WATER USE LICENCE APPLICATION

For the Clean Up of FOX-C
Intermediate DEW Line Site

Submitted by: **Department of Indian Affairs and Northern Development**
Northern Affairs Program
Nunavut Regional Office

Prepared by: **Public Works and Government Services Canada**
Real Property Services
Architectural & Engineering Services
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Executive Summary

1. BACKGROUND

The federal government has initiated the Federal Contaminated Sites Accelerated Action Plan (FCSAAP) this year to clean up federally owned contaminated sites and to deal with their related liability. The FCSAAP program provides funding for the remediation of contaminated sites posing risk to human health or the environment. The Department of Indian Affairs and Northern Development (DIAND) has applied for funding during the initial 4 year period of the program. The investigation and remediation of the abandoned intermediate DEW Line site at FOX-C (near Ekalugad Fjord) has been funded under this program.

The former DEW Line site was constructed in 1957 and subsequently closed and abandoned in 1963. The site has not been formally occupied since 1963. A hazardous materials removal program completed in 1985 and an assessment completed in 1994 have confirmed the presence of various hazardous materials and contaminated soil. A number of drum caches were identified. Many of the drums still contained product and were left in-place. In addition to drum caches, many drums were also strewn along the river, the road and in the bottom of the lake. Elevated PCB concentrations were noted in soil samples and paint. However, these investigations did not include assessment of hydrocarbon contamination that has the potential to be a significant source of contamination at the site.

The proposed project consists of an evaluation of the existing information regarding hazardous materials and contaminated soil at the site, identification of any information gaps and the implementation of a detailed assessment plan to delineate contaminants. As well some waste management activities are planned to make the site more environmentally secure until the clean-up begins. Based on the 2004 information a remedial action plan will be developed for the site and implemented in 2005 under a separate regulatory submission.

2. PROJECT LOCATION

FOX-C is located at 68°42' N, 68°33' W on the east coast of Baffin Island on the south shore of Ekalugad Fjord, 195 km south of the community of Clyde River, Nunavut. The terrain at FOX-C consists of high rugged hills cut by rock outcrop. The beaching area is located on Qarmaralik Cove, 3 km NW of the main station area. The main station area overlooks Ekalugad Fjord and is 770 m above sea level. A gravel road links the beaching area and the freshwater lake to the upper site.

The site is accessible by barge. Due to the uneven terrain, an airstrip was never constructed at FOX-C. A freshwater lake has previously been used as a landing strip in the winter and a helipad is located at the upper site.

3. PROJECT ACTIVITIES & SCHEDULE

The primary purpose of the site activities proposed for the summer of 2004 at FOX-C is to complete site assessment work in preparation for a remediation program to begin at the site in 2005. Waste consolidation will also be initiated while on-site in summer 2004. All activities will be completed in the immediate vicinity of the former military facility.

Assessment activities to be completed at the site will include the delineation of various contaminants (hydrocarbons, PCBs and heavy metals,); characterization of landfill contents; identification of potential borrow sources for future cover requirements; site evaluation to determine if an engineered landfill can be constructed on-site; and the identification of remaining hazardous materials/wastes (asbestos, leaded paint and PCB-containing equipment).

Waste consolidation activities at the site will focus on the approximately 10,000 abandoned oil drums that have been identified at the site, most of which are empty. The proposed work plan for these items is to collect them using all-terrain vehicles and crush them in accordance with the DEW Line Cleanup Criteria for Barrels. Barrels that contain liquid or are found in, or adjacent to, a waterway will be left in-place and included in the comprehensive remediation program to be implemented in 2005. In order to minimize the risk of releasing the contents onto the ground or into the water, specialized training will be required to move the barrels containing liquid. The assessment work conducted in 2004/2005 will provide necessary details on the number of drums, their content and various locations (eg. bottom of lake, along road or river, etc.). Activities in the adjacent river will be limited to non-intrusive assessments of wastes interred there as well as water and sediment sampling. An assessment of the creek's fishery resources will also be carried out.

A temporary camp will be set up at the site that will consist of approximately ten "Labrador-style" canvas tents. This will include accommodation for a maximum of approximately 15 people at the site as well as kitchen facilities and an engineer's tent. The camp will be erected in early August and dismantled in late September. It is assumed that most of the materials will be delivered by helicopter in the 2004 field season. Alternatives, such as the use of the Coast Guard for the delivery of equipment are being investigated.

All additional works to remediate the site will be carried out under a separate project that will be designed following completion of the site investigation.

4. SOCIAL IMPACT OF THE PROJECT

During any remediation project, whenever possible, DIAND strives to support and enhance the development of healthy, sustainable communities by leveraging local skills and knowledge into their approach to addressing environmental issues associated with contaminated sites. By these means core competencies are maximized and deployed. Whenever possible, the project will also adopt solutions tailored to the northern

environment and its inhabitants. This includes leveraging local knowledge and the incorporation of provisions accounting for the unique needs of northerners and the needs of the environment in which they live into the development and implementation of policies and procedures.

Community presentations were conducted in Clyde River and Qikiqtarjuaq in May 2004 to Hamlet Councils, Hunters & Trapper Organizations and Qikiqtani Inuit Association. Presentations were generic in scope and focused on the fact that FOX-C near Ekalugad Fjord is targeted for clean up. The community presentations were used to complete the following objectives:

- Introduce the project to the community.
- Obtain site specific information from the Inuit who visit the site or were familiar with the on-site activities during facility operation.
- Identify resources (labour and equipment) in the community which would assist in the execution of the project.
- Identify the issues and concerns the communities had with the site.

Based on these meetings, the most common concerns from the communities of Qikiqtarjuak and Clyde River regarding the site were:

- The potential for contamination resulting from the barrels strewn about the site, in the lake, and along the river leading from the lake to the fjord.
- The safety of the arctic char in the lake for human consumption. This lake is a popular fishing area for both communities and they would like to be sure that the fish caught in the lake are safe to eat.

The community identified issues will be considered during the preparation of the detailed 2004 work plan. For additional details regarding the community consultations in Qikiqtarjuaq and Clyde River, please refer to the meeting minutes appended to this application.

The same information was presented to representative(s) of Environment Canada Environmental Protection Branch and Department of Indian Affairs and Northern Development. Plans have been made to discuss the project with representatives of the Nunavut Impact Review Board, Nunavut Water Board and Fisheries and Oceans.

As well, meetings to update the Federal and Territorial regulatory bodies are being planned. Resources for on-going communications, as requested by the communities, have been budgeted for.

A second meeting is planned for July to discuss the proposed investigation in detail with the communities and to conduct a preliminary site visit, potentially with community representatives, in order to obtain a better understanding of the site conditions.

