Remediation Work Plan

FOX-C Ekalugad Fiord

Intermediate DEW Line Site

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Mr. Jared Buchko, P.Eng.
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Dear Mr. Buchko:

RE: Remediation Work Plan for the FOX-C Intermediate DEW Line Site

UMA Engineering Ltd. (UMA) is pleased to provide six (6) copies of the work plan for the remediation of the FOX-C Intermediate DEW Line Site. As discussed in the attached report, the rationale for decisions for remediation is provided, as well as the location of various program components (i.e. debris clean-up, demolition, landfill areas, contaminated soil, etc.).

We trust that this is sufficient for your requirements at this time. Please contact me on my direct line at (780) 486-7624 if you have any questions or require anything further.

Sincerely,

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1.0 Introduction

UMA Engineering Ltd. (UMA) was retained by Public Works and Government Services Canada (PWGSC), on behalf of Indian and Northern Affairs Canada (INAC), to develop a remediation work plan for FOX-C Intermediate DEW Line site at Ekalugad Fiord, Territory of Nunavut. The purpose of this project is to develop remediation strategies for issues of environmental concern that remain as a result of the operation of this former intermediate DEW Line site. Specifically, remediation will mitigate and/or control contaminant migration to the surrounding environment.

The work plan involves several proposed components:

- The existing site infrastructure will be demolished and the demolition wastes will be segregated into hazardous and non-hazardous materials and disposed of appropriately;
- Contaminated soil areas, identified during the previous field investigations, will be remediated;
- All hazardous materials and soil will be disposed of at an off-site licensed disposal facility;
- Scattered surface debris and partially buried debris on the site is to 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, on this site, will be remediated, as required; and
- Disturbed areas will be physically restored to a stable condition and shaped to match the existing terrain.

The scope of work for this work plan is summarized as follows:

- Provide a summary of the major findings from the site investigation program;
- Summarize the cleanup protocols including confirmation of the proposed remediation criteria;
- Provide a summary of contaminated soil areas from the investigation program(s);
- Provide conceptual remedial design options for various decisions for remediation include those related to remediation of existing debris/landfill areas;
- Provide preliminary drawings indicating the locations of various remediation program components (i.e. non-hazardous landfill, secure disposal facilities, site debris, demolition components etc.);
- Develop remediation design recommendations;
- Identify proposed sources of granular materials required for remediation facilities;
- Provide a preliminary estimate of quantities and costs for various remediation elements; and
- Outline the overall remediation schedule for the site.

2.0 Site Description

2.1 Location and Site Facilities

The FOX-C Intermediate DEW Line Site is located on the east coast of Baffin Island at 68°42'N, 68°33'W in the Territory of Nunavut. The site is situated on the south shore of the Ekalugad Fiord, approximately 195 km south of the community of Clyde River and 240 km northwest of Qikiqtarjuaq. An airstrip was never constructed at FOX-C.

The FOX-C station was constructed in 1957 as an Intermediate DEW Line Site. In 1963, the site was abandoned and responsibility was taken over by the Department of Indian Affairs and Northern Development (DIAND). An overall site plan of the FOX-C DEW Line Site showing the site layout, is provided on Drawing 413759-C01 in Appendix I.

The FOX-C site consists of four main areas including the Beach and Lake Areas at the Lower Site and the Mid Station and Upper Station Areas at the Upper Site. There is a junction at the lower site where the access roads from the Lake, Beach and Upper Station meet. Several sections of the access road have become impassable since the site was abandoned in the 1960's. A glacier opposite the Mid-Station Area feeds a river that flows along the Upper Station Access Road to the lake. The lake has an outlet where the river continues its course to the ocean.

The Upper Station is approximately 5.9 km from the junction along the access road and is located on a summit at elevation 770 m above mean sea level. The Mid-Station area is located at the base of the summit approximately 500 m to the east of the Upper Station Area. The main site facilities are located at the Upper Station and include a module train, warehouse, garage, a former Quonset building, Inuit house, bulk fuel storage tanks, a radar tower that has been knocked down and other site debris. The Mid-Station Area consists of a dump area, barrel storage pad, four former Quonset buildings and numerous barrel debris areas.

The Lake Area at FOX-C is accessed by a 1.1 km long road to the southwest of the junction. There is a helicopter landing pad along the road to the lake area.

The Beach Area is located approximately 2.2 km from the junction and includes two POL storage tanks, barrel caches and abandoned construction equipment. The landing area at the beach was used to allow ships to transfer fuel to the POL storage tanks.

The FOX-C Intermediate DEW Line Station was originally going to be located at a site west of the water lake. There may be some debris at this original FOX-C location.

2.2 PREVIOUS INVESTIGATIONS

The first site investigation was completed by the Environmental Sciences Group (ESG) in 1993. A risk assessment was conducted by CANTOX Inc. and Gartner Lee Ltd. for the Qikiqtaaluk Corporation in 1998. These assessments identified chemical contaminants at the site and provided information for an initial engineering design and cost estimate for the clean up of the site (Sinanni, Qikiqtaaluk Corporation, 2001).

Recent site investigations include a Human Health Screening Level Risk Assessment by SENES Consultants for DIAND in 2003 and a Surface and Groundwater Sampling Program by Gartner Lee in 2003. The results of the Risk Assessment indicated that FOX-C was a high priority Intermediate DEW Line Site requiring further investigation and remedial activity.

In 2004, Earth Tech Canada Inc. was retained to conduct a Phase III Environmental Site Assessment and EBA Engineering Consultants, Ltd. was retained to complete a geotechnical investigation at FOX-C.

Community meetings were facilitated by PWGSC in Qikiqtarjuaq and Clyde River in 2004. A summary of issues brought up at these community meetings is provided in Appendix III.

2.3 SUMMARY OF MAJOR FINDINGS

The environmental and geotechnical site investigations have identified the following major findings:

- The primary station infrastructure, identified to be demolished, includes a module train, warehouse, garage and two 75,000 litre POL storage tanks at the Upper Station and two 75,000 litre POL storage tanks at the Beach Area. Hazardous materials, including asbestos, paint amended with PCBs and hydrocarbon product, were identified in the site infrastructure.
- Five existing landfills were investigated including the Main Dump, Garage Dump and House Dump at the Upper Station; the Mid-Station Dump and the Original Dump, located to the south of the Mid-Station Area.
- Various contaminated soil areas were identified at the Beach, Lake, Mid-Station and Upper Station Areas. The primary contaminants were PCBs, hydrocarbons and metals.
- Numerous debris areas were identified at the Beach, Lake, Mid-Station and Upper Station areas and along the access road and river. This debris includes approximately 8,380 barrels, located on this site. Some of the barrels contain hydrocarbon product.
- Several sections of the access road have become impassable due to significant washouts.

