including storage tanks, will be removed and disposed of. Tanks and pipes containing fuel will be pumped out or drained prior to cleaning and disposal;
- Building facility components coated with PCB-amended paint at PCB concentrations in excess of 50 mg/kg will be removed, segregated, and containerized;
- In accordance with the asbestos abatement program, asbestos will be removed and disposed of using a method that eliminates the risk of exposure to friable asbestos. Proper personal protection equipment (PPE) and specialized equipment will be used when removing asbestos. Asbestos materials will be bagged in polyethylene prior to placement in a NHW Landfill;
- Hazardous demolition waste will be removed and placed in containers in accordance with the Hazardous Waste regulations. Hazardous demolition waste will be segregated and disposed of according to CEPA guidelines;
- Creosote treated timbers will be removed, wrapped in plastic and disposed of in the NHW Landfill.
- Drainage culverts will be removed and disposed of; and
- Non-hazardous materials require no special treatment and can be crushed and placed in the NHW Landfill.

Demolition debris that is to be disposed of on-site will be cut into shapes and sizes that will minimize void spaces in the NHW Landfill. Most concrete foundations will be left in place and regraded except where they are coated with PCB paints.

Once all site structures are removed, demolition areas will be reshaped or backfilled to a height flush with the remaining foundations.

4.5.4 Removal of Hazardous Material

All material that is determined to be hazardous under the Nunavut territorial or federal legislation will be placed in containers and shipped off-site to a licensed hazardous material disposal facility. Specific materials that are considered hazardous include:

- batteries;
- metal-contaminated organic liquids;
- liquids containing organic compounds with chlorine concentrations greater than 1000 mg/L;
- oil absorbent material containing organic compounds with PCB concentrations greater than 2 mg/kg;
- liquids containing organic compounds other than those described above;
- fuel tank bottom sludges;
- fuels, lubricating oils, alcohols and glycols; and
- liquids and solids containing organic compounds with PCB concentrations greater than 50 mg/kg.

Fuel-tank bottom sludges and fuels, lubricating oils, alcohols and glycols could be incinerated on site. Temporary storage of these materials on site will be in accordance with the Temporary Storage of PCB Waste Regulations under CEPA.

4.5.5 Transportation of Hazardous Materials Off Site

Hazardous materials will be placed in environmentally suitable containers at an approved containment facility developed on-site as per Environment Canada guidelines. The hazardous materials will be removed by sea lift in accordance with the *Transportation of Dangerous Goods Act*.

4.5.6 Construction of New Landfills

Four potential non-hazardous waste debris landfill locations were evaluated by UMA in 2004 based on size of the area available, acceptable soil and foundation conditions, surface runoff through the area, topography, drainage and setback from natural water bodies or watercourses.

The preferred site is located at Mid-Station Area because of its proximity to the Upper Station and Mid-Station Dump Areas where the majority of site demolition and debris are located. In addition, this location is approximately 2 km from a borrow source and has suitable soil and groundwater conditions.

A second NHW Landfill is proposed at the Lake Area for disposal of Lower Site demolition debris and Tier I contaminated soils.

The landfills will be constructed on grade using containment berms around the perimeter of the landfill area. The debris will be placed in 0.5 m-thick lifts with intermediate fill worked into the voids. The maximum debris thickness will not exceed 2 m. Upon completion, the landfill will be capped with a minimum of 1 m of fill that will be compacted to 95 percent of the standard proctor density. The surface will then be graded to a slope of 2 to 4 percent and contoured to blend with the existing topography. Approximately 10,000 m^3 of borrow material will be required for construction of the containment berms and cover of the NHW Landfill.

4.5.7 Grading and Addition of Granular Materials

The areas identified that require grading and possibly addition of fill material include piles of buried or partially buried, non-hazardous debris that will be covered with additional fill material and shaped to blend in with the natural terrain and promote positive drainage.