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1. ᖃᓄᐃᓕᖓᓚᐅᕈᓯᖓᑦ

ᒐᕙᒪᑦᑲᒃᑯᑦ ᐊᐅᓚᔾᔭᐃᒋᐊᖅᓯᒪᕗᑦ ᑕᒪᑐᒥᖓ ᑲᓇᑕᒥ ᓱᕈᔪᙳᖅᑐᖅᑕᖅᑐᓕᑦ ᐃᓂᖏᑦ ᓱᒃᑲᓕᕆᐊᕈᑎᒃᓴᖏᑦ ᐱᓕᕆᐊᒃᓴᓄᑦ ᐸᕐᓇᐅᑎ ᑕᒪᑐᒪᓂ ᐊᑦᒌᒧᒥ ᓴᓗᒪᖅᓴᐅᑕᐅᓂᐊᖅᑐᓄᑦ ᒐᕙᒪᑦᑲᒃᑯᓂᑦ ᐱᖁᑎᒋᔭᐅᔪᓄᑦ ᓱᕈᔪᙳᖅᑐ ᐃᓂᖏᓐᓂᒃ ᐊᒻᒪ ᐱᓕᕆᓗᒋᑦ ᑕᒪᑐᒧᖓ ᐃᓚᖏᓐᓂᒃ ᐱᔭᒃᓴᐃᑦ. ᑖᓐᓇ ᑲᓇᑕᒥ ᓱᕈᔪᙳᖅᑐᑦᑲᖅᑐᑦ ᐃᓂᖏᑦ ᓱᒃᑲᓕᕆᐊᕈᑎᒃᓴᖏᑦ ᐱᓕᕆᐊᒃᓴᓄᑦ ᐸᕐᓇᐅᑎ ᐱᓕᕆᑎᑦᑎᔾᔪᑕᐅᔪᖅ ᑐᓂᓯᓯᒪᓂᐊᖅᑐᖅ ᕿᓇᐅᔭᒃᓴᓂᒃ ᑕᒪᑐᒧᖓ ᐱᐅᓯᑎᑕᐅᖁᑦᑐᒍ ᓱᕈᔪᙳᖅᑐᓕᑦ ᐃᓂᖏᑦ ᐊᑦᑕᖅᓇᖅᑐᒦᓕᖅᑎᑦᑎᒍᓐᓇᖅᑐᑦ ᐃᓄᐃᑦ ᑎᒥᖏᓐᓄᑦ ᐅᕙᓗᓐᓂᑦ ᐊᕙᑎᑎᓄᑦ. ᐃᓄᓕᕆᔨᑦᕐᒃᑯᑦ ᐱᓇᓱᐊᖅᓯᒪᕗᑦ ᕿᓇᐅᔭᒃᓴᓂᒃ ᑕᐃᒪᖓᓐᓂᑦ ᐊᖅᑲᒧᑦ ᓯᑕᒪᑦ (4) ᐃᖏᕋᓂᖓᓂᑦ ᐱᓕᕆᑎᑦᑎᔾᔪᑕᐅᔪᖅ. ᑕᒪᓐᓇ ᖃᐅᔨᓴᐃᖅᑯᓪᓗᒋᑦ ᐊᒻᒪᓗ ᐱᐅᓯᑎᑦᑎᖅᑯᓪᓗᒋᑦ ᐋᖅᑭᒃᓱᖅᓗᒋᑦ ᐃᓂᑐᖃᖓᓄᑦ ᑕᒃᑯᓂᖓ ᐃᒡᓯᓐᓇᖅᑕᐅᓯᒪᔪᓂᒃ ᑑᓚᐃᒃᑯ ᐃᓂᖏᑦ ᑕᐃᑲᓂ ᐋᒃ C (*FOX-C*), (ᖃᓂᒋᔫᓃᑦᑐᖅ ᐃᖃᓗᒐᖅ ᑲᖏᖅᓱᒃ ᐃᓐᓈᕈᓕᒃ) ᕿᓇᐅᔭᓕᖅᑕᐅᓯᒪᔪᖅ ᐊᑖᓂᑦ ᑕᒪᑐᒪᖓᑦ ᐱᓕᕆᑎᑦᑎᔾᔪᑕᐅᔪᒥᑦ.

ᑑᓚᐃᑰᓚᐅᖅᓯᒪᔪᑦ ᐃᓂᖓᑦ ᓴᓇᔭᐅᓚᐅᖅᓯᒪᔪᖅ 1957 ᒥ ᐊᒻᒪᓗ ᒪᑐᓚᐅᖅᓯᒪᔪᖅ ᐊᒻᒪ ᐃᒡᓯᓐᓇᖅᑕᐅᓪᓗᓂ 1963 ᒥ. ᐃᓂᖓ ᐃᓄᖃᓚᐅᖅᓯᒪᓐᓇᓂ ᑕᐃᒪᖓᓐᓂᑦ 1963 ᒥᑦ. ᐊᑦᑕᖅᓇᖅᑐᑦ ᐅᓗᕆᐊᓇᖅᑐᑦ ᓱᓇᒐᓚᐃᑦ ᐋᔭᖅᑕᐅᖁᓪᓗᒋᑦ ᐱᓕᕆᑎᑦᑎᔾᔪᑕᐅᔪᖅ ᐱᔭᕇᓚᐅᖅᑐᖅ 1985 ᒥ ᐊᒻᒪᓗ ᖃᐅᔨᓴᖅᑕᐅᑦᑎᐊᖅᓗᓂ ᐃᓱᓕᑉᓗᓂᓗ 1994 ᒥ ᓇᓗᓇᕈᓐᓂᓚᐅᖅᑐᖅ ᑕᐃᑲᓂ ᐱᑕᖃᕐᓂᖓᓂᒃ ᐅᓄᖅᑐᓂᒃ ᐊᔾᔨᒌᙱᖦᑐᓂᒃ ᐅᓗᕆᐊᓇᖅᑐᓂᒃ ᐊᑦᑕᖅᓇᖅᑐᓂᒃ ᐊᒻᒪ ᓱᕈᔪᙳᖅᑐᓂᒃ ᐃᔾᔪᖓᓂ ᑕᒪᓐᓇ ᓇᓗᓇᐃᖅᑕᐅᓚᐅᖅᑐᑦ. ᐅᓄᖅᑐᑦ ᖃᑦᑕᐅᔭᐃᑦ ᐅᖅᓱᖃᐅᑎᕕᓂᑦ ᐃᓗᓕᖃᖅᑐᑦ ᐊᒻᒪ ᐃᒡᓯᓐᓇᖅᑕᐅᓯᒪᔪᑦ. ᐊᒻᒪᓗᑕᐅᖅ ᑕᒃᑯᓇᓄᖓ ᖃᑦᑕᐅᔭᐃᑦ ᕿᒪᒃᑕᐅᓯᒪᔪᑦ, ᐅᓄᖅᑐᒻᒪᕆᐊᓗᐃᑦ ᖃᑦᑕᐅᔭᐃᑦ ᓇᒥᑐᐃᓐᓈᑦᑎᐊᖅᑐᑦ ᑰᖓᓂ, ᐊᖁᑎᓂ ᐊᒻᒪᓗ ᐃᖃᖏᓂ ᑕᓯᑦ. ᖁᑎᒃᓯᓯᒪᔪᖅ ᐲᑎᐱᓐ ᓱᕈᔪᙳᖅᑐᓖᑦ ᓇᓗᓇᐃᖅᑕᐅᓚᐅᖅᑐᑦ ᒪᓂᕋᖓᓂ ᐃᔾᔪᖓᓂᑦ ᖃᐅᔨᓴᖅᑕᐅᒐᒥ ᐊᒻᒪᓗ ᐊᒥᐊᕈᑎᖓᓂᑦ. ᑕᐃᒪᓐᓇᐅᒐᓗᐊᕐᒪᑦ, ᑕᒃᑯᐊ ᖃᐅᔨᓴᐃᓃᑦ ᖃᐅᔨᓴᖅᓯᓚᐅᓐᖏᑦᑐᑦ ᖄᕈᓐᓇᖅᑐ ᐸᐅᕐᑎᖓᔪᑦ ᐃᒪᕐᓗᙳᖅᓯᒪᔪᑦ ᓱᕈᔪᙳᖅᑐᑦ ᑕᒃᑯᐊ ᐊᖏᔪᒻᒪᕆᐊᓗᖏᒃ ᑕᒃᑯᓂᖓ ᓱᕈᔪᙳᖅᑐᖅᑐᖅ ᐱᑕᖅᑐᑦ ᑕᐃᑲᓂ ᐃᓂᖓᓂ.

