### 4.5.4 Collection and Disposal of Hazardous and Non-Hazardous Debris

In addition to Dump A and Dump B, there were numerous other isolated areas of debris. All this debris will be sorted into hazardous and non-hazardous materials. In areas where removal of debris warrants, the area will be backfilled or reshaped as necessary to match natural topography.

Table 4-2 summarizes the non-hazardous demolition and debris areas at the CAM-F site and Table 4-3 the hazardous demolition and debris areas. There is approximately 2774 $m^3$ of non-hazardous debris on the site and 41.86 $m^3$ of hazardous debris.

The non-hazardous material and debris will be excavated and disposed of in the non-hazardous waste landfill site. The hazardous materials will be excavated and disposed of at an approved off-site facility. Any asbestos containing materials will be handled in accordance with standard industry protocols and disposed of in the non-hazardous waste landfill (UMA 2004).

**Table 4-2: Summary of Non-hazardous Debris at CAM-F**

| Debris Area | Approximate Volume ($m^3$) | Description |
|---|---|---|
| Garage | 16 | Aluminum claddings, structural steel, scrap wood and steel, cement mixer, barrels (concrete floor to remain in place). |
| Warehouse | 11 | Two fuel tanks (1080 L), structural steel, aluminum cladding, scrap wood and steel, barrels, wooden stairs (concrete floor to remain in place). |
| Module Train | 177 | Building materials (wood, cladding, timbers, flooring insulation etc.), empty high pressure cylinders, office furnishing, small fuel tanks. |
| Outfall area | 4 | Pipe, cable and misc. domestic waste. |
| Quonset building | 24 | Building materials (wooden remains from other Quonsets), weathered canvas, empty heating oil tank (1400 L). Bags of asbestos. |
| Antenna Base area | 86 | 135 m antenna, cables, scattered wood and metal debris (concrete footing to remain in place). |
| Inuit house area | 29 | Building materials, stoves, house contents, concrete footings, scrap steel and wood. |
| Fuel storage area | 73 | Two 75,000 L aboveground storage tanks (ASTs), concrete tank pad, piping, pump house, scattered debris including barrels, bombardier track, flat bed trailer etc. |
| Stained area NW of Module train | 7 | Steel cable, barrels, heavy equipment and miscellaneous metal. |
| Vehicle pile (south of warehouse) | 38 | Approximately 30 empty barrels, heavy equipment and miscellaneous metal. |
| West Barrel Cache | 450 | Includes approximately 5000 barrels. |
| Debris near runway | 39 | Debris scattered near the runway and aircraft crash site includes 150 barrels. |
| Beach area borrow site | 4 | Approximately 40 empty barrels. |
| Dump A | 1,119 | Steel debris, misc. electrical equipment, wood, 585 empty barrels. |
| Dump B | 159 | Cable, wood and metal debris, cat tracks, vehicle parts, domestic waste. |
| Vehicle dump north of Dump B | 37 | Heavy equipment (grader, truck, 150 scattered barrels etc.) pushed off a small bedrock ledge. |
| Former construction camp | 258 | Two small areas of contaminated soil require excavation, backfilling and regarding. Includes approximately 1970 barrels, road construction equipment etc. |
| Domestic Garbage Dump | 227 | Mainly domestic refuse including 700 barrels, glass, wire, wood crates. |
| Sarcpa Lake Borrow Areas | 16 | Approximately 100 empty barrels in east borrow area across lake. |

Source: UMA Engineering Ltd. (2005)

| Table 4-3: Summary of Hazardous Debris at CAM-F | | |
|---|---|---|
| Debris Area | Approximate Volume ($m^3$) | Description |
| Garage | 5 | PCB paint on metal cladding and surface of concrete floor. |
| Warehouse | 5 | PCB paint on fuel tanks, interior plywood and surface of concrete floor. |
| Module train | 25 | PCB paint on interior plywood and concrete pad in generator room. Some asbestos piping insulation and tile. Small volumes of miscellaneous fuels/glycols/batteries. 18 compressed gas cylinders. |
| Inuit house area | 2 | PCB paint on interior wood surfaces. 20 barrels with fuel/POL waste. |
| Fuel storage area | 1.3 | PCB paint on exterior of tank. Small volumes of batteries and one barrel of oil near tanks. |
| Dump B | 2.5 | 15 lead acid batteries, some asbestos containing materials, potential PCB paint on metal. |
| Vehicle dump north of Dump A | 0.24 | 8 lead acid batteries. |
| Former construction camp | 0.71 | 21 lead acid batteries. |
| Domestic garbage dump | 0.08 | 3 lead acid batteries. |
| Sarcpa Lake Borrow Areas | 0.03 | 1 lead acid battery. |

Source: UMA Engineering Ltd. (2005)

### 4.5.5 Barrel Disposal

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.