4.5.8 Land Treatment of Petroleum Hydrocarbons

A landfarm is proposed at the Potential Soil Disposal Facility Location #1 to treat hydrocarbon F1/F2 contaminated soils from the Beach POL area. The activities associated with the landfarm include (UMA 2004):

- surface preparation, such as removal of boulders and placement of granular bedding material, to facilitate treatment options as required;
- construction and maintenance of roadways required to support treatment operations;

- construction of exterior berms and drainage ditches;
- placement of hydrocarbon F1/F2 contaminated soil in the landfarm;
- specific activities for landfarming operations including nutrient application, tilling, and moisture conditioning;
- final grading to promote drainage away from the site and to match the surrounding terrain;
- supply and installation of groundwater monitoring wells around the perimeter of the landfarm; and
- closure and removal of all equipment and materials following confirmation that treatment has remediated the contaminated soil.

Any areas of contaminated soil that exist within 2 m of a watercourse or within 2 m of the high water mark of the intertidal zone will not be excavated.

Granular nutrients will be distributed evenly over the surface of the contaminated soils during landfarm operation at rates that will provide the minimum nitrogen loading. As required, moisture conditioning will be conducted through the application of freshwater spray to maintain optimum water content within the soil.

Once nutrients have been applied, the full thickness of the soil will be tilled every 10 days, with tilling frequency increased during periods of prolonged warm, dry weather to every 5 days. During periods of precipitation, tilling of the soil will be delayed until the soil is damp to a depth of 100 mm.

Water collected in the perimeter collection system will be collected and tested, relative to the wastewater discharge criteria, prior to the end of each operating season. When the water does not meet guidelines it may be treated (using an oil water separator) so that it does meet the criteria or it will be treated as hazardous material and disposed of off-site.

At the end of each treatment season, the landfarm will be closed by:

- conducting confirmation testing of soils to verify the remediation objectives have been met;
- placement and compaction of granular material from the perimeter berms to provide a cover of at least 300 mm over the remediated hydrocarbon contaminated soils (granular fill will be compacted to 95 percent maximum dry density);
- grading the surface of the area, as required, to promote surface water runoff; and
- decommissioning the groundwater monitoring wells, including backfilling with appropriate grout.

4.5.9 Development of Borrow Areas

There is a need for approximately 25,000 m^3 of fill material for site clean-up activities. This fill is required for upgrading the access roads during construction, backfilling of contaminated soil areas and general site grading purposes. Granular fill is also required for development of the NHW Landfill and the Landfarm. Borrow areas are shown in Figures C01 and C02 in Appendix A

4.5.10 Contractor Support Activities

The following activities will occur on site in support of the remediation work (UMA 2005):

- access roads at the site will be upgraded for equipment transport and movement;
- the existing beach landing area and roads will be used for equipment transport, movement and access to work areas;
- the site will be set-up for camp and equipment storage and demobilized and cleaned up of following project completion;
- sewage from the camp will be handled with, at minimum, primary treatment and discharge to ground surface; and
- domestic waste to be disposed of, as is, or incinerated as specified by the Land Use Permit in the new NHW Landfill.

Labour and equipment requirements are anticipated to include 15 to 25 personnel, 10 pieces of heavy construction equipment and 2 support vehicles. Duration of work is anticipated to be approximately 4 months, not including winter shutdown period, over a period of two years.

4.5.11 Auxiliary Features

4.5.11.1 Access Road Upgrade

The two access roads at the FOX-C site will require repair and upgrading for the remediation activities. The Beach Road extends approximately 2.2 km inland from the ocean. Four road failures were noted during the 2004 field program and culverts will be required at these locations. The local soils at these sites are fine-grained and are therefore, extremely erodible. All of these crossings are over the glacial stream that flows from the Fox Charlie Glacier. Areas of the road adjacent to the glacial stream will require stabilization to enable the passage of heavy equipment.