ᑐᒃᓯᕋᖅᑕᐅᔪᖅ ᐅᓇ ᐱᓕᕆᐊᖑᔪᒪᓪᓗᓂ ᐃᓚᖅᑐᖅ ᑕᒃᑯᐊ ᖃᐅᔨᓴᖅᑕᐅᓗᑎᒃ ᒫᓇᐅᔪᖅ ᖃᐅᔨᒪᔭᐅᔪᑦ ᐱᓪᓗᒋᑦ ᐊᑦᑕᖅᓇᖅᑐᑦ ᐅᓗᕆᐊᓇᖅᑐᑦ ᓱᓇᐅᙱᓐᖓᑕ ᐊᒻᒪ ᓱᕈᔪᙳᖅᑐᓖᑦ ᐃᔾᔪᖓ ᑕᐃᑲᓂ ᐃᓂᖓᓐᓂ, ᓇᓗᓇᐃᔭᑦᑎᐊᕐᓗᒋᑦ ᓇᓪᓕᐊᑐᐃᓐᓇᖅ ᖃᐅᔨᒪᓕᕈᑕᐅᓇᓱᒃᑐᓄᑦ ᑐᓗᖅᑕᕈᑕᐅᔪᑦ ᐊᒻᒪᓗ ᐊᐅᓚᔾᔭᒋᐊᕐᑎᑕᐅᓯᒪᓗᑎᒃ ᓇᓗᓇᐃᔭᑦᑎᐊᖅᓯᒪᓗᑎᒃ ᐸᕐᓇᐅᑎ ᑕᒪᑐᒨᖓ ᐋᔭᐃᔾᔪᑕᐅᓂᐊᖅᑐᓄᑦ ᓱᕈᔪᙳᖅᑐᓂᒃ. ᐊᒻᒪᓗ ᐃᓚᖏᑦ ᐊᒃᑕᑯᓄᑦ ᐊᐅᓚᑦᑎᔾᔪᑕᐅᓂᐊᖅᑐᓂᒃ ᖃᓄᐃᓕᐅᕈᑕᐅᓂᐊᖅᑐᓄᑦ ᐸᕐᓇᒃᓯᒪᓗᑎᒃ ᑕᒪᓐᓇ ᐃᓂᖓᑦ ᐊᕙᑎᖓᓄᑦ ᐅᓗᕆᐊᓇᖅᑐᖅᑕᖅᓯᓂᐊᓐᖏᓪᓕᒪᑦ ᑕᐃᒃᖓᑦ ᓴᓗᒪᖅᓴᐃᓂᖅ ᐱᒋᐊᓚᐅᕐᖏᓐᓂᖓᓂ. ᒪᓕᒡᓗᑎᒃ 2004 ᖃᐅᔨᒪᑎᑦᑎᔾᔪᑕᓚᐅᖅᑐᑦ ᐱᐅᓯᒋᐊᕈᑎᒋᓂᐊᖅᑕᖏᓐᓂᒃ ᖃᓄᐃᓕᐅᕈᑕᐅᓂᐊᖅᑐᓄᑦ ᐸᕐᓇᐅᑎ ᓴᕿᑎᑕᐅᓗᓂ ᑖᓱᒧᖓ ᐃᓂᖓᓄᑦ ᐊᒻᒪᓗ ᐊᐅᓚᔾᔭᒋᐊᕐᑎᑕᐅᓗᓂ 2005 ᒥ ᐊᑖᒍᑦ ᓯᓚᑖᒍᖓᔪ ᐱᖁᔭᕐᑎᒎᖓᓗᔪᓂᑦ ᑐᓐᓂᖁᑕᐅᔪᓯᒪᔪᓂᑦ.

2. ᐱᓕᕆᐊᕆᔭᐅᓂᐊᖅᑐᖅ ᓇᓃᓐᓂᖓ

FOX C ᑑᓚᐃᒃᑯᑦ ᐃᓂᖅᑐᖅᑐᖅ 68°42’ ᑕᕐᖓᖓᓄᑦ, 68°33’ ᐅᐊᖕᓇᖓᓄᑦ ᑲᓇᖕᓇᖓᓂ ᓯᑯᔭᕐᒥᓂ ᕿᑭᖅᑖᓗᒃ ᓂᒋᐊᓂ ᓯᑯᔭᖓᓂ ᐃᖃᓗᒐᖅ ᑲᖏᖅᓱᒃ, 195 ᑭᓚᒦᑕᔅ ᐅᖓᓯᖕᓂᓕᒃ ᓂᒋᐊᓄᑦ ᓄᓇᕙᑦ ᑲᖏᖅᓱᒡᓘᐱᒃ, ᓄᓇᕗᑦ. ᑕᒪᓐᓇ ᓄᓇᑐᐃᓐᓇᖓ ᐋᒃ C ᑕᐃᑲᓂ ᑕᒃᑯᐊᖑᔪᑦ ᖁᑎᒃᑐᒪᓇᐊᓗᐃᑦ ᓄᕗᕙᑦ ᖃᖃᐃᑦ ᐊᕕᒃᑎᓯᒪᔪᑦ ᐅᔭᖃᓄᑦ. ᑕᒪᓐᓇ ᓯᒡᔭᖓ ᐃᓂᖅᑐᖅᑐᖅ ᖃᒪᕋᓕᒃ, 3 ᑭᓚᒦᑕᔅ ᐅᐊᖕᓂᖓᓄᑦ ᑕᓖᖓᑦ ᓈᓚᐅᑎᖃᕿᐱᕆᔭᕐᒋᓐᓂᑦ. ᑕᒪᓐᓇ ᐃᓂᕐᒥᓈᖅᓂᑯᖓᑦ ᑕᑯᒃᓴᐅᔪᖅ ᐃᖃᓗᒐᖅ ᑲᖏᖅᓱᒐᓄᑦ ᐊᒻᒪᓗ 770 ᒦᑕᔅ ᖁᓖᓪᓄᑦ

ᓴᓇᔪᓕᕆᔨᒃᑯᑦ ᐊᒻᒪ ᒐᕙᒪᒃᑯᓐᓄ ᐱᔨᑦᑎᕋᖅᑎᖏᑦ, ᑲᓇᑕ, ᐱᖁᑎᖃᖅᑐᓄᑦ ᐱᔨᑦᑎᕋᖅᑎ, ᓴᓇᔭᒃᓴᓄᑦ ᐊᒻᒪ ᐃᑯᒪᓕᕆᓂᖅᒧᑦ ᐱᔨᑦᑎᕋᖅᑎᑦ, ᐊᕙᑎᓕᕆᓂᖅ ᑲᓇᑕᒥ, ᐅᐊᖕᓇᖓᓂ ᓄᓇᖓᓐᓄᑦ.

ᐃᒪᕖᖏᑦ. ᒪᓂᕋᖓ ᑐᐊᐸᒃ ᑎᑭᐅᑎᓯᒪᔪᖅ ᓯᒡᔭᖓᓄᑦ ᐊᒻᒪᓗ ᑕᕆᐅᖅᑲᓐᖏᑦᑐᖅ ᑕᓯᖅ ᑖᐸᐅᖓᒋᐊᑲᓐᓂᖅ ᐃᓂᖃᖅᑐᑦ.

ᐃᓂᖓ ᐅᐸᒃᑕᐅᔪᓐᓇᖅᑐᖅ ᐅᓯᒃᖃᑕᐅᑎᒃᑯᑦ ᐅᒥᐊᕐᔪᐊᒃᑯᑦ. ᐱᔾᔪᑎᒋᓪᓗᒍ ᒪᓂᕋᐅᓐᖏᓐᓂᖓᓄᑦ ᓄᓇᖓᑦ ᒪᓂᕋᖓ, ᒥᖕᕖᖕᒥᒃ ᑎᖕᒥᓲᓄᑦ ᓴᓇᔪᖅᑲᓚᐅᖅᓯᒪᓐᖏᑦᑐᖅ ᑕᐃᒃᑲᓂ FOX C. ᑕᕆᐅᖅᑲᓐᖏᑦᑐᖅ ᑕᓯᖅ ᐊᑐᖅᑕᐅᓚᐅᖅᑐᖅ ᒥᖕᕖᐅᖅᑳᖅᑕᓗᓂ ᐅᑭᐅᒃᑯᑦ ᐊᒻᒪᓗ ᖁᓕᒥᒎᓕᖅᑲᖅᕕᖓ ᐃᓂᖃᖅᑐᖅ ᖁᑎᖓᓂᖓᓂ ᐃᓂᖓᓂᑦ.

3. ᐱᓕᕆᐊᒃᓴ ᖃᓄᐃᓕᐅᖅᑕᐅᓂᐊᖅᑐᑦ ᐊᒻᒪ ᐅᓪᓗᖏᑦ

ᐱᒋᐊᕈᑎᖓᓄᑦ ᐱᔾᔪᑎᒋᔭᖓᑦ ᑕᒪᑐᒪᖓ ᐃᓂᖓ ᑐᒃᓯᕋᐅᑕᐅᔪᖅ ᐊᐅᔭᖓᓄᑦ 2004 ᑕᐃᒃᑲᓂ FOX C ᐱᔭᓐᖅᓯᓗᑎᒃ ᐃᓂᖓᓐᓂᒃ ᖃᐅᔨᓴᐃᓗᑎᒃ ᐱᔭᒃᓴᖏᓐᓄᑦ ᐱᓂᒃᓴᓂᐊᕐᓗᒍ ᐋᖅᑭᒃᑐᖅᑕᐅᖁᓪᓗᒍ ᐱᐅᓯᑎᑕᐅᖁᓪᓗᒍ ᐅᑎᕐᑎᑕᐅᖁᓪᓗᒍ ᐃᓂᑐᖃᖓᓄᑦ ᐱᓕᕆᑎᑦᑎᔾᔭᑕᐅᔪᖅ ᐱᒋᐊᖁᓪᓗᒍ ᑕᐃᒃᑲᓂ ᐊᕐᕌᒍᖓᓂ 2005. ᐊᒃᑕᑯᓄᑦ ᐃᓂᓕᐊᖑᓂᐊᖅᑐᖅ ᐊᐅᓚᔾᔭᒋᐊᕐᑎᑕᐅᓯᒪᓂᐊᖅᑐᖅ ᑕᐃᒃᑲᓂ ᐃᓂᖓᓂ ᐊᐅᔭᖓᓂ 2004. ᑕᒪᕐᒥᒃ ᖃᓄᐃᓕᐅᖅᑕᐅᓂᐊᖅᑐᑦ ᐱᔭᓐᖅᓯᒪᓂᐊᖅᑐᑦ ᑕᐃᒃᑲᓂ ᐃᓂᖓᓐᓂ ᓄᓇᒥ ᐅᓇᑕᖅᑐᒃᓴᖃᐅᑎᕕᓃᑦ ᐃᒡᓗᖁᑎᖏᑦ.