Preliminary drawings for FOX-C are provided in Appendix I.

3.0 Implementation and Design/Engineering

The purpose of this project is to remediate the site to an acceptable level of environmental risk by:

- Remediating contaminated soil areas;
- Stabilizing existing landfills;
- Collecting and disposing of surface debris;
- Demolishing and removing existing site facilities; and
- Physically restoring the site.

The remediation plan and procedures are outlined in the following sections. Selected photographs of the clean up areas at FOX-C are provided in Appendix II.

3.1 Site Access and Transportation Methods

Off site activities in support of this project will be in the form of transportation associated with the transport of materials, equipment and personnel to the site. These activities are described below:

- ***Air Transport*** - Most transportation by air is expected to utilize a charter rotary aircraft as there is no airstrip at this site. It may be feasible to utilize a float plane that could land on the lake.
- ***Sealift Transport*** - It is anticipated that contractors will utilize sealift to transport bulk materials and equipment (vehicles, construction equipment, fuel, etc.) to/from FOX-C. This would potentially result in the increase in sealift traffic by one or two sailings per year (one early and one late summer). Otherwise, no additional vessel traffic is anticipated.
- ***Land Transport*** - It is anticipated that overland transport will be required between the beach landing area and the Station Area via existing roads for mobilization/demobilization of materials and equipment.

3.2 Contaminated Soil Disposal Requirements

The analytical results for inorganic elements and PCBs can be interpreted using the established DEW Line Cleanup Criteria (DCC) (Table 3-1). The DCC protocol defines two concentration tiers of soil contamination for metals and polychlorinated biphenyls (PCBs), including Tier I Contaminated Soil, which is either placed in an on-site landfill or buried beneath a minimum of 0.3 m of clean fill and Tier II Contaminated Soil, which requires disposal in a manner that provides additional measures to permanently segregate these contaminants from the Arctic ecosystem. Soils exceeding federal legislative limits (i.e., Canadian Environmental Protection Act and Chlorobiphenyl Regulations) require disposal off-site at a licensed disposal or destruction facility.

For soils contaminated with hydrocarbons, the Canada Wide Standards (CWS) for Petroleum Hydrocarbons (PHC) defines criteria for a residential/parkland application for fine grained soil. The generic Tier 1 values were assumed for the residential/parkland land uses using the default set of exposure assumptions. Although the Tier 1 guidelines were developed for a more typical "southern exposure and land use", the use of these generic guidelines for the DIAND Intermediate DEW Line Sites is considered suitable. It should be noted that the reader should not confuse references to the CCME Tier 1 values with those referenced in the DCC protocol.

The contaminated soil at FOX-C has been divided into several categories depending on the type and severity of the contamination. Generally, non-hazardous surface contaminants are covered or excavated. Excavations left by soil removal are backfilled with clean fill.

3.2.1 Contaminated Soil Types

There are a variety of contaminated soil types that require disposal at FOX-C. Definitions of the types of contamination and contaminated soils potentially found at the FOX-C site are as follows:

DCC Tier I Contaminated Soil: Soils containing concentrations of any or all contaminants listed as follows:

Table 3-1: DCC Tier I Contaminant Criteria

Parameter	Criteria
Lead	200 to <500 ppm
PCBs	>5 to <50 ppm

DCC Tier II Contaminated Soils: Soils containing concentrations equal to or in excess of any or all of the contaminants listed as follows:

Table 3-2: DCC Tier II Contaminant Criteria

Parameter	Criteria
Arsenic	30 ppm
Cadmium	5 ppm
Chromium	250 ppm
Cobalt	50 ppm
Copper	100 ppm
Lead	500 ppm
Mercury	2 ppm
Nickel	100 ppm
Zinc	500 ppm
PCBs	>5 ppm to <50 ppm

Petroleum Hydrocarbons: Hydrocarbon products include those described by laboratory analyses as lubricating oil and grease, fuel oil, diesel and/or gasoline.

Hydrocarbon Contaminated Soil: Soil containing concentration of hydrocarbons greater than the Canada Wide Standards for Petroleum Hydrocarbons (CWS PHC) Residential Parkland criteria for fine grained soil, as per the Phase III Environmental Site Assessment (Earth Tech, 2001).

The CWS PHC Tier 1 levels are divided into four fractions which refer to the carbon range: Fraction 1: nC6 to nC10; Fraction 2: >nC10 to nC16; Fraction 3: >nC16 to nC34 and Fraction 4: >nC35+. These are referred to F1, F2, F3 and F4 hydrocarbons respectively.

Clean Soil: Soil that has been sampled, analysed, and determined to have contaminant concentrations less than DCC Tier I, DCC Tier II Levels and CWS PHC Tier I Levels

Hazardous Contaminated Soil: Contaminated soil is classified as hazardous in accordance with the Transportation of Dangerous Goods Act and Regulations (including Canadian Environmental Protection Act (CEPA) and leachable soil).

CEPA Contaminated Soil: Soil containing concentrations of PCBs equal to or in excess of 50 mg/kg. Materials contaminated with PCBs at concentration equal to or greater than 50 mg/kg are legislated as hazardous materials.

Leachable Soil: Soil containing contaminants that when subject to the leachate test, prescribed in the Transportation of Dangerous Goods Act (TDGA) and Regulations, leaches concentrations greater than those listed in Part V of the regulations.

3.2.2 Tier I Soil Disposal Facility Requirements

Soils exceeding Tier I contaminated criteria but not classified as Tier II contaminated soil do not pose a leachate risk and therefore may be disposed of in an on-site, non-hazardous waste (NHW) landfill. NHW landfills are also used to dispose of non-hazardous site debris and demolition materials. Typical constructions of a NHW landfill consists of gravel perimeter berms surrounding layers of interbedded waste and intermediate cover soil. A layer of granular material, minimum one metre thick, is placed as final cover for the landfill and graded to promote positive drainage. A more detailed description of a NHW Landfill is provided in Section 3.3.1.