The Station Road runs approximately 5.9 km to the Upper Station. The two river crossings on the road have undersized culverts that need replacement. In addition, there are five washout areas along the road that have occurred because the route follows the natural path of the glacial stream. These areas will require the installation of new culverts and stream bank stabilization.

4.5.11.2 Work Camp

A work camp will be established at the FOX-C DEW Line Site to carry out the remediation program. The camp will be owned by the primary contractor who will be responsible for:

- food services;
- heating;

- lighting;
- fuel;
- domestic water systems;
- sewage collection, treatment and disposal system;
- waste, refuse and garbage collection and disposal;
- camp fire prevention, alarm and fire fighting system;
- camp safety and security service;
- sleeping and washroom facilities;
- bedding and bedding laundry service;
- janitorial service;
- personnel laundry facilities; and
- snow removal.

The work camp, including its facilities, utilities, services, location and operation will be operated in accordance with applicable Federal, Territorial, and local codes, regulations and requirements governing camps, including environmental regulatory requirements, Land Use Permit and Water Use Licence.

Prior to the installation of camp facilities, all necessary work will be completed to ensure the protection of the environment. Additionally, consideration will be given to possible wildlife encounters when determining the camp layout. Bear and other wildlife safety literature will be considered when selecting the location of the kitchen, food storage, washroom and sleeping facilities. A working wildlife deterrent system will be put in place and there will be a replacement made available within 24 hours, should the primary system fail.

All camp wastes will be disposed of in accordance with the Land Use Permit. Sewage will be disposed of in pits. All sewage pits will be located a minimum of 60 m away from any drainage courses, water bodies and main camp buildings in accordance with the Land Use Permit. All potable water required for the camp, including dish washing and cooking water, will be brought to the site.

A fire extinguisher will be provided for each camp facility. A carbon monoxide detector will be provided for each facility that is equipped with an oil-burning heater. All flammable liquids will be handled and stored according to the current National Fire Code of Canada.

Basic camp rules will be established for the benefit of all occupants. The rules will cover subjects such as property damage, smoking, use of alcoholic beverages, drugs, firearms, security, nuisance, and any other matter related to the management of the camp operation. A copy of the camp rules will be provided to all occupants upon arrival to camp. Camp rules will prohibit the consumption of alcoholic beverages on site.

Following completion of the remediation activities in October 2007, the camp site will be decommissioned and restored. Decommissioning activities will include removal of all camp facilities, burning and/or removal of garbage, removal of equipment and general site clean up. The site will be graded as required to match surrounding terrain and to ensure positive drainage. The site will be secured for human health and safety and environmental security.

4.6 Schedule of Activities

The proposed activities at the FOX-C DEW Line Site for the remediation program are summarized in Table 4-4.

Table 4-4: Task Description and Tentative Schedule – FOX-C DEW Line Site Remediation