ᖃᐅᔨᓴᖅᑕᐅᓗᓂ ᖃᓄᐃᓕᐅᖅᑕᐅᓂᐊᖅᑐᓄᑦ ᐱᔭᓐᖅᓯᒪᓗᓂ ᑕᐃᒃᑲᓂ ᐃᓂᖓᓂ ᐃᓚᖃᖅᑕᐅᓂᐊᖅᑐᖅ ᑕᒪᓐᓇ ᓄᖑᑎᕐᓗᒍ ᐅᓄᖅᑐᑦ ᐊᔾᔨᒌᓐᖏᑦᑐᑦ ᓱᕈᔪᓐᓇᖅᑐᑦ (ᖄᕈᓐᓇᖅᑐ ᐸᐅᕐᑎᖓᔪᑦ ᐃᒪᕐᓗᖕᖑᖅᓯᒪᔪᑦ ᓱᕈᔪᓐᓇᖅᑐᑦ, ᐲᓯᐱᓐ ᐊᒻᒪᓗ ᐅᕐᑯᒪᐃᑦᑐᑦ ᓴᕕᕋᔭᐃᑦ); ᑮᓱᒪᖕᖓᑕ ᓄᓇᒥ ᓴᐅᓯᒪᔪᑦ ᐃᓗᓕᖏᑦ; ᓇᓗᓇᐃᔭᕐᓗᒋᑦ ᐊᑐᖅᑐᐊᖅᑕᐅᒍᓐᓇᖅᑐᑦ ᓯᕗᓂᒃᓴᒥ ᐱᓯᒪᓂᐊᕐᓗᑎᒃ ᐃᒪᓐᓇᐃᓕᖓᔭᕆᐊᓕᖕᖑᓄᑦ; ᐃᓂᖓ ᖃᐅᔨᓴᖅᑕᐅᑦᑎᐊᕐᓗᓂ ᖃᓄᐃᓕᖓᓂᐊᕐᒪᖔᑦ ᓴᓇᔭᐅᔭᕆᐊᖅᓂᐊᕐᑎᓪᓗᒋᑦ ᓴᐅᓯᒪᔪᑦ ᓄᓇᒥ ᓴᓇᔭᐅᓗᑎᒃ ᑕᐃᒃᑲᓂ ᐃᓂᖓᓐᓂ; ᐊᒻᒪ ᓇᓗᓇᐃᔭᕐᓗᒋᑦ ᐱᑦᖃᖅᑐᑦ ᐅᓗᕆᐊᓇᖅᑐᓂᒃ ᐊᑦᑕᖅᓇᕈᓐᓇᖅᑐᓂᒃ ᓱᓇᐃᑦ/ᐊᒃᑕᑯᑦ (ᖄᔭᑦᑐᑦ, ᐊᕿᑦᑐᔭᓕᑦ ᐊᒥᐊᕈᑎᑦ ᐊᒻᒪᓗ ᐲᓯᐱᓐ ᐃᓚᓕᑦ ᓴᓇᕈᑎᖏᓄᑦ).

ᐊᒃᑕᖅᑕᐅᔭᕆᐊᓕᑦ ᖃᓄᐃᓕᐅᖅᑕᐅᓂᐊᖅᑐᑦ ᑕᐃᒃᑲᓂ ᐃᓂᖓᓂ ᐱᓕᕆᓂᐊᖅᑐᑦ ᖃᓂᒋᔮᓂ 10,000 ᐃᒡᓯᓐᓇᖅᑕᐅᓯᒪᔪᑦ ᖃᑦᑕᐅᔭᐃᑦ ᐅᖅᓱᐊᓗᖅᑲᐅᑎᕕᓃᑦ ᑕᒃᑯᐊ ᓇᓗᓇᐃᖅᑕᐅᓚᐅᖅᑐᑦ ᑕᐃᒃᑲᓂ ᐱᑦᖃᕐᓂᖏᓐᓂᒃ, ᑕᒪᕐᒥᐸᓗᒃ ᐃᒪᖃᓐᖏᑦᑐᑦ. ᑖᓐᓇ ᑐᒃᓯᕋᖅᑕᐅᓯᒪᔪᖅ ᐱᓕᕆᐊᖑᔪᒪᔪᓄᑦ ᐸᕐᓇᐅᑎ ᑕᒪᒃᑯᓐᓄᖓ ᓱᓇᖏᓐᓂᒃ ᓄᐊᑦᑎᓗᑎᒃ ᐊᑐᖅᑕᐅᓗᑎᒃ ᓄᓇᑐᐃᓐᓇᑰᕐᓇᖅᑐ ᓄᓇᓯᐅᑎᑦ ᐊᒻᒪᓗ ᓯᖕᖓᕐᑎᕐᓗᕆᑦ ᒪᓕᒡᓗᑎᒃ ᑑᓚᐃᒃᑯᑦ ᓴᓗᒻᒪᖅᓴᐅᑎᓄᑦ ᐃᒪᓐᓇᐃᓕᖓᐅᑎᖏᓐᓂᒃ ᑕᒪᒃᑯᓐᓄᖓ ᖃᑕᐅᔭᕐᓄᑦ. ᖃᑦᑕᐅᔭᐃᑦ ᑕᒪᒃᑯᐊ ᐃᓗᓕᖅᑐᑦ ᐃᒪᓖᑦ ᐅᖁᓘᓐᓃᑦ ᓇᓂᓯᕖᐅᔪᑦ, ᐅᖁᓘᓐᓃᑦ ᖃᓂᒋᔭᖏᓐᓂ, ᐃᒪᕐᒧᐊᖓᔪᑦ ᑕᐃᒪᓐᓇᐃᓕᖓᔭᐅᑐᐃᓐᓇᖅᓂᐊᕐᓗᑎᒃ ᐊᒻᒪᓗ ᐃᓚᓕᐅᑎᓯᒪᓗᑎᒃ ᑐᑭᓯᓇᖅᓯᑦᑎᐊᖅᓯᒪᔪᓂ ᐱᐅᓯᓇᑎᑦᑎᔾᔪᑕᐅᓂᐊᖅᑐᓂᒃ ᐅᑎᕐᑎᕆᓂᕐᒥ ᓄᓇᑐᖅᑯᒧᑦ ᐱᓕᕆᑎᑦᑎᔾᔪᑕᐅᔪᒪᔪᑦ ᐊᐅᓚᔾᔭᒋᐊᕐᑎᑕᐅᓗᑎᒃ 2005 ᒥ. ᑕᒪᓐᓇ ᒥᑭᓪᓕᑎᓯᒪᓂᐊᕐᓗᒍ ᐊᑦᑕᖅᓇᓕᕋᔭᖅᑐᑦ ᐊᓂᐅᕋᕐᑎᑕᐅᓕᕐᑎᓪᓗᒋᑦ ᐃᓗᓕᖏᑦ ᑕᒪᑐᒪᖓ ᓄᓇᑐᐃᓐᓇᒧᑦ ᐅᖁᓘᓐᓃᑦ ᐃᒪᓅᓄᑦ, ᖃᐅᔨᒪᑦᑎᐊᖅᑐᑦ ᐱᔭᕆᐅᖅᓴᑎᑦᑎᓂᐊᖅᑐᑦ ᓅᒃᑎᖅᑕᐅᓂᐊᕐᑎᓪᓗᒋᑦ ᖃᑦᑕᐅᔭᐃᑦ ᐃᒪᖃᖅᑐᑦ. ᖃᐅᔨᓴᐃᓂᕐᒥ ᐱᔭᒃᓴᐃᑦ ᐱᓕᕆᐊᖑᓗᑎᒃ ᐊᕐᕌᒍ 2004/2005 ᑐᓂᓯᓂᐊᕐᓗᑎᒃ ᓇᓗᓇᐃᔭᑦᑎᐊᖅᓯᒪᔪᓂᒃ ᐅᖅᑐᓂᒃ ᖃᑦᑕᐅᔭᕐᓂᒃ, ᐃᓗᓕᖏᓐᓂᒃ ᐊᒻᒪᓗ ᓇᒦᓐᓂᖏᓐᓂᒃ (ᓱᕐᓗ ᐃᖅᑲᖓᓂ ᑕᓲᑦ, ᓴᓂᐊᓂ ᐊᕐᑯᑎᑦ ᐅᖁᓘᓐᓃᑦ ᑰᑦ, ᑕᒪᒃᑯᐊ). ᖃᓄᐃᓕᐅᖅᑕᐅᔪᑦ ᖃᓂᒋᔭᖏᓐᓂ ᑰᖑᓄᑦ ᓱᕋᒃᓯᓐᖏᑦᑎᐊᖅᑐᓂᒃ ᖃᐅᔨᓴᕈᑎᖃᕐᓂᐊᖅᑐᑦ ᐃᒪᖏᓐᓂᒃ ᑕᐃᒪᓕ ᐃᒪᖏᑦ ᐊᒻᒪ ᐃᖅᑲᖓᓂᑦ ᖃᐅᔨᓴᐃᓂᐊᖅᑐᑦ. ᐃᓕᑦᑎᓇᓱᐊᕐᓂᖓᑦ ᖃᐅᔨᓴᐃᓂᖓᑦ ᑰᓪᓚᖏᓐᓂ ᐃᖃᓗᖕᓂᒃ ᑕᒪᓐᓇᑕᐅᖅ ᐱᓕᕆᐊᖑᓂᐊᖅᑐᖅ.