3.2.3 Secure (Tier II) Soil Disposal Facility Requirements

Secure (Tier II) Soil Disposal Facilities have been utilized at the Main DEW Line Sites for disposal of soils exceeding the DCC Tier II concentrations. The construction of these Secure Soil Disposal Facilities at the Main DEW Line Site has been cost effective because of the large volume of Tier II contaminated soil that requires segregation in a manner which precludes their continued contact with the Arctic ecosystem. These facilities utilize a double containment system, consisting of permafrost to limit leachate generation and synthetic liners to prevent migration of contaminants into the surrounding environment.

Because of the low volumes of Tier II contaminated soil (<50 m^3), a Secure Soil Disposal Facility is not considered a cost effective disposal option at the FOX-C DEW Line Site.

3.2.4 CEPA Contaminated Soil Disposal Requirements

Contaminated soils, which contain levels of contaminants in greater than CEPA and associated regulations are considered hazardous material and will not be placed in a secure soil disposal facility. These materials will be excavated, removed from the site and transported to a licensed disposal facility. In addition, wastes determined to be leachable are also removed from the site to a licensed disposal facility.

3.2.5 Hydrocarbon Contaminated Soil Disposal Requirements

The remediation requirements for hydrocarbon contaminated soils at the main DEW Line sites have included excavation and disposal in a NHW landfill or re-grading of soils containing F3 and/or F4 hydrocarbon fractions and excavation, treatment and/or disposal of soils with exceedences of BTEX, F1 and/or F2 fraction hydrocarbons into a secure soil disposal facility. Where the primary hydrocarbon present was F3 and/or F4 hydrocarbon fraction, covering these soils in place with minimum 0.75 m of fill or excavation and disposal into the NHW landfill is considered an acceptable remediation for FOX-C. This will reduce the possibility of impact to potential receptors due to the low solubility and volatility of these compounds.

For contaminated soils that contain BTEX, F1 and/or F2 fraction hydrocarbons, regrading or disposal in a NHW landfill is generally not considered acceptable due to the concern of solubility and migration of dissolved hydrocarbon compounds. Several options have been used for treatment and disposal of these types of materials based on location and site specific factors. The most feasible and environmentally sound disposal options are placement in a secure soil disposal facility; passive land-treatment (landfarming); and containerization and transport off-site to a licensed disposal facility.

The treatment of excavated F1 and F2 hydrocarbon contaminated soils in-situ or at a constructed landfarm is a demonstrated method of remediation that has been implemented at the DND DEW Line Sites. Sufficient space is available for a landfarm at the Ekalugad Fiord Site and landfarm operation is generally the most economical because there is no requirement for specialized equipment, no need for mobilization of additives or fuel and no need for specialized skills.

At FOX-C, there are two primary hydrocarbon contaminated areas with exceedences in the F2 fraction range that warrant consideration for remediation by landfarming. These areas are both related to bulk fuel storage and include the Upper Site POL Storage Area and the Beach POL Storage Area. Treatment of hydrocarbon contaminated soils by landfarming, even on a small scale, is considered more cost effective than constructing a secure facility for disposal or shipping these soils off-site for southern treatment or disposal.

The generic risk reduction strategies for hydrocarbon contaminated soil areas include:

- Excavation of the source of contamination to a depth where PHC F1, F2, F3 and F4 fractions are less than 260 mg/kg, 900 mg/kg, 800 mg/kg and 5,600 mg/kg respectively;
- In-situ or ex-situ landfarming of soils where the PHC F1 and F2 fractions exceed 260 mg/kg and 900 mg/kg, respectively;
- Covering of soils with 0.75 m of fill where the PHC F3 and F4 fractions exceed 800 mg/kg and 5600 mg/kg respectively; and
- No action.

3.2.6 Proposed Contaminated Soil Remediation

A summary of the contaminated soils and proposed remedial solutions for FOX-C, is provided in Table 6-1 in Section 6 of this report.

3.3 PROPOSED CONSTRUCTION OF DISPOSAL FACILITIES

Two types of specialized facilities are to be constructed to dispose of waste on site due to the demolition of existing structures, removal of contaminated soil and site debris, and landfill excavation. Only soils exceeding the CEPA standards (Hazardous) and DCC Tier II criteria will be disposed of off site.

EBA Engineering Consultants Ltd. have identified several potential sites for new disposal facilities. Generally no new roads will have to be constructed to access these areas, however, the contractor may be required to make special provisions to improve roadways and to protect vegetation where applicable. The contractor will also require adequate drainage for all excavations.

3.3.1 Non-Hazardous Waste (NHW) Landfill

A Non-Hazardous Waste (NHW) Landfill is designed on the premise that it will contain non-hazardous materials only and will not generate leachate. Therefore, it is not necessary to eliminate all moisture migration into and out of the landfill. The NHW Landfill is not designed to maintain the contents in a perennially frozen state.

The following materials are proposed for disposal in a Non-Hazardous Landfill at FOX-C:

- Tier I contaminated soil;
- Hydrocarbon contaminated soil, where applicable;
- Non-hazardous demolition debris;
- Non-hazardous site debris;
- Non-hazardous debris/soils excavated from landfills;
- Creosote timbers wrapped in polyethylene sheeting; and
- Double-bagged asbestos.

A NHW Landfill consists of a perimeter containment berm and granular cover to minimize erosion and infiltration in order to provide long-term stability. A NHW Landfill is generally established on native ground (stripped of any organic matter). No base cover or liner is required for NHW landfill. The development and closure of a NHW Landfill includes the following work:

- Construction of exterior berms;
- Placement of Tier I, F3/F4 hydrocarbon soil and non-hazardous demolition waste and site debris in the landfill;
- Compaction of landfill debris;
- Placement and compaction of intermediate granular cover;
- Placement and compaction of final granular cover;
- Grading to promote drainage away from the landfill; and
- Survey of the locations of the asbestos and creosote-treated timbers.

One NHW Landfill is proposed for the Mid Station Area for disposal of Upper Site demolition, debris and contaminated soil and one NHW Landfill is proposed for the Lake Area for disposal of waste and contaminated soil from the Lower Site.

During construction of these facilities, the gradation, moisture content and compaction are monitored for compliance with the design.

3.3.2 Secure Soil Disposal Facility

Because of the low volumes of Tier II contaminated soil, a Secure Soil Disposal Facility is not considered a cost effective disposal option at the FOX-C DEW Line Site.