Activity	Status	Comment
Mobilisation	**September 2005 – Winter 2006**	
Transport Equipment from Montreal	September 2005	Via barge or sealift
Temporary Storage	September 2005	Temporary storage to be set up until equipment can be moved to DEW Line Site
Mobilisation to DEW Line Site	Winter 2005/2006	
Remediation	**July to October 2006 and 2007**	
Development of borrow sources.	Summer 2006	25,000 m^3 of fill material required for site clean up
Construction of non-hazardous material landfill	Summer 2006	2 locations – one at Mid-Station Area and second at Lake Area
Remediation of Main Dump	Summer 2006 / 2007	Considered to be a surface debris area with minor buried debris and contaminated soils
Remediation of Garage Dump	Summer 2006 / 2007	Extensive hydrocarbon staining at this landfill as a result of waste disposal oil
Remediation of House Dump	Summer 2006 / 2007	Considered to be a surface debris area with minor buried debris and contaminated soils
Remediation of Mid-Station Dump	Summer 2006 / 2007	Granular cover is expected to be unstable in the long term. Landfill footprint covers an area of approximately 20,000 m^2.
Remediation of Original Dump	Summer 2006 / 2007	Considered to be a surface debris area with minor buried debris.
Demolition of Existing Site Infrastructure – Upper Station	Summer 2006 / 2007	Includes module train, warehouse, garage and two 75,000-L POL tanks
Demolition of Existing Site Infrastructure – Beach area	Summer 2006 / 2007	Includes two 75,000-L POL Tanks
Demolition of Existing Site Infrastructure – Hazardous Materials	Summer 2006 / 2007	Include asbestos, paint amended with PCBs and hydrocarbons
Segregation of demolition wastes into hazardous and non-hazardous	Summer 2006 / 2007	As sites are demolished wastes will be separated
Remediation of contaminated soil areas	Summer 2006/2007	Includes Beach, Lake Mid-Station and Upper-Station areas; primary contaminants are PCBs, hydrocarbons and metals
Collection of surface debris	Summer 2006/2007	Includes Beach, Lake, Mid-Station and Upper-Station areas and access roads
Disposal of Barrels	Summer 2006/2007	8380 barrels throughout site
Landfarming of Hydrocarbon contaminated soils	Summer 2006/2007	Includes soils from Upper Site POL Storage Area and Beach POL Storage Area
Physical restoration of disturbed areas	Summer 2006/2007	All disturbed areas restored and reshaped to match existing terrain

Table 4-4: Task Description and Tentative Schedule – FOX-C DEW Line Site Remediation		
Activity	**Status**	**Comment**
Demobilisation	**Winter 2007 / 2008**	
Demobilisation from DEW Line Site	Winter 2007/2008	Via Sealift

4.7 Environmental Management

The Project, the remediation of a former DEW Line Site, is a component of INAC's environmental management of the abandoned sites. Therefore, environmental protection is a prime component of the Project and remediation activities will follow procedures designed to protect the environment. In addition to the remediation activities discussed above, environmental protection is incorporated into the remediation work plan. Table 4-5 summarizes these measures. In addition, an Environmental Protection Plan has been developed for the removal of drums within the watershed and the installation of culverts, and a Contingency Plan has been developed for the remediation program. These are included as Appendix B and Appendix C.

Table 4-5: Environmental Protection Measures Incorporated into the Remediation Work Plan	
Activity	**Environmental Protection Measures**
Work Camp	All camp facilities will be placed within previously disturbed areas of the site.
	Water will be pumped to site via a small horsepower pump and water intake pipe laid overland and equipped with a small mesh screen. Pump will be placed at least 30 m from either water body and a spill kit will be sited near the pump. A suitably sized screen will be placed over the intake end of the pipe.
Fuel Storage and Handling	Diesel will be transported to site in a truck-mounted tank. Fuel will be transferred directly from barrels or the truck to vehicles and equipment using and electric pump. Fuel transfer will be completed at a location at least 100 m from waterbodies. There will be four drum spill kits present at the site – two at the Upper site and two at the Lower site - each capable of absorbing 174 L of liquid hydrocarbons.
	The kits will be located near the fuel cache areas that will house the drummed fuel. Two standard spill packs capable of absorbing 40 L of liquid hydrocarbons will accompany the equipment on site (one at Upper site and one at Lower site).
Sewage Handling	One two cell temporary lagoon will be constructed a minimum of 100 m from the work camp, a minimum of 450 m from any water body, and downwind of the camp.
	There will be no water discharges into waterbodies.
Hazardous Material Handling	Dedicated spill kits will be on-site during the in-stream barrel removal activities.
	Handling, storage and use of flammable liquids will be governed by the current National Fire Code of Canada. Flammable liquids such as gasoline, kerosene and naphtha will be kept for ready use in quantities not exceeding 45 litres, provided they are stored in approved safety cans bearing the Underwriter's Laboratory of Canada or Factory Mutual seal of approval.
	Upon award of contract, the Contractor will provide types, quantities, and MSDS for all fuel and chemicals on site.