Used oil absorbent material will be treated as hazardous waste and disposed of off site at a licensed disposal facility. If it is shown to be uncontaminated with PCBs (<2 mg/L), chlorine (<1,000 mg/L), cadmium (<2 mg/L), chromium (<10 mg/L), and lead (<100 mg/L), it may be incinerated on-site.

Empty barrels will be crushed or shredded and landfilled as non-hazardous waste after they have been cleaned in an appropriate manner. The barrels shall be crushed in such a manner so as to reduce their volume by a minimum of 80 percent. Shredded barrels may be disposed of in the NHW Landfill or off site as recycled metals.

### 4.5.6 Demolition and Disposal of Site Facilities

As part of the remediation program, all structures and utilities on-site will be demolished, removed and disposed or containerized. This task includes but is not limited to the activities described below (UMA Engineering Ltd. 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.
- Removal and disposal of Asbestos material, in accordance with the asbestos abatement program, will be removed and disposed of using a method that eliminates the risk of exposure to friable asbestos. Proper personal protective equipment (PPE) and specialized equipment will be used when removing asbestos.
- Concrete contaminated with PCBs at concentrations greater than 1 mg/kg and less than 50 mg/kg will be removed and disposed of.
- Concrete contaminated with PCBs at concentrations greater than 50 mg/kg will be removed and containerized.
- Hazardous demolition waste material 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 Canadian Environmental Protection Act (CEPA) guidelines.
- Creosote-treated timbers will be removed and disposed of in the non-hazardous waste landfill. Creosote coated power poles or foundations will be cut off 300 mm below ground level.
- Drainage culverts will be removed and disposed of.
- Disconnecting and capping of services will be carried out as required.
- Non-hazardous materials will be crushed and placed in the non-hazardous waste landfill.

Concrete foundations are to be left largely intact except where they are coated with PCB paints. Once areas have been demolished and site structures have been removed, areas will be filled where necessary and all areas will be recontoured to match the surrounding topography.

### 4.5.7 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 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.

As the paint on many of the buildings contains PCBs in concentrations greater than 50 mg/kg, this will be collected and containerized before being transported off-site for disposal. The temporary storage of the materials on-site will be in accordance with the Temporary Storage of PCB Waste Regulations under CEPA.

### 4.5.8 Transportation of Hazardous Materials Off Site

Hazardous materials will be placed in environmental suitable containers at an approved containment facility developed on-site as per Environment Canada Guidelines. The hazardous materials will be removed by CAT/Train/sealift in accordance with the Transportation of Dangerous Goods Act.

### 4.5.9 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.

### 4.5.10 Development of Borrow Areas

Approximately 33,000 m3 of fill material is required for site clean up. Fill is required for upgrading of the access roads during construction, backfilling contaminated soil areas and general site grading purposes. Additional fill is required for the development of the new non-hazardous waste landfill and the secure soil disposal facility. Sufficient borrow areas were identified in the geotechnical report completed by EBA. Further details on borrow area sources are contained in EBA's geotechnical report.

### 4.5.11 Contractor Support Activities

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

- the existing beach landing area, airstrip and roads will be used for equipment transport, movement and access to work areas;
- 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 15-25 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.

### 4.5.12 Work Camp

A work camp will be established at the CAM-F 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;
- potable and 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;
- meals and catering service;
- sleeping and washroom facilities;
- bedding and bedding laundry service;
- janitorial service;
- personnel laundry facilities;
- recreational 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. The camp will be installed at the same location as the previous years. 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 100 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 CAM-F DEW Line Site include mobilization, remediation and clean up and demobilization. Information on all activities associated with the remediation program are summarized in Table 4-4.

| Table 4-4: Task Description and Tentative Schedule – CAM-F DEW Line Site Remediation | | |
|---|---|---|
| **Activity** | **Status** | **Comment** |
| **Mobilisation** | **September 2005 – Winter 2006** | |
| Transport Equipment from Montreal to Hall Beach | September 2005 | Via barge or sealift |
| Temporary Storage | September 2005 | Temporary storage to be set up at Hall Beach until Winter. |
| Mobilisation to DEW Line Site | Winter 2005/2006 | Remediation equipment mobilised to Sarcpa lake via CAT Train. |
| **Remediation** | **July to October 2006 and 2007** | |
| Development of borrow sources. | Summer 2006 | |
| Construction of non-hazardous material landfill | Summer 2006 | |
| Construction of hazardous materials landfill | Summer 2006 | |
| Incineration of liquid hydrocarbons | Summer 2006 | |
| Excavation and disposal (or containerization) of identified surface contamination which exceeds DCC criteria | Summer 2006 | |
| Excavation of Dump A and removal of hazardous material including PCB contaminated soil | Summer 2006 / 2007 | This task will occur due to CEPA requirements to delineate and remove PCB wastes in and under this landfill. |
| Removal and containerization of PCB contaminated concrete (CEPA waste) | Summer 2007 | This task will occur due to CEPA requirements to remove materials. |
| Collection and crushing of empty oil barrels | Summer 2007 | This task will occur in all foreseeable options. |
| Abatement of hazardous materials from on-site structures (PCB contaminated walls and floors from generator room, utility room, water storage room, warehouse, former garage and Inuit house, ACMs) | Summer 2007 | This task will occur due to CEPA requirements to remove materials. |
| Remove balance of asbestos insulation | Summer 2007 | |
| Demolition of on-site structures | Summer 2007 | |
| Demolish module train, warehouse, Inuit House and radar tower | Summer 2007 | |
| Demolish two empty 75,000 L POL tanks and Quonset hut | Summer 2007 | |
| Collection and disposal of non-hazardous waste | Summer 2007 | Non-hazardous waste includes shredded barrels, abandoned vehicles, crashed aircraft, and the toppled antenna and building demolition materials |
| Complete site restoration | Summer 2007 | Cap landfills, grade site to return it to a 'natural state'. |

| Table 4-4: Task Description and Tentative Schedule – CAM-F DEW Line Site Remediation | | |
|---|---|---|
| **Activity** | **Status** | **Comment** |
| Transport of hazardous liquids (PCB oil, metal contaminated and/or chlorinated waste oil) south | Summer 2007 | This task will occur due to CEPA requirements t remove materials; no hazardous waste liquids will remain at site. |
| Transport of PCB contaminated soil and concrete (CEPA waste) south | Summer 2007 | This task will occur due to CEPA requirements to remove materials |
| Off-site disposal of 13 drums. Incineration of 18 drums | Summer 2007 | |
| Excavate, containerize 153 $m^3$ soils contaminated with metals; excavate containerize 285 $m^3$ soils contaminated with PCBs | Summer 2007 | |
| Dispose of 164 plastic barrels containing soils contaminated with PCBs | Summer 2007 | |
| Dispose of CEPA hazardous liquids and CEPA waste in south | Summer 2007 | |
| **Demobilisation** | **Winter 2007 / 2008** | |
| Demobilisation from DEW Site to Hall Beach | Winter 2007/2008 | |
| Demobilisation from Hall Beach to Montreal | Summer 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, a Contingency Plan has been developed for the remediation program. This is included as Appendix B.

| 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. |
| 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 at least two drum spill kits present at the site each capable of absorbing 174 L of liquid hydrocarbons. Both kits will be located near the containment area that will house all of the drummed fuel. One standard spill pack capable of absorbing 40 L of liquid hydrocarbons will accompany field crews working at the site. . |

| Table 4-5: Environmental Protection Measures Incorporated into the Remediation Work Plan | |
|---|---|
| **Activity** | **Environmental Protection Measures** |
| Sewage Handling | Two independently operated temporary lagoons will be installed. Each lagoon will have an individual capacity for 45 days of wastewater storage or one half of the duration of the construction season, whichever is less. Maximum fluid depth will not exceed one metre. The location of the lagoons will be a minimum of 100 m from the construction camp or other temporary facilities and drainage paths, a minimum of 450 m from water bodies supporting aquatic life and downwind of the construction camp (based on the prevailing wind direction). Discharge criteria will be as follows: 1) oil and grease – none visible, 2) pH – 6 to 9, 3) TSS –180 mg/L, 4) BOD – 120 mg/L, 5) fecal coliforms – 10,000 CFU/dl. |
| | 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. |
| | 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 labeling and providision 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. Noncombustible 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 proposed project 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 Indian and Northern Affairs Canada (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 gases 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 | ✓ | ✓ | ✓ |
| Soil Quality | ✓ | ✓ | ✓ |
| Water Quality | ✓ | ✓ | ✓ |
| Terrain | | ✓ | ✓ |
| Terrestrial Animals and Habitat | ✓ | ✓ | ✓ |
| Aquatic Animals and Habitat | ✓ | ✓ | ✓ |
| Health and Safety | ✓ | ✓ | ✓ |
| Archaeological and Heritage Resources | ✓ | ✓ | ✓ |
| Land Use | ✓ | ✓ | ✓ |
| Aesthetics | ✓ | ✓ | ✓ |
| Socio-economic Issues | ✓ | ✓ | ✓ |

(*) 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 the remediation of the CAM-F 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, is conducted. Potential interactions between the project and the identified VECs are described in the sub-sections below.

## 6.1 Regional Setting

CAM-F DEW Line Site is located on the eastern portion of Melville Peninsula, about 85 km west of Hall Beach and 100 km south of Igloolik. The site is located on the west side of Sarcpa Lake. Most of the Melville Peninsula is a polar semi-desert, being a high plateau of granitic Canadian Shield and holding only a small amount of soil, which is usually acidic. Coastal areas have basic soils on a limestone base and support a low shrub tundra complex. Vegetation is discontinuous and bedrock outcroppings are common (Ecological Stratification Working Group, 1995).

## 6.2 Public Consultation

DIAND had carried out an extensive public consultation program with stakeholders to discuss the remediation of the FOX-C site and to solicit input from the public regarding concerns they may have with the program. The concerns raised have been incorporated into the environmental assessment.

A summary of the consultation program is presented below.

January 2004: initial meeting with Hamlet Councils, Hunters & Trappers, Qukiqtani Inuit Association representatives and the public in Hall Beach and Igloolik to briefly introduce the project, especially the planned site investigation.

March 2004: community public consultations in Hall Beach and Igloolik; presented planned site investigation work and sought ideas on overall site remediation plan.

May 2004: initial meetings with Hunters & Trappers Organizations, Hamlet Councils, Qikiqtani Inuit Organizations representatives and the public in Hall Beach and Igloolik to briefly introduce the project and especially the planned site investigation.

July 2004: initial meeting with the NIRB & Nunavut Water Board (NWB) representatives to introduce the project and obtain feedback on regulatory approval requirements and submissions.

July 2004: transported Hunters & Trappers and Hamlet representatives from local communities to the site during investigation work to illustrate work being carried out and to familiarize them with site and site-specific issues

December 2004: presented the results of site investigation and preliminary remedial design options to regulators.

December 2004: community public consultations in Hall Beach and Igloolik; results of the site investigations and preliminary remediation work plans were presented.

December 2004 Qikiqtaaluk Environmental was contracted to review the Site Specific Risk Assessment (SSRA) and to interview Hall Beach and Igloolik elders about the project and project area.

February 2005: presented summary results of site investigation and preliminary remediation work plan to NIRB. NIRB has drafted a "checklist" of submission requirements and provided these to DIAND/PWGSC to be included with the Sarcpa regulatory submission.

February 2005: presented a brief overview of the project to Fisheries and Oceans Canada (FOC) representatives. No major issues were identified for this site.

March 2005: PWGSC presenteed the government contracting process to Inuit businesses.

March 2005: met with potential contractor bidders to familiarize them with the remedial project specifics.

The questions raised at the public meetings focused on methods of contaminant removal, the frequency of monitoring (every year for the first five years and then every three or five years unless there are problems that require more frequent monitoring), and if fish in Sarcpa Lake have been contaminated (studies show they have not been).

## 6.3 Air Quality

### 6.3.1 Existing Environment

The climate on the Melville Peninsula is a typical polar climate characteristic of other high arctic sites. The snow begins to disappear in late May (Montgomerie *et al.*, 1982). The mean annual temperature is approximately -11°C with a summer mean of 2°C and a winter mean of -23°C. The mean annual precipitation ranges from 100 mm to 300 mm. Drainage tend to flow south-eastward towards Foxe Basin (Ecological Stratification Working Group, 1995).

### 6.3.2 Air Quality Impact Assessment

#### 6.3.2.1 Study Area Boundaries

The spatial boundary for the assessment of project effects on air quality is the airshed on the Melville Peninsula. The temporal boundary is the remediation field work period as well as the additional monitoring period following completion of the project.

The administrative boundaries for the assessment refer to the jurisdictions within which and for which the assessment is being prepared. In this case, the assessment is being prepared under CEAA and NIRB for review by other federal and territorial departments following the CEAA process with additions to meet the NIRB requirements. Technical boundaries of the air quality assessment are the lack of site-specific meteorological data and the limited time frame associated with the environmental screening.

### 6.3.2.2 Identification of Issues, Interactions and Potential Effects

During the remediation activities, there will be emissions of greenhouse gases, nitrogen oxides ($NO_x$), sulphur dioxide ($SO_2$) particulate matter (PM) and carbon monoxide (CO) due to combustion of diesel fuel or gasoline in vehicles. There is also the potential for generation of dust during vehicle movement and ground disturbance. These emissions will be of short-term duration and will be restricted to the local area around the site. Table 6-1 is an environmental assessment matrix for the Air Quality VEC.

**Table 6-1: Environmental Effects Assessment Matrix: Air Quality**

| Project Activity | Potential Positive (P) or Adverse (A) Environmental Effect | Mitigation | Evaluation Criteria for Assessing Residual Environmental Effects | | | | |
|---|---|---|---|---|---|---|---|
| | | | Magnitude | Geographic Extent | Duration/ Frequency | Reversibility | Ecological/Socio-Cultural and Economic Context |
| Site Preparation Activities | Emissions of greenhouse gases, nitrous oxides, sulphur dioxide, particulate matter, and carbon monoxide from vehicles (A). | • None | 1 | 2 | 2/5 | R | 1 |
| | Vehicle movement will generate dust (A). | • Dust control measures will be implemented. Water will be used for dust suppression. Exposed soil piles will be covered. | 1 | 2 | 2/5 | R | 1 |
| Hazardous Materials Removal | The removal of the contaminated soil from the environment will reduce the risk of effects on air quality (P). | • N/A | | | | | |

**Table 6-1: Environmental Effects Assessment Matrix: Air Quality**

| Project Activity | Potential Positive (P) or Adverse (A) Environmental Effect | Mitigation | Evaluation Criteria for Assessing Residual Environmental Effects | | | | |
|---|---|---|---|---|---|---|---|
| | | | Magnitude | Geographic Extent | Duration/ Frequency | Reversibility | Ecological/Socio-Cultural and Economic Context |

KEY:

**Magnitude:**

1 = Low: emissions predicted to be within the CCME National Ambient Air Quality Objectives
3 = High: Emissions predicted to exceed the CCME National Ambient Air Quality Objectives

**Geographic Extent:**

1 = <1 km²
2 = 1-10 km²
3 = 11-100 km²
4 = 101-1000 km²
5 = 1001-10,000 km²
6 = >10,000 km²

**Duration:**

1 = <1 month
2 = 1-12 months
3 = 13-36 months
4 = 37-72 months
5 = >72 months

**Frequency:**

1 = <11 events/year
2 = 11-50 events/year
3 = 51-100 events/year
4 = 101-200 events/year
5 = >200 events/year
6 = continuous

**Reversibility:**

R = Reversible
I = Irreversible

**Ecological/Socio-cultural and Economic Context:**

1 = Relatively pristine area or area not adversely affected by human activity.

Evidence of adverse effects.

N/A = Not Applicable

### 6.3.2.3 Mitigation

Mitigative measures for controlling fugitive dust emissions during the project activities will be detailed in procedures that the contractors will be required to follow (i.e., watering down roads and exposed portions of the project site, covering exposed soil piles). Windblown dust during project activities is expected to be minor.

### 6.3.2.4 Residual Environmental Effects

***Definition of Significance***

Significant impacts to the atmospheric environment are defined to occur when ground-level concentrations associated with emissions from activities exceed ambient air quality standards that have been established by the government to protect human health and the environment. In this case, the National Ambient Air Quality Objectives from the Canadian Council of Ministers of the Environment (CCME 1999) are the standards used.

***Residual Environmental Effects Summary***

Table 6-2 summarizes the residual environmental effects of the project activities on air quality. The effects of vehicle and equipment emissions during the remediation activities are not expected to exceed CCME ambient air quality objectives, although no monitoring of emissions has been carried out. Emissions will be short term and intermittent and will not be unlike those from low traffic volumes in a city such as Iqaluit. Dust generation is expected to also be low in volume and infrequent.