ᐊᑕᐃᓐᓇᔾᔮᖏᑦᑐᒥᒃ ᑕᖕᒫᖅᓯᒪᕖᖅᖄᓗᑎᒃ ᐋᖅᑭᒃᑕᐅᓗᓂ ᑕᐃᒃᑲᓂ ᐃᓂᖓᓂ ᑕᒪᒃᑯᐊᖑᓗᑎᒃ ᖃᓂᒋᔮᓂ ᖁᓕᑦ "ᓖᐸᑐᐊ ᓴᓇᐅᒐᖏᑦᑎᑐᑦ" ᑐᐲᑦ. ᐅᓐᓇ ᐃᓂᖃᖅᓂᐊᖅᑐᖅ ᓯᓂᒡᕕᖏᓐᓂᒃ ᐅᖕᓚᒑᓄᐊᕈᓐᓇᖏᑦᑐᖅ ᖃᓂᒋᔮᓂ 15 ᐃᓄᐃᑦ ᐃᓂᖓᓂ ᐊᒻᒪᓗ ᓂᕆᕖᖏᑦ ᐊᒻᒪ ᓴᓇᕖᐅᔪᖅ ᑐᐱᖏᑦ. ᑖᓐᓇ ᑕᖕᒫᖅᓯᒪᕖᐅᓂᐊᖅᑐᖅ ᓇᐸᖅᑕᐅᓂᐊᖅᑐᖅ ᐱᒋᐊᓕᕚᕐᐸᑦ ᐋᒍᓯ

ᓴᓇᔪᓕᕆᔩᒃᑯᑦ ᐊᒻᒪ ᒐᕙᒪᒃᑯᓐᓄ ᐱᔩᑦᑎᕋᕐᑎᖏᑦ, ᑲᓇᑕ, ᐱᕐᑯᑎᖅᑐᓄᑦ ᐱᔩᑦᑎᕋᕐᑎ, ᓴᓇᔭᒃᓴᓄᑦ ᐊᒻᒪ ᐃᑯᒪᓕᕆᓂᕐᒧᑦ ᐱᔩᑦᑎᕋᕐᑎᑦ, ᐊᕙᑎᓕᕆᓂᖅ ᑲᓇᑕᒥ, ᐅᐊᖕᓇᖓᓂ ᓄᓇᖓᓐᓄᑦ.

ᐊᒻᒪᓗ ᐲᔭᖅᑕᐅᓗᓂ ᓄᕐᖑᐊᓂ ᓯᑎᐱᕆ. ᓂᕆᐅᒋᔭᐅᔪᖅ ᑕᒪᒃᑯᐊ ᑕᒪᕐᒥᐸᓗᒃ ᓴᓇᕐᕈᑎᒋᔭᖏᑦ ᑎᑭᑎᑕᐅᓂᐊᖅᑐᑦ ᖁᓕᒥᒎᓕᒃᑯᑦ 2004 ᒥ ᓄᓇᖓᓐᓄᐊᖅᓯᒪᔪᓄᑦ. ᐊᑐᖅᑕᐅᒍᓐᓇᕐᒥᔪᓂᒃᑕᐅᖅ, ᓲᕐᓗ ᑕᒪᒃᑯᐊ ᑲᓇᑕᒥ ᐅᒥᐊᕐᔪᐊᓄᑦ ᐱᖕᒋᖕᓇᑐᓕᕆᔨᒃᑯᑦ ᐋᑦᑎᓗᑎᒃ ᐊᒡᔭᖅᑐᐃᔪᓐᓇᕐᒪᖔᑕ ᓴᓇᕐᕈᑎᖏᓐᓂᒃ ᑕᒪᓐᓇ ᖃᐅᔨᔭᐅᓇᓱᖕᓂᐊᖅᑐᖅ ᑕᐃᒪᓐᓇᐅᔪᓐᓇᕐᒪᖔᑦ.

ᑕᒪᕐᒥᒃ ᐱᔭᒃᓴᑲᓐᓂᐅᓂᐊᖅᑐᑦ ᑕᒪᑐᒧᖓ ᐱᐅᓯᑎᑦᑎᓂᕐᒧᑦ ᐃᓂᑐᖃᕐᓕᓗᐊᕐᑎᕆᓂᕐᒧᑦ ᐃᓂᖓᓂᒃ ᐱᓕᕆᐊᖑᓯᓂᐊᖅᑐᖅ ᐊᑖᒍᑦ ᓴᓂᐊᒎᖅᑐᖅ ᐱᔭᒃᓴᓄᑦ ᑕᒪᒃᑯᐊ ᓴᓇᓯᒪᔪᑦ ᒪᓕᒋᐊᓕᑦ ᐱᔭᕇᖅᓯᓯᒪᖁᔨᔪᑦ ᐃᓂᖓᓂᒃ ᖃᐅᔨᓴᐃᓚᐅᕐᑎᓪᓗᒋᑦ.

4. ᐃᓅᓯᕐᒧᑦ ᐊᒃᑐᐃᓂᖓ ᑕᒪᓐᓇ ᐱᓕᕆᐊᒃᓴᖅ

ᑕᐃᑲᓂ ᐱᐅᓯᑎᑦᑎᕙᓪᓕᐊᑎᓪᓗᒋᑦ ᐱᓕᕆᐊᖑᑦ, ᖃᖓᑐᐃᓐᓇᑦᑎᐊᒃᑯᑦ, ᐃᓄᓕᕆᔨᑐᖃᒃᑯᑦ ᐃᑲᔪᖅᓯᓂᐊᖅᑐᑦ ᐊᒻᒪ ᐱᐅᓯᕚᓪᓕᑎᑦᑎᓯᒪᓗᑎᒃ ᐱᕙᓪᓕᐊᑎᑦᑎᓂᕐᒧᑦ ᖃᓄᐃᖏᑦᓯᐊᖁᓪᓗᒋᑦ, ᑲᔪᓰᓐᓇᑦᑐᓂᒃ ᓄᓇᓕᖃᖁᓪᓗᒋᑦ ᑕᒪᐅᓐᓇ ᐊᑐᖅᓯᓗᑎᒃ ᓄᓇᓕᖕᓂ ᐱᓕᕆᔪᓐᓇᖅᑐᓂᒃ ᐊᒻᒪᓗ ᖃᐅᔨᒪᔪᓂᒃ ᑕᒪᑐᒧᖓ ᐱᒋᐊᖅᓯᔾᔪᑎᖃᓕᕐᑎᓪᓗᒋᑦ ᐅᖃᐅᓯᕆᓂᐊᕐᓗᒍ ᐊᕙᑎᓕᕆᓂᖅ ᐱᔾᔪᑕᐅᔪᑦ ᐱᓯᒪᔪᑦ ᓱᕋᔪᖕᓇᖅᑐᓄᑦ ᐃᓄᖕᓄᑦ. ᑕᒪᓐᓇ ᖃᓄᑐᐃᓐᓇᑦᓯᐊᒃᑯᑦ ᑕᒪᓐᓇ ᐃᓗᓕᖏᓐᓄᑦ ᐱᓕᕆᔾᔪᑎᖏᓐᓄᑦ ᓇᓗᖁᑎᓐᖏᓪᓗᑎᒃ ᑕᒪᓐᓇ ᐊᖏᓛᖑᑎᓪᓗᒍ ᐊᒻᒪ ᐊᑑᑎᖃᖅᑐᓂᒃ ᐱᓕᕆᓗᑎᒃ. ᖃᖓᑐᐃᓐᓇᑦᓯᐊᒃᑯᑦ, ᐱᓕᕆᐊᒃᓴᖅ ᐊᑐᖅᓯᖃᑦᑕᖅᓂᐊᖅᑐᖅ ᐋᕿᒃᓯᒪᐅᑕᐅᒍᓐᓇᖅᑐᓂᑦ ᓴᓇᔭᐅᓯᒪᔪᓄᑦ ᑐᕌᖅᑐᑦ ᐊᑐᖅᓯᑦᑎᐊᖅᑐᖅ ᐅᑭᐅᖅᑕᖅᑐᖅ ᐊᕙᑎᖓᓄᑦ ᓯᓚᖓᓄᑦ ᐊᒻᒪᓗ ᐆᒪᔪᕐᒥᓐᓄᑦ ᓄᓇᖃᖅᑐᕐᒥᓐᓄᑦ. ᐅᓐᓇ ᐃᓚᖃᖅᑐᖅ ᐃᓚᐅᑎᑦᑎᓂᖅ ᓄᓇᓕᖕᓂ ᖃᐅᔨᒪᔪᓂᒃ ᐊᒻᒪᓗ ᐃᓚᓕᐅᑎᓯᒪᓗᒋᑦ ᑐᖓᔾᔪᑎᖏᓐᓄᑦ ᓵᑕᒃᓴᐅᒍᓐᓇᖅᓂᖏᓐᓄᑦ ᑕᒪᒃᑯᓐᓄᖓ ᐊᔾᔨᐅᓐᖏᑦᑐᓄᑦ ᐱᔭᐅᔪᒪᔪᓄᑦ ᐅᑭᐅᖅᑕᖅᑐᒥᐅᓄᑦ ᐊᒻᒪᓗ ᐱᔭᕆᐊᖃᖅᑕᖏᓐᓄᑦ ᓯᓚᒧᑦ ᐊᕙᑎᒧᑦ ᑕᒪᓐᓇ ᓄᓇᖃᖅᑳᕐᕕᒋᔭᖏᑦ ᐃᓗᐊᓐᓄᑦ ᐱᕙᓪᓕᐊᑎᑦᑎᔪᑦ ᐊᒻᒪᓗ ᐊᐅᓚᔾᔭᒥᐊᕐᑎᑕᐅᕙᓪᓕᐊᓯᒪᔪᑦ ᐊᑐᐊᒐᐃᑦ ᐊᒻᒪ ᐱᐅᓯᒃᓴᓕᐊᕆᔭᐅᓯᒪᔪᓄᑦ.

ᓄᓇᓕᖕᓄᑦ ᑕᒪᓐᓇ ᐅᖃᐅᓯᐅᓚᐅᖅᑐᖅ ᑲᑎᒪᑎᑦᑎᔾᔪᑕᐅᓗᓂ ᑲᖏᖅᓗᒑᐱᖕᒥ ᐊᒻᒪᓗ ᕿᑭᖅᑕᕐᔪᐊᖅ ᑕᐃᑲᓂ ᒪᐃ 2004 ᑖᒃᑯᓐᓄᖓ ᓄᓇᓕᖕᓂ ᑲᑎᒪᔨᖏᓐᓄᑦ, ᐊᖑᓇᓱᒃᑐᓕᕆᔨᒃᑯᓐᓄᑦ ᐊᒻᒪᓗ ᕿᑭᖅᑕᓂ ᐃᓄᐃᑦ ᑲᑐᔾᔨᖃᑎᒌᖏᓐᓄᑦ. ᐅᖃᓪᓚᐅᑕᐅᔪᑦ ᐱᓕᕆᓚᐅᖅᑐᑦ ᑕᐅᑦᑐᕆᓂᐊᖅᑕᖓᓐᓂᒃ ᐊᒻᒪ ᐱᓕᕆᓂᐊᖅᑕᖏᓐᓄᑦ ᖃᓄᐃᓕᖓᓪᓚᕆᖕᓂᐊᕐᓂᖓ ᑕᐃᑲᓂ ᖃᓂᒋᔮᓂ FOX C ᖃᓂᒋᔮᓃᑦᑐᖅ ᐃᖃᓗᒐᖅ ᑲᖏᖅᓱᒃ ᑐᕌᕆᔭᐅᓂᐊᖅᑐᑦ ᑕᐃᖕᓇ ᓴᓗᒻᒪᖅᓴᖅᑕᐅᓗᓂ. ᐅᑯᐊ ᓄᓇᓕᖕᓄ ᐅᖃᓪᓚᐅᑕᐅᔪᑦ ᐱᔭᕇᖅᓂᐊᕐᓗᒍ ᑕᒪᓐᓇ ᑐᕌᕆᐸᓪᓚᐊᔭᖓᑦ:

- ᑐᓴᕐᑎᑕᐅᓗᑎᒃ ᓄᓇᓖᑦ ᐱᓕᕆᐊᒃᓴᖓᓐᓂᒃ
- ᐱᓗᒋᑦ ᐃᓂᖓᓂ ᖃᓄᐃᓕᖓᓪᓚᕆᖕᓂᖓᓂ ᖃᐅᔨᒪᑎᑦᑎᔪᑦ ᑕᐃᑲᖓᑦ ᐃᓄᖕᓂᑦ ᐳᓛᖅᓯᒪᔪᓂᑦ ᐃᓂᖓᓂ ᐅᕝᕙᓘᓐᓃᑦ ᖃᐅᔨᒪᑦᑎᐊᖅᑐᓂᑦ ᐃᓂᖓᓂ ᖃᓄᐃᓕᐅᕈᑕᐅᖃᑦᑕᖅᑐᓂᒃ ᑕᐃᓱᒪᓂ ᐊᐅᓚᑎᓪᓗᒍ
- ᓇᓗᓇᐃᔭᕐᓗᒋᑦ ᐊᑐᐃᓐᓇᐃᑦ (ᐃᖃᓇᐃᔭᕈᓐᓇᖅᑐᑦ ᐊᒻᒪᓗ ᓴᓇᕐᕈᑎᖏᑦ) ᓄᓇᓕᖕᓂ ᑖᒃᑯᐊᓗ ᐃᑲᔪᖅᓂᐊᖅᑐᑦ ᑕᒪᓐᓇ ᐱᓕᕆᔭᐅᓗᓂ ᐱᓕᕆᐊᒃᓴᖅ.
- ᓇᓗᓇᐃᔭᕐᓗᒋᑦ ᐱᔾᔪᑎᖏᑦ ᐊᒻᒪᓗ ᐃᓱᒫᓗᑎᖏᑦ ᓄᓇᓖᑦ ᑕᒪᑐᒧᖓ ᐃᓂᖓᓄᑦ.

ᒪᓕᒡᓗᒋᑦ ᓇᓗᓇᐃᖅᑕᐅᓚᐅᖅᑐᑦ ᑲᑎᒪᑎᓪᓗᒋᑦ, ᐃᓱᒫᓗᑕᐅᖃᑦᑕᕐᓂᕐᐸᐅᓚᐅᖅᑐᖅ ᓄᓇᓕᖕᓂ ᑖᒃᑯᓐᓇᖓᑦ ᕿᑭᖅᑕᕐᔪᐊᕐᒥ ᐊᒻᒪᓗ ᑲᖏᕐᓗᒑᐱᒃ ᐱᔾᔪᑎᒋᓪᓗᒍ ᑖᓐᓇ ᐃᓂᖓ ᐅᑯᐊᖑᕗᑦ:

- ᐱᑕᖃᕐᒪᖔᑦ ᓱᕋᔪᖕᓇᖅᑐᖅ ᑕᐃᒪᓐᓇᐃᓕᑎᑕᐅᓯᒪᔪᖅ ᑕᒪᒃᑯᓐᓇᖓᑦ ᖃᑦᑕᐅᔭᐃᑦ ᓇᒥᑐᐃᓐᓈᑦᑎᐊᖅᑐᑦ ᐃᓂᒋᔭᖓᓐᓂᑦ, ᑕᓯᕐᓂᒃ, ᐊᒻᒪᓗ ᓴᓂᐊᓂ ᑰᑦ ᑎᑭᐅᑎᓯᒪᔪᑦ ᑕᓯᖓᓄᑦ ᑲᖏᖅᓲᑉ.
- ᐊᑦᑕᖅᓇᖏᑲᓗᐊᕐᒪᖔᑕ ᐃᖃᓗᐃᑦ ᓂᕆᔭᕆᐊᒃᓴᖏᑦ. ᐅᓐᓇ ᑕᓯᖅ ᐃᖃᓗᒐᓱᒡᕕᐅᕙᒃᑐᖅ ᑕᒪᐃᓐᓂᑦ ᓄᓇᓕᖕᓂᑦ ᐊᒻᒪᓗ ᖃᐅᔨᒪᑦᑎᐊᕈᒪᔪᑦ ᑕᒪᒃᑯᐊ ᐃᖃᓗᒃᑕᐅᔪᑦ ᑕᐃᑲᖓᑦ ᑕᓯᕐᒥᑦ ᐅᓗᕆᐊᓇᓐᖏᑲᓗᐊᕐᒪᖔᑕ ᓂᕆᔭᕆᐊᒃᓴᖏᑦ.

ᓴᓇᔪᓕᕆᔨᒃᑯᑦ ᐊᒻᒪ ᒐᕙᒪᒃᑯᓐᓄ ᐱᔨᑦᑎᕋᕐᑎᖏᑦ, ᑲᓇᑕ, ᐱᖁᑎᖃᖅᑐᓄᑦ ᐱᔨᑦᑎᕋᕐᑎ, ᓴᓇᔭᒃᓴᓄᑦ ᐊᒻᒪ ᐃᑯᒪᓕᕆᓂᕐᒧᑦ ᐱᔨᑦᑎᕋᕐᑎᑦ, ᐊᕙᑎᓕᕆᓂᖅ ᑲᓇᑕᒥ, ᐅᐊᖕᓇᖓᓂ ᓄᓇᖓᓄᑦ.

ᓄᓇᓕᖕᓂᑦ ᓇᓗᓇᐃᖅᑕᐅᔪᑦ ᐱᔾᔪᑕᐅᔪᑦ ᐃᓯᒪᕆᔭᐅᑦᑎᐊᕐᓂᐊᖅᑐᑦ ᑕᖏᑲᓂ ᐅᖃᓪᓚᐅᓯᐅᑎᓪᓗᒋᑦ ᓇᓗᓇᐃᔭᑦᑎᐊᖅᓯᒪᔪᓂ 2004 ᐃᖃᓇᐃᔭᖅᑕᐅᓂᐊᖅᑐᑦ ᐸᕐᓇᐅᑎ ᐃᓚᓕᐅᑎᓯᒪᓂᐊᖅᑐᑦ. ᑕᐃᒪᓗ ᓇᓗᓇᐃᕆᐊᑦᑎᐊᑲᓐᓂᕆᐊᓕᖕᓄᑦ ᐱᔾᔪᑎᒋᓪᓗᒍ ᓄᓇᓖᑦ ᕿᒥᕈᐊᖅᑎᒌᖕᓂᖓᑦ ᕿᑭᖅᑕᕐᔪᐊᒥ ᐊᒻᒪ ᑲᖏᕐᖢᒑᐱᒃ, ᐅᖅᑲᓕᒫᕈᓐᓇᖅᑕᑎᑦ ᑲᑎᒪᑎᓪᓗᒋᑦ ᑲᑎᒪᐅᑎᕕᓂᖏᑦ ᐃᓚᓕᐅᑎᓯᒪᔪᑦ ᑖᒃᑯᓐᓄᖓ ᐆᒃᑐᕈᑎᒋᓇᓱᐊᖅᑕᑦᑎᓄᑦ.

ᐊᔾᔨᖏᑦ ᑖᒃᑯᐊ ᐅᖃᐅᓯᐅᓚᐅᖅᑐᑦ ᑐᓴᕐᑎᑦᑎᔾᔪᑕᐅᓪᓗᑎᒃ ᑭᒡᒐᖅᑐᕐᑎᖏᓐᓄᑦ ᓯᓚᓕᕆᔩᒃᑯᑦ ᑲᓇᑕᒥ ᐊᕙᑎᓕᕆᓂᕐᒧᑦ ᓴᐳᓐᓂᐊᕐᑎᖓᑦᑕ ᑎᑎᕋᕐᕕᖓᑦ ᐊᒻᒪᓗ ᐃᓄᓕᕆᔨᑐᖃᒃᑯᑦ. ᐸᕐᓇᐃᓯᒪᔪᑦ ᐅᖃᓪᓚᖅᑎᒌᒍᒪᓪᓗᑎᒃ ᑕᒪᑐᒥᖓ ᐱᓕᕆᐊᒃᓴᒥᒃ ᑭᒡᒐᖅᑐᖅᑎᓄᑦ ᓄᓇᕗᒻᒥ ᐱᕙᓪᓕᐊᓂᖓᑕ ᐊᒃᑐᖅᑕᐅᓇᔭᕐᓂᖓᓄᑦ ᕿᒥᕐᕈᔩᑦ, ᓄᓇᕗᒻᒥ ᐃᒪᓕᕐᓂᕐᒧᑦ ᑲᑎᒪᔩᑦ ᐊᒻᒪᓗ ᐃᖃᓗᖕᓂᐊᖅᑐᓕᕆᔨᖏ ᐊᒻᒪ ᐃᒪᕕᖕᓄᑦ.

ᐊᒻᒪᓗᑕᐅᖅ, ᑲᑎᒪᓗᑎᒃ ᖃᓄᐃᓕᖓᓕᕐᒪᖔᑕ ᐅᖃᐅᓯᖃᕐᓗᑎᒃ ᒐᕙᒪᑐᖃᒃᑯᑦ ᐊᒻᒪ ᑎᐅᓕᑐᐊᓕᐊ ᐱᖁᔭᓕᕆᓂᕐᒧᑦ ᑎᒥᖁᑎᖏᑦ ᑕᒪᓐᓇ ᐸᕐᓇᒃᑕᐅᓯᒪᔪᖅ. ᐊᑐᐃᓐᓇᓄᑦ ᑲᔪᓰᓐᓇᖅᓂᐊᖅᑐᓂᒃ ᑐᓴᐅᑎᓕᕆᔾᔪᑎᒥᓗᒋᑦ, ᑐᒃᓯᕋᖅᑕᐅᓯᒪᔪᓄᑦ ᓄᓇᓕᖕᓂᑦ, ᑕᒪᓐᓇ ᑮᓇᐅᔭᒃᓴᖃᕐᑎᑕᐅᔪᖅ.

ᑭᖑᓪᓕᖅ ᑲᑎᒪᓂᒃᓴᖓᑦ ᐸᕐᓇᒃᑕᐅᓯᒪᔪᖅ ᔪᓚᐃᒧᑦ ᐅᖃᖅᑎᒌᒍᑎᒥᓗᒋᑦ ᑕᒃᑯᐊ ᑐᒃᓯᕋᐅᑎᓄᑦ ᖃᐅᔨᓴᐃᓂᖅ ᓇᓗᓇᐃᔭᑦᑎᐊᕐᓗᒍ ᑖᒃᑯᐊᓗ ᓄᓇᓖᑦ ᐊᒻᒪᓗ ᐋᕿᒃᓱᐃᓗᑎᒃ ᓯᕗᓪᓕᕐᐹᖑᓂᐊᖅᑐᒥᒃ ᐃᓂᖓᓄᑦ ᐳᓛᕆᐊᕐᓗᑎᒃ, ᐱᖃᑎᒥᓗᒋᑦ ᓄᓇᓖᑦ ᑭᒡᒐᖅᑐᕐᑎᖏᑦ, ᑐᑭᓯᑦᑎᐊᕐᓂᐊᕐᒪᑕ ᐃᓂᖓᑕ ᖃᓄᐃᓂᖓᓂᖓᓂᒃ.

ᓴᓇᔪᓕᕆᔨᒃᑯᑦ ᐊᒻᒪ ᒐᕙᒪᒃᑯᓐᓄ ᐱᔨᑦᑎᖁᑎᖏᑦ, ᑲᓇᑕ, ᐱᖁᑎᖃᖅᑐᓄᑦ ᐱᔨᑦᑎᖁᑎ, ᓴᓇᔭᒃᓴᓄᑦ ᐊᒻᒪ ᐃᑯᒪᓕᕆᓂᕐᒧᑦ ᐱᔨᑦᑎᖁᑎᑦ, ᐊᕙᑎᓕᕆᓂᖅ ᑲᓇᑕᒥ, ᐅᐊᖕᓇᖓᓂ ᓄᓇᖓᓐᓄᑦ.

Table of Contents

Nunavut Water Board
NUNAVUT IMALIRIYIN KATIMAYINGI

WATER LICENCE
APPLICATION FORM

Application for: (check one)

_x_ **New** ___ **Amendment** ___**Renewal** ___**Assignment**

LICENCE NO: (for NWB use only)	
1. NAME AND MAILING ADDRESS OF APPLICANT/LICENSEE Glen Stephens Indian and Northern Affairs Canada Bldg. 918, P.O. Box 100 Iqaluit, Nunavut X0A 0H0 Phone:___(867) 975-4549_____ Fax: ____(867) 975-4585_____ e-mail: _StephensG@inac.gc.ca_	2. **ADDRESS OF CORPORATE OFFICE IN CANADA** (if applicable) Phone:___N/A_____ Fax: _____ e-mail:_____
3. LOCATION OF UNDERTAKING (describe and attach a topographical map, indicating the main components of the Undertaking) **Abandoned Military Station, FOX-C Intermediate DEW Line site on the east coast of Baffin Island, on the south shore of Ekalugad Fjord, Nunavut; Site Map/Plan attached** Latitude:__68°42' N___ Longitude:___68°33' W__ NTS Map No.	

4. DESCRIPTION OF UNDERTAKING (attach plans and drawings)

The principle activities of this project include:

- Review all previous information gathered for the site regarding on-site landfills, contaminated soils, and hazardous materials;
- Conduct detailed site assessment activities to:
    - Quantify the volume of contaminated soil at the site. This will include soil contaminated with heavy metals, PCBs, and petroleum hydrocarbons.
    - Quantify the volume of hazardous materials at the site, including asbestos containing materials and paint containing PCBs and/or lead.
    - Quantify the volume of non-hazardous materials at the site, including wood, metal and concrete waste.
    - Quantify the volume of liquid waste that can be incinerated on-site (hydrocarbons) or requires southern disposal (PCB-containing oil, chlorinated or metal-containing hydrocarbons).
    - Identify potential locations for an engineered landfill for the disposal of hazardous and/or non-hazardous waste.
    - Identify borrow sources to supply enough granular material for the construction of the landfill by way of a full geotechnical evaluation.
    - Determine fisheries resources in adjacent water bodies.
    - Complete a human health and ecological risk assessment at the site. This will likely include the collection of flora, fauna, and sediment samples.
    - Evaluate the condition of the access road connecting the beach site, lower site, drum storage area, and the upper site.
- Initiate drum consolidation and crushing program at the upland portions of the site. Barrels that contain liquid or are found in, or adjacent to, a waterway will be left in-place and included in the comprehensive remediation program to be implemented in 2005. The assessment work conducted in 2004/2005 will provide necessary details on the number of drums, their content and various locations (eg. bottom of lake, along road or river, etc.).
- General site clean up activities.
- Prepare a detailed design for site remediation activities.

5. TYPE OF UNDERTAKING (A supplementary questionnaire must be submitted with the application for undertakings listed in **"bold"**)

___ Industrial
___ **Mine Development**
___ **Advanced Exploration**
___ **Exploratory Drilling**
___ **Remote/Tourism Camps**
___ **Municipal**
___ **Power**
_x_ **Other** (describe) Environmental Investigation & Preliminary Waste Consolidation (completed Remote Camp Supplementary Questionnaire attached)

6. WATER USE

_x_ To obtain water
___ To modify the bed or bank of a watercourse
___ To alter the flow of, or store, water
___ To cross a watercourse
___ To divert a watercourse
___ Flood control
___ Other (describe)_____

7. QUANTITY OF WATER INVOLVED (litres per second, litres per day or cubic metres per year, including both quantity to be used and quality to be returned to source)

115 litres /day/person x 15 people x 42 days = 72,450 litres of non-potable water from the river located adjacent to the Lower Beach Site

The calculation is conservatively based on the highest number of people and days expected on site. Potable water for drinking and cooking will be transported into site.

8. WASTE (for each type of waste describe: composition, quantity, methods of treatment and disposal, etc…)
(See attached Remote Camp Supplementary Questionaire)

_x_ Sewage
_x_ Solid Waste
_x_ Hazardous
_x_ Bulky items/Scrap Metal
_x_ Waste Oil
_x_ Greywater
___ Sludges
___ Other (describe)_____

9. PERSONS OR PROPERTIES AFFECTED BY THIS UNDERTAKING (give name, mailing address, and location; attach if necessary)

Land Use Permit

DIAND _x_ Yes ___ No If no, date expected_____

Regional Inuit Association _x_ Yes ___ No If no, date expected_____

Commissioner ___ Yes ___ No If no, date expected_____

10. PREDICTED ENVIRONMENTAL IMPACTS OF UNDERTAKING AND PROPOSED MITIGATION MEASURES (direct, indirect, cumulative impacts, etc…)

NIRB Screening _x_ Yes ___ No If no, date expected_ attached_____

11. INUIT WATER RIGHTS

Will the project or activity substantially affect the quality, quantity, or flow of water flowing through Inuit Owned Lands and the rights of Inuit under Article 20 of the Nunavut Land Claims Agreement?
No; a small amount of water will be used for non-potable water usage during the camp period. No other impacts are expected. There will be no discharges to any waterbodies.

If yes, has the applicant entered into an agreement with the Designated Inuit organization to pay compensation for any loss or damage that may be caused by the alteration. If no compensation agreement has been made, how will compensation be determined?

N/A

12. CONTRACTORS AND SUB-CONTRACTORS (name, address and functions)

Once regulatory approvals are in place, contracting for the project will proceed.

13. STUDIES UNDERTAKEN TO DATE (list and attach copies of studies, reports, research, etc…)
See section 8 of attached Remote Camp Supplementary Questionnaire

14. THE FOLLOWING DOCUMENTS MUST BE INCLUDED WITH THE APPLICATION FOR THE REGULATORY PROCESS TO BEGIN

Supplementary Questionnaire (where applicable: see section 5) _x_ Yes ___ No
If no, date expected_____

Inuktitut/English Summary of Project _x_ Yes ___ No
If no, date expected_____

Application fee $30.00 (c/o Receiver General for Canada) ___ Yes __x_ No
(Application being made by a federal gov't department)
If no, date expected_____

15. PROPOSED TIME SCHEDULE

_x_ Annual (or) ___ Multi year

Start Date: July 26, 2004 Completion Date: October 31, 2004

Name (Print) **Title (Print)** **Signature** **Date**

For Nunavut Water Board use only
APPLICATION FEE **Amount: $_____ Receipt No.:_____**

WATER USE DEPOSIT Amount: $_____ Receipt No.:_____

P.O. BOX 119
GJOA HAVEN, NT X0E 1J0 kNK5 wmoEp5 vtmpq
TEL: (867) 360-6338 NUNAVUT WATER BOARD
FAX: (867) 360-6369 NUNAVUT IMALIRIYIN KATIMAYINGI

EXPLORATION/ REMOTE CAMP SUPPLEMENTARY QUESTIONNAIRE

Applicant: Indian and Northern Affairs Canada Licence **No:** _____