Table 4-5: Environmental Protection Measures Incorporated into the Remediation Work Plan	
Activity	**Environmental Protection Measures**
	Contractor will comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding employee training, use, handling, storage and disposal of hazardous materials, and regarding labelling and provision of Material Safety Data Sheets (MSDS) as required by WHMIS legislation.
	Hazardous materials will be removed by sea lift in accordance with the *Transportation of Dangerous Goods Act*.
Waste Handling	Non-hazardous, combustible solid waste will be incinerated on-site in an enclosed container. Non-combustible solid waste generated from the camp operations will be stored in a secure waste disposal bin. The contents of the waste disposal bin will be transported and disposed of in the on-site non-hazardous waste landfills on an as required basis.
	Camp greywater will be directed to a discharge pit excavated a minimum 30 m from the camp, any natural drainage course, or waterbody. Upon completion of site activities the pit will be filled in.
	Groundwater monitoring wells will be installed around the perimeter of the landfill to facilitate long-term leachate monitoring. Monitoring will occur at least annually for the first five years and every five years thereafter for a total of 25 years. The monitoring requirements of the landfill will be reassessed at that time.

5.0 ENVIRONMENTAL ASSESSMENT METHODOLOGY

5.1 Overview and Approach

The assessment of the potential environmental effects of the site remediation has been carried out using a rigorous methodological framework developed on the basis of current, accepted practice and professional experience of the study team. The potential environmental effects of activities associated with the project on each VEC selected for consideration has been evaluated. Mitigation measures to address and minimize any potential environmental effects are also identified and discussed. The potential environmental effects resulting from malfunctions and accidents associated with the work plan have been evaluated. As well, the cumulative environmental effects of past, present and planned future activities have been assessed.

The assessment of project impacts is determined through the following procedure:

- VEC definition;
- determination of boundaries;
- potential interactions, assessment of impacts and mitigation analysis;
- summary of residual environmental impacts; and
- summary of mitigation and monitoring.

Each of these steps is described in further detail below.

5.2 VEC Definition and Selection

Standard environmental assessment practice encourages scoping to focus assessments on those environmental issues of greatest importance, referred to as Valued Environmental Components or VECs. The identification of key issues through stakeholder consultation, documents review process and site assessment process is critical to ensuring that the assessment focuses on those matters of primary concern to regulatory authorities, stakeholders and the assessor.

VECs are selected as components of the environment that are valued by society, and upon which the environmental assessment is focused. Potential environmental issues of concern that may be associated with the proposed project have been identified through consultation with INAC, the Government of Nunavut, and the professional judgement of the study team.

Based on the existing environmental conditions, the scope of the screening includes environmental effects on physical, biological, social and environmental components of value. The scope excludes the effects of accidental events on worker safety and the effects of burning fossil fuels by machinery used during the site remediation on the atmospheric environment (including greenhouse gas levels and climate change). The scope of the socio-economic assessment is limited to the basic requirements of the *CEAA* Screening process whereby the assessment of socio-economic effects is limited to "*any change that the project may cause in the environment, including any such change on health and socio-economic conditions*". The VECs identified for the project take in to consideration the nature, and temporal and spatial scope of the project and anticipated potential-environmental interactions. VECs selected and the rationale for their selection is provided in Table 5-1.

Table 5-1: VEC Selection Rational

VEC	Rationale For Selection		
	Public/Stakeholder Concerns	Regulatory Considerations(*)	Professional Judgement
Air Quality	v	v	v
Soil Quality	v	v	v
Water Quality	v	v	v
Terrain		v	v
Terrestrial Animals and Habitat	v	v	v
Aquatic Animals and Habitat	v	v	v
Health and Safety	v	v	v
Archaeological and Heritage Resources	v	v	v
Land Use	v	v	v
Aesthetics	v	v	v
Socio-economic Issues	v	v	v

(*) Includes federal and territorial regulations.