All Tier II contaminated soils from FOX-C will be shipped off site for disposal at a southern facility.

3.4 DESCRIPTION OF EXISTING DUMP AREAS

A total of five existing dump areas have been identified at FOX-C, including the Main Dump, Garage Dump, House Dump, Mid-Station Dump and the Original Dump. The following sections will provide a description of each dump area and a proposed remediation strategy.

3.4.1 Main Dump

The Main Dump is located approximately 20 m northeast of the module train on the north side of the summit on a steep slope with bedrock ridges and small plateaus. The ground surface in this area is mainly comprised of rock outcrops and bedrock derived cobbles and boulders. The contents of the Main Dump consist mainly of scattered surface debris, including barrels and miscellaneous wood and metal, extending over an area of approximately 5000 square metres. This dump does not have a specific area where there is significant concentrated debris. The geophysical survey indicates that there are two small barrel cache locations within this dump (Main Dump - Lobe A and Lobe B).

The environmental investigation has identified contaminated soil areas with exceedences for Tier I PCBs. The buried debris is upgradient of these areas and may be a source for the contaminated soils.

Based on the information collected, the Main Dump is considered to be a debris area with contaminated soil rather than a landfill. The proposed remediation for the Main Dump would fall under the general site clean up methodology and would include removal and disposal of all surface debris and excavation and disposal of Tier I soils in the NHW Landfill. Any soils, with PCB contamination exceeding the Tier II Criteria, will be shipped off-site for disposal. The two barrel caches (Main Dump - Lobes A and B) are considered to be concentrated surface debris areas from which the debris should be collected and disposed of in the NHW Landfill.

3.4.2 Garage Dump

The Garage Dump is located on the edge of the summit, just off the station pad to the south and southeast of the garage. The contents of the Garage Dump consist mainly of scattered surface debris, including barrels and miscellaneous wood and metal. The Garage Dump does not have a specific area where there is significant concentrated debris. One small barrel cache was found in the dump area.

The geophysical survey has identified two small areas with exposed debris including Lobe A with dozer tracks and miscellaneous metal debris and Lobe B which consists of a barrel cache.

The environmental investigation has identified contaminated soils 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 the 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 this landfill would involve extending the Station Pad over the landfill area to promote sheet drainage. As a preliminary estimate, a volume of 5,000 cubic metres of granular fill would be required to cap this stained area.

3.4.3 House Dump

The House Dump is located on the east side of the summit near the remnants of the Inuit House. The dump area consists of a small pad among small bedrock outcrops with very scattered domestic waste, including metal and wood, and a couple of barrels. This dump does not have a specific area where there is significant concentrated debris. The geophysical survey indicates that there is one small area of surface debris comprised of barrels (House Dump - Lobe A) within the dump, which covers an area of approximately 100 square metres. No contaminated soils have been identified in the immediate vicinity of the House Dump.

Based on the information collected, the House Dump is considered a debris area. The proposed remediation for the Main Dump would fall under the general site clean up methodology and would include removal and disposal of all surface debris. The barrel area identified from the geophysical survey (House Dump – Lobe A) is considered to be a surface debris area from which the debris should be collected and disposed of in the NHW Landfill.

3.4.4 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. The Mid-Station Area consists of a level gravel pad, access road and the Mid-Station Dump. The dump site is located over a ridge on a steep slope to the north of the gravel pad. The dump area consists of concentrated debris including barrels, domestic waste and miscellaneous wood and metal. There is no soil cover over the landfill and there appears to be little soil mixed in with the landfill debris. The native ground surface adjacent to the dumpsite consists of bedrock outcrops with numerous cobbles and boulders.

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 2,000 square metres, and the average depth is estimated to be 1.5 metres. There is additional scattered debris down the slope from Lobe B.

The environmental investigation has identified contaminated soils with hydrocarbon and Polycyclic Aromatic Hydrocarbon (PAH) exceedances in the northwest corner of the gravel pad, extending to approximately 25 metres downslope of the pad. Analytical testing of soil samples, downgradient from the dump, report no exceedences for PCBs, metals and hydrocarbons.

The gravel pad in the Mid-Station Area has been identified as the only potential Non-Hazardous Waste Landfill site near the Upper Station and is expected to be utilized because of its proximity to the majority of the demolition and debris clean up areas. Barrel caches on the pad should be removed to allow for construction of the NHW Landfill. Contaminated soils are to be excavated and removed from the area downgradient of the pad area.

The steep slope, over which the dump area is concentrated, is expected to preclude remediation by covering of this landfill. Because there is likely little to no infill soil within the debris, a soil landfill cover would be subject to settlement depressions and/or slope movement as a result of the disintegration of landfill debris over time. A landfill cover may also require an excessive amount of fill to provide shallow enough slopes to maintain long term stability. Because of these concerns and the close proximity of this dump to the proposed Non-Hazardous Waste Landfill, it is recommended that Lobe B of the Midstation Landfill be excavated in its entirety and its non-hazardous waste components disposed of in the adjacent NHW Landfill.

Hazardous debris and contaminated soil may be encountered during landfill excavation and would be containerized and disposed of at an off-site waste disposal facility.

3.4.5 Original Dump

The Original Dump is located along the access road, approximately 1 kilometre southeast of the Upper Station Area. The ground surface in this area is mainly comprised of rock outcrops, bedrock derived boulders and some native surficial soils. This dump consists primarily of scattered debris including barrels, domestic waste, miscellaneous metal and wood and does not have a specific area where there is significant concentrated debris. The geophysical survey indicates that there is one small barrel cache (Original Dump - Lobe A) which covers an area of approximately 100 square metres. No contaminated soils have been identified in the immediate vicinity of the House Dump.

Based on the information collected, the Original Dump is considered a debris area rather than a landfill. The proposed remediation for the Original Dump would fall under the general site clean up methodology and would include removal and disposal of all surface debris. The barrel cache (Original Dump – Lobe A) is considered to be a surface debris area from which the debris should be collected and disposed of in the NHW Landfill.

3.5 DISPOSAL OF SITE DEBRIS

Several areas of debris, not included within Main Dump, Garage Dump, House Dump, Mid-Station Dump and Original Dump, were also investigated in 2004. These debris areas are designated as follows:

- Beach Area - Barrel Dump #'s 1, 2 and 3, Vehicle Dump and POL AST Area;
- River Area - between Water Lake and Beach;
- Water Lake Area - Barrel Dump #1, East Side West Side and Vehicle Dump;
- Access Road – Dump #7 to Intersection and Mid-Station to Upper Site;
- Mid-Station Area – Heli-Pad, Barrel Dump #'s 1 to 8, Quonset Buildings #'s 1 to 4;
- Upper Station - 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 site debris is to be sorted and classified as hazardous and non-hazardous debris. Hazardous materials will be shipped off-site for disposal and non-hazardous materials will be placed in the NHW landfill.

Asbestos containing materials are to be double-bagged for disposal in the NHW landfill. PCB painted material will be segregated, containerized and disposed of off site at a licensed disposal facility.

Where scattered or partially buried debris is removed, the area will be reshaped, if necessary, and any voids left by removal of debris will be backfilled with granular material and graded to match the natural topography.

3.6 BARREL DISPOSAL REQUIREMENTS

In order to determine the correct disposal method for barrels and their contents, the contents must first be identified. A representative number of barrels containing product will be sampled and analyzed. Barrels containing only rust and sediment shall be treated as empty barrels.

Barrel contents comprising water only (less than 2% glycols or alcohols) shall be transferred to an open vessel such as a utility tub or half-barrel and any organic material removed by agitation with a pillow or segment of oil absorbent material. The water may then be discarded onto ground that is a minimum of 30 m distant from natural drainage courses. Used oil absorbent material shall be treated as described in the following sections.

Barrel contents, which are comprised of water with glycols and/or alcohols or organic phases, and which contain less than 2 mg/L PCBs, 100 mg/L chlorine, 2 mg/L cadmium, 10 mg/L chromium, and 100 mg/L lead, 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 shall

be subjected to a leachate extraction test. Material found to be non-leachate toxic shall be disposed of as contaminated soil. Leachate toxic material will be treated as hazardous waste and disposed of off-site at a licensed disposal facility.

Barrel contents, which contain greater than 2 mg/L PCBs, 1,000 mg/L chlorine, 2 mg/L cadmium, 10 mg/L chromium or 100 mg/L lead will be disposed of off-site at a licensed disposal facility. Contents may be combined with compatible materials for shipping purposes. Flash points may be required to be determined if they cannot be inferred from the product identification.

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.

Barrels in the river will be collected using precautions to not allow the release of product into the river and in a manner which minimizes the disturbance of river sediment.

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%. Shredded barrels may be disposed of in the NHW Landfill or off-site as recycled metals.

3.7 DEMOLITION OF FACILITIES

The clean up work at the FOX-C site includes the demolition, removal and disposal or containerization of all structures and utilities as shown on the demolition drawings (Drawing 413759-S01) in Appendix I and includes the following:

- Removal and disposal of all contents of buildings identified for demolition, including storage tanks. Tanks and pipes containing fuel must be pumped out or drained prior to cleaning and disposal.
- Removal, segregation and containerization of building facility components coated with PCB amended paint at PCB concentrations in excess of 50 mg/kg.
- Removal and disposal of asbestos material in accordance with the asbestos abatement program. Asbestos must be removed and disposed of in a method that eliminates the risk of exposure to friable asbestos. Proper personal protective equipment and specialized equipment is required when removing asbestos. Asbestos materials are bagged in polyethylene prior to placement in a NHW landfill.
- Removal and placement of hazardous demolition waste material in containers in accordance with the Hazardous Waste regulations. Hazardous demolition waste is segregated and disposed of according to CEPA guidelines.

- Removal, wrapping in plastic, and disposal of creosote treated timbers. Creosote treated timbers must be wrapped in polyethylene sheets before being placed in a NHW landfill.
- Removal and disposal of drainage culverts.
- Non-hazardous materials require no special treatment and can be crushed and placed in the NHW Landfill.

Demolition debris, to be disposed of on-site, will be cut into shapes and sizes which will minimize void space when landfilled. Concrete foundations are largely left in place and regraded except where coated with PCB paints. Following the removal of site structures, demolition areas are reshaped or backfilled with fill to a height flush with the remaining foundations.

3.8 REMOVAL OF HAZARDOUS MATERIAL

"Hazardous" waste materials are defined as waste materials that are designated as 'hazardous' under Nunavut Territorial or Federal legislation; or as 'dangerous goods' under the Transportation *of Dangerous Goods Act* (TDGA). The Canadian Environmental Protection Act (CEPA) regulates material containing PCBs at greater that 50 mg/kg. Specifically identified hazardous materials include: batteries, asbestos, fuel tank bottom sludges, solvents, PCB-containing liquids, fuels and lubricating oils, alcohols and glycols, and heavy metal contaminated liquids. Disposal requirements of these hazardous waste materials are presented in Table 3-2.

Table 3-2: Hazardous Waste Material Disposal Requirements

Hazardous Waste Material	Disposal Requirement
• Batteries • Metal contaminated organic liquids - Cadmium > 2 mg/L - Chromium >10 mg/L - Lead >100 mg/L • Liquids containing organic compounds with chlorine concentrations >1,000 mg/L • Liquids containing organic compounds with PCB concentrations > 2 mg/kg and > 50 mg/kg • Liquids containing organic compounds other than those described above	Off-site licensed treatment/disposal facility (by separate contract).
• Fuel tank bottom sludges • Fuels, lubricating oils, alcohols and glycols	Off-site licensed treatment/disposal facility (by separate contract) **OR** On-site incineration
• Liquids and solids containing organic compounds with PCB concentration > 50 mg/kg	Off-site licensed treatment and disposal facility

All hazardous materials are to be shipped off-site to a licensed hazardous material disposal facility. The exceptions to this are asbestos and creosote treated wood. Asbestos will be double-bagged and creosote-treated timbers will be wrapped in plastic and placed in the NHW Landfill. The locations these materials within the landfill will be marked on "as-built" drawings.

The paint on many of the building materials contains PCBs in concentrations greater than 50 mg/kg. The paint and substrate will be collected using suitable equipment for the task, containerized and transported off site for disposal. Temporary storage of these materials on-site will be in accordance with the Temporary Storage of PCB Waste Regulations under CEPA.

3.9 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.

3.10 GRADING AND ADDITION OF GRANULAR MATERIALS

There were numerous areas identified that require grading and possibly addition of fill material. These areas generally consist of 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. These areas are identified on the drawings in Appendix I.

3.11 CONTRACTOR SUPPORT ACTIVITIES

The following activities will occur on-site to support the remediation work:

- Upgrading of access roads at the site for equipment transport, and movement.
- Use of existing beach landing area and roads for equipment transport, movement and access to work areas.
- Set-up of the site for camp and equipment storage. Demobilization and clean up of the camp following project completion.
- Sewage from the camp will be handled with, at minimum, primary treatment and discharged to ground surface.
- Domestic waste to be disposed (as is, or incinerated as specified by the Land Use Permit) in the new Non-hazardous Waste 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.

4.0 Proposed New Landfills

New landfills and a landfarm are proposed for disposal of the non-hazardous site debris and treatment/disposal of hydrocarbon F1/F2 contaminated soils. The locations of these facilities are based on a variety of factors including;

- Size of the area available;
- Acceptable soil and foundation conditions;
- Limited surface runoff through the area;
- Relatively level topography;
- Drainage; and
- Setback from natural water bodies or water courses.

Four potential debris landfill locations and one potential landfarm location were evaluated in 2004.

4.1 NHW Debris Landfills

EBA assessed four possible locations for the NHW debris landfills. Debris Landfill Location #1, at the Mid-Station Area, is a preferred site because of its proximity to the Upper Station and Mid-Station Dump Areas, where the majority of the site demolition and debris are located. This location is approximately 2 km from a source of borrow material and has suitable soil and groundwater conditions.

A second NHW disposal facility is proposed for Debris Landfill Location #3 at the Lake Area for disposal of Lower Site demolition, debris and Tier I contaminated soils.

Debris Landfill Locations #1 and #3 are shown on Drawing 413759-C02 in Appendix I.

4.1.1 NHW Debris Landfill Design Parameters

The design parameters for the siting of the NHW landfill are outlined as follows:

- Constructed on grade using containment berms around the perimeter of the landfill area. The containment berms should have a maximum outside slope of 3H: 1V and an inside slope of 1.5H: 1V. The top of the berm should have a minimum width of 2.0 m.
- Debris to be placed in 0.5 m thick lifts with suitable intermediate fill worked into the voids in the debris. The maximum debris thickness not to exceed 2 m.
- The landfill to be capped with a layer of fill compacted to 95% of the standard proctor density. The surface will be graded to a slope of between 2% and 4% and contoured to blend into the existing topography.
- A landfill cover of 1 m thick is required.

- The NHW landfill will contain an airspace volume of 10,400 m^3, which includes an allowance for intermediate cover material (assuming a ratio of intermediate cover of 1 part cover to 3 parts debris) and 20 % contingency for volume estimate.
- 10,000 m^3 of suitable borrow material will be required for construction of the containment berms and cover.

4.2 LAND TREATMENT OF PETROLEUM HYDROCARBONS

A landfarm is proposed at the Potential Soil Disposal Facility Location #1 at FOX-C to treat hydrocarbon F1/F2 contaminated soils from the Beach POL Area. Development, operation and closure of the landfarm will involve the following work:

- 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.
- Closure and removal of all equipment and materials following confirmation that treatment has remediated the contaminated soil.

Excavation of hydrocarbon-contaminated soils will not be conducted within 2 m of any watercourse or within 2 m of the high water mark of the intertidal zone.

During the landfarm operation, granular nutrients are to be distributed evenly over the surface of the contaminated soil, at rates that will provide the minimum nitrogen loading. Moisture conditioning of the landfarm will be conducted as required by application of fresh water spray to maintain optimum water content within the soil.

After application of nutrients, the full thickness of the soil is to be tilled. The contaminated soil will be tilled every 10 days. During periods of prolonged warm, dry weather, the tilling frequency will be increased to every 5 days. During periods of precipitation, tilling of the soil will be delayed until the soil is considered damp to a depth of 100 mm.

All contact water in the perimeter collection system is to be collected and tested, relative to the wastewater discharge criteria, prior to the end of each operation season. If the contact water does not meet these guidelines, it may be treated (e.g., 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 conclusion of the treatment season, the following tasks are to be completed to close the landfarm:

- Confirmatory testing of the soils to verify the remediation objectives have been met;
- Placement and compaction of granular material from the perimeter berms to provide a cover over the remediated hydrocarbon contaminated soils. Additional cover material is to be placed to provide a 300 mm minimum depth of compacted granular fill as cover over this soil area. All granular fill is to be compacted to 95% Maximum Dry Density;
- Grade the surface of the area, as required, to promote surface water runoff; and
- Decommission the groundwater monitoring wells, including backfilling with appropriate grout.

The landfarm is proposed to be located at Soil Disposal Facility Location #1 as shown on Drawing 413759-C02 in Appendix I.

4.3 DEVELOPMENT OF BORROW AREAS

Approximately 25,000 m^3 of fill material is required for site clean up. Granular material fill is required for upgrading of the access roads during construction, backfilling contaminated soil areas and general site grading purposes. Additional granular fill is required for the development of the new Non-hazardous Waste Landfills and the Landfarm. 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.

5.0 Schedule

Detailed site investigations were conducted at FOX-C in 2004, and remediation is scheduled to begin in 2006, with completion expected in 2007. The contractor will mobilize to site in September 2005, by barge or sealift. Clean up activities are expected to begin in 2006 and continue through to the summer of 2007, depending on the contractors' approach and weather conditions. At the end of the 2007 construction season, equipment will be demobilized from the site via sea lift.

The expected duration of remedial 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 the contractors' workforce and accessory personnel will mobilize to and from the site from nearby northern communities.

Long-term monitoring of the landfills will begin upon completion of the clean up (2008) and will continue for a 25-year period. After 25 years, the monitoring requirements will be re-evaluated.

6.0 Summary and Recommendations

A remediation work plan has been developed for the FOX-C, Ekalugad Fiord Intermediate DEW Line site. The major components of the workplan included:

- Contaminated soil excavation / remediation;
- Dump area remediation;
- Collection and disposal of hazardous and non-hazardous debris; and,
- Demolition and disposal of site facilities.

6.1 Contaminated Soil Excavation / Remediation

The following (Table 6-1) summarizes the location, type of contaminant, estimated volume and proposed remediation for contaminated soils at the FOX-C Ekalugad Fiord Intermediate DEW Line Site:

Table 6-1: Summary of Remediation Options for Contaminated Soil Areas

Location of Contaminated Soils	Contaminant of Concern	Volume (m^3)	Comment	Remediation Options
Beach Area - POL Tanks	PHCs (F2)	340	PHC contaminated soils to depth of 1.2 m	• Landfarm • Excavate and dispose Off Site
Beach Area – Barrel Dump #1	Metals	-	Potentially 340 m^3 of chromium contaminated soils to depth of 0.3. Elevated levels may be due to naturally occurring chromium.	• No remediation required relative to Tier II Criteria
Beach Area – Barrel Dump #2	Metals	-	Potentially 680 m^3 of chromium contaminated soils to depth of 0.3. Elevated levels may be due to naturally occurring chromium.	• No remediation required relative to Tier II Criteria
Water Lake Area – Heli-Pad Surface Stains (2)	PHCs (F3)	75	PHC contaminated soils to depth of 0.6 m	• Cover with granular fill • Excavate and dispose as Intermediate Fill in on site NHW Landfill
Drainage Course Stain	PHCs (F3/F4)	6	18 m^2 area at 0.3 m depth = 6 m^3	• Cover with granular fill • Excavate and dispose as Intermediate Fill in on site NHW Landfill

Location of Contaminated Soils	Contaminant of Concern	Volume (m^3)	Comment	Remediation Options
Mid-Station Area – Existing Pad	PHCs (F3/F4), PAHs	75	Can excavate pad, off pad consists mostly boulders with little contaminated soil infill.	• Leave existing pad soils in place and build NHW Landfill over. • Excavate and dispose off pad soils as Intermediate Fill in on-site NHW Landfill
Mid-Station Area – Barrel Dump #2	PHCs (F3/F4),	50	Covers an area of 1800 m^2, mostly boulders with little soil contaminated infill material.	• Cover with granular fill
Mid-Station Area – Barrel Dump #6	PHCs (F3/F4)	60	Two areas with an area of 1800 m^2, mostly boulders with little soil contaminated infill.	• Cover with granular fill
Upper Station – Main Dump	Tier I / II? PCBs, PHCs	30	PCB / Hydrocarbon contamination	• Delineate Tier II PCB Soils and provide on site or off site disposal • Excavate and dispose of Tier I Soils as Intermediate Fill in on-site NHW Landfill
Upper Station – Main Dump	Tier II Metals	15	Copper, Lead, Zinc and Chromium contamination	• Excavate and dispose of Tier II Soils Off Site
Upper Station – South of Module Train	Tier I PCBs	7	PCB Contamination	• Excavate and dispose as Intermediate Fill in on site NHW Landfill
Upper Station – West of Module Train	PHCs (F2/F3)	14	Hydrocarbon contamination	• Landfarm • Excavate and dispose off site
Upper Station – Warehouse	PHCs (F2/F3/F4)	15	Warehouse AST contamination	• Landfarm • Excavate and dispose off site
Upper Station – Gravel Pad West of Garage	PHCs (F3)	140	Depth = 0.5 to 0.75 m	• Cover with granular fill
Upper Station – D8 Cat	PHCs (F2/F3)	4	Depth = 0.15 m	• Cover with granular fill

Location of Contaminated Soils	Contaminant of Concern	Volume (m^3)	Comment	Remediation Options
Upper Station – West of Garage Building	Tier I PCBs, Metals	1	PCB contamination (3.8 ppm) over 5 m^2	• No remediation required relative to metals exceeding Tier II Criteria • Excavate and dispose Tier I PCB Soils as Intermediate Fill in on site NHW Landfill
Upper Station – East of Garage Building	Tier I PCBs, PHCs (F3)	15	PCBs at 3.8 ppm/ PHC contamination over 40 m^2	• Excavate and dispose as Intermediate Fill in on site NHW Landfill
Upper Station – Garage Dump	Tier I PCBs, PHCs (F2/F3/F4), Tier II Metals	8 35 330	Metals contamination depth = 0.2 m PCB contamination Hydrocarbon contamination covers an area of 1100 m^2 with a depth of 0.3 m	• Contaminated soils to be dealt with as part of landfill remediation
Upper Station – POL Storage	PHCs (F2/F3)	200	Hydrocarbon contamination covers an area of 650 m^2 with a depth of 0.3 m	• Landfarm in place
Surface Stain – Antenna Base Area	PHCs (F3/F4)	25	Hydrocarbon contamination	• Cover with granular fill • Excavate and dispose as Intermediate Fill in on site NHW Landfill
Surface Stains – NW of Module Train	Tier I PCBs, PHCs (F3/F4)	10	PCB / Hydrocarbon contamination	• Excavate and dispose as Intermediate Fill in on site NHW Landfill
TOTAL VOLUME OF SOIL REQUIRING REMEDIATION:		**1,455 m^3**		

6.2 DUMP AREA REMEDIATION

The following (Table 6-2) summarizes the recommended remediation options related to the dump areas at FOX-C Ekalugad Fiord Intermediate DEW Line Site.

Table 6-2: Summary of Dump Area Remediation Options

Designation	Recommended Option	Comments
Main Dump	Remove surface debris, excavate contaminated soil and buried debris, backfill excavated areas with clean granular fill.	Considered to be a surface debris area with minor buried debris and contaminated soils.
Garage Dump	Remove source contaminated soil and surface debris including partially buried leaking barrels, cap landfill with a minimum 0.75 m granular fill to extend pad at maximum 4% slope over extent of landfill.	Extensive hydrocarbon staining at this landfill as a result of waste oil disposal.
House Dump	Remove surface debris, excavate contaminated soil and buried debris, backfill excavated areas with clean granular fill.	Considered to be a surface debris area with minor buried debris and contaminated soils.
Mid-Station Dump	Excavate landfill in its entirety and place non-hazardous debris in the Upper Site NHW Landfill. Est. landfill volume = 3300 m^3.	Granular cover is expected to be unstable in the long term. Landfill footprint covers an area of approximately 2000 m^2.
Original Dump	Remove surface debris, excavate buried debris, backfill excavated areas with clean granular fill.	Considered to be a surface debris area with minor buried debris.

6.3 SUMMARY OF NON-HAZARDOUS DEMOLITION AND DEBRIS

The following (Table 6-3) summarizes the non-hazardous materials at the various demolition and debris areas at FOX-C, Ekalugad Fiord:

Table 6-3: Summary of Demolition/Debris Areas - Non-Hazardous Materials

Debris Area Designation	Approximate Volume	Description of Non Hazardous Debris
Beach Area Barrel Dump #'s 1, 2 and 3	155 m^3	920 empty barrels, cement powder, heavy equipment, miscellaneous wood and metal.
Beach Area Vehicle Dump	71 m^3	Three D4 Dozers, D6 Dozer, D2 Dozer, Tracked Bombardier, 3 generators, 35 empty barrels, creosote timber, miscellaneous wood and metal.
Beach Area POL AST's Area	30 m^3	75,000 litre tanks (2) and piping, scattered wood debris, rubber hose and fittings, 40 barrels, propane tank.
River Area between Water Lake and Beach	467 m^3	450 barrels, domestic waste.
Water Lake Barrel Dump #1	31 m^3	250 empty barrels, scattered wood debris.
East Side of Water Lake	82 m^3	Cable spools, fire extinguishers, heavy metal, 200 empty barrels, cement powder, heavy equipment, miscellaneous wood and metal.
West Side of Water Lake	1 m^3	6 barrels
Water Lake Vehicle Dump	62 m^3	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 m^3	250 barrels, wooden sleds, dragline bucket, miscellaneous wood and metal.
Mid-Station Area – Heli-Pad	56 m^3	360 barrels, 4 compressed gas cylinders, scattered wood debris
Mid-Station Area – Mid-Station Dump	3300 m^3	
Mid-Station Area – Barrel Dump #'s 1 to 8;	810 m^3	5170 barrels, various 10 gallon barrels, cable spools, rubber hoses, cable spools, piping, fire extinguishers, dozer tracks, dozer blades, miscellaneous wood and metal.

Debris Area Designation	Approximate Volume	Description of Non Hazardous Debris
Quonset Building #'s 1, 2, 3 and 4	218 m^3	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 power, rubber hoses, heavy equipment, 50 barrels, plywood, miscellaneous wood and metal.
Access Road – Mid-Station to Upper Site	33 m^3	150 barrels, miscellaneous wood and metal.
Upper Station - Garage Exterior	29 m^3	D8 dozer, tracked bombardier, heavy equipment parts, ladder, rubber hose, 10 barrels, miscellaneous wood and metal.
Upper Station Area - Garage Interior	70 m^3	Structural Steel, glass wool insulation, metal decking, interior cladding, interior shelving, tracked bomdardier, compressed gas cylinders, HVAC system, shelving, generator units, day tanks, asbestos insulation
Upper Station – Paint Shed Area	46 m^3	Shed, dozer parts, strapping, pipe fittings, spool, wire, truck, fuel tank, compressed gas cylinders, miscellaneous wood and metal.
Upper Station - Warehouse Exterior	25 m^3	Hoist, dozer tracks, bombardier tracks, heavy chain, cables, to 1080 L AST's, 20 barrels, compressed gas cylinders, miscellaneous wood and metal.
Upper Station Area - Warehouse Interior	20 m^3	Structural Steel, aluminum cladding, shelving units, domestic waste, glass wool insulation, furniture, beds and desks, asbestos insulation, asbestos floor tile.
Upper Station – Modular Train Exterior	7 m^3	Rubber hose, miscellaneous wood and metal.
Module Train - Interior	185 m^3	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 m^3	40 barrels, cable, domestic waste, rubber hose, pipe, miscellaneous wood and metal.
Upper Station – Quonset Building	31 m^3	Canvas, heating oil tank, furnace, water tank, domestic waste, 75 barrels.
Upper Station – Antenna Base Area	400 m^3	135 m antenna structure, concrete support blocks, cables, tractor cab, electrical equipment, small antenna, miscellaneous wood and metal.
Upper Station - Inuit House Area	75 m^3	Cement mixer, 2 generators, pump, 200 barrels, house remains, stove, miscellaneous wood and metal, creosote timbers.

Debris Area Designation	Approximate Volume	Description of Non Hazardous Debris
Upper Station – Fuel Storage Area	160 m^3	Two 75,000 litre POL tanks, piping, metal pumphouse, pump, water tank, 25 barrels, rubber bladder, rubber hose, miscellaneous wood and metal.
Garage Dump	10 m^3	Canvas, 10 gallon barrels on pallet in fill, steel cable , 40 barrels, miscellaneous wood and metal.
TOTAL VOLUME NON-HAZARDOUS DEBRIS	**6455 m^3**	

6.4 SUMMARY OF HAZARDOUS DEMOLITION AND DEBRIS

The following (Table 6-4) summarizes the hazardous materials at the various demolition / debris areas at the FOX-C, Ekalugad Fiord site:

Table 6-4: Summary of Demolition / Debris Areas - Hazardous Materials

Debris Area Designation	Approximate Volume	Description of Hazardous Debris
Beach Area - Vehicle Dump	1 m^3	Oil, fuel, air filters.
Beach Area - POL AST's Area	1 m^3	Propane tank contents.
Water Lake Area – East Side	7 m^3	Blasting caps, miscellaneous air, oil and fuel filters, painted hut materials
Access Road from Dump #7 to Water Lake Access Road	9 m^3	10 partially full barrels, large diameter metal culverts (galvanized steel), blasting caps.
Mid-Station Area – Heli-Pad and Mid-Station Dump	6 m^3	20 full to partially full barrels .
Mid-Station Area – Barrel Dump #'s 1 to 8;	21 m^3	130 full to partially full barrels .
Mid-Station Area - Quonset Building #'s 1, 2, 3 and 4	3 m^3	PCB Amended Paint on plywood, filter canisters; air, oil and fuel filters.
Upper Station Area - Garage Exterior	1 m^3	4 lead acid batteries.
Upper Station Area - Garage Interior	30 m^3	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 m^3	22 cans of paint, 2 cans of paint thinner, fuel in fuel tanks on skid.
Upper Station Area - Warehouse Exterior	1 m^3	fuel in fuel tanks.
Upper Station Area - Warehouse Interior	10 m^3	PCB Amended Paint on plywood.

Debris Area Designation	Approximate Volume	Description of Hazardous Debris
Upper Station Area – Module Train Interior	60 m^3	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 m^3	Air, oil and fuel filters, 2 partially full barrels.
Upper Station Area - Inuit House Area	1 m^3	PCB Amended Paint on plywood.
Upper Station Area - Garage Dump	5 m^3	200 leaking 10 gallon barrels.
TOTAL VOLUME HAZARDOUS MATERIALS	**170 m^3**	

7.0 References

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Appendix I -
Drawings