5.3 Identification of Cumulative Environmental Effects

Cumulative effects have been defined as changes to the biophysical, social, cultural or economic environments caused by a project component in combination with any ongoing, past or future activities. Cumulative effects can occur as interactions between project components (either from the same or more than one site) and/or between environmental components. Effects can occur in one of four ways:

- physical or chemical transport mechanisms;
- "nibbling loss" (*i.e.*, gradual disturbance);
- spatial or temporal crowding; and
- growth induction initiated by a project.

5.3.1 Analysis of Cumulative Environmental Effects

Four steps in the analysis of the cumulative environmental effects of this project include scoping, analysis of effects, mitigation measures, and significance.

Scoping: Scoping includes the identification of issues of potential concern, VECs that could be affected and boundary setting. The activities considered include all remediation activities at the FOX-C DEW Line Site. Temporal and spatial boundaries encompass those periods during, and areas within which, the VECs are likely to interact with, or be influenced by project activities. The spatial boundaries include impacts over a larger (regional) area including the crossing of jurisdictional boundaries. As the landfills will remain on site, temporal boundaries extend beyond the time frame required to complete the clean up. Other boundaries to be considered as appropriate include administrative and technical boundaries imposed by factors such as finite resources of data, time, cost, and labour, as well as technical, political, or administrative and jurisdictional considerations.

Analysis of Effects: This section identifies the specific nature and extent of the interactions between the project and the VECs. Where appropriate, the assessment includes a summary of major concerns or hypotheses of relevance regarding the effect of each activity on the VECs being considered. Where existing knowledge or the application of standard mitigation indicates that an interaction is not likely to result in an impact, certain issues may warrant only limited analysis.

Mitigation Measures: For each interaction, options available for mitigation are considered in the impact analysis.

Significance: The environmental assessment considers activities associated with project activities that could result in adverse environmental effects in consideration of their likelihood of occurring, and taking into account appropriate mitigation measures. In determining whether there are adverse environmental effects, the following factors are considered:

- negative effects on the health of biota;
- loss of rare or endangered species;
- reductions in biological diversity;

- loss of critical/productive habitat;
- fragmentation of habitat or interruption of movement corridors and migration routes;
- transformation of natural landscapes;
- discharge or presence of persistent and/or toxic chemicals;
- toxicity effects on human health; and
- effects on cultural issues.

5.3.2 Identification of Mitigation Measures, Residual Impacts and Monitoring

Mitigation measures are identified that will result in a reduction or elimination of likely environmental impacts associated with the clean up. Section 6 discusses each VEC, the associated potential adverse environmental effects, the mitigation, and residual environmental effects. Taking into account the mitigation measures, the significance or anticipated residual impacts are identified for all potential impacts. The significance of the residual environmental impacts of project activities on a VEC is evaluated based on review of relevant literature, consultation with experts, and professional judgement.

Monitoring will be required in the future for a number of reasons including compliance, agreement commitments and impact management. This methodology also allows INAC to be able to establish baseline conditions for the project at the time of initiation. The implementation of recommended mitigation and monitoring will allow future activities to be compared to the current conditions identified by this assessment.

6.0 ENVIRONMENTAL ASSESSMENT

This section describes the potential interactions of specific project activities with the existing environmental conditions. Planned appropriate mitigation activities are identified and an assessment of the potential residual environmental effects (after mitigation is applied), including cumulative environmental effects. Potential interactions between the project and the identified VECs are described in the sub-sections below.

6.1 Regional Setting

FOX-C Intermediate DEW Line Site is located on the south shore of Ekalugad Fjord on the east coast of Baffin Island, approximately 1.5 km inland from the coast. The nearest community is Clyde River, which is approximately 195 km to the north of the site. The site is within the Baffin Mountain Ecoregion in the Arctic Cordillera Ecozone, which is characterized by a high arctic ecoclimate, low species diversity and sparse vegetation cover (Ecological Stratification Working Group, 1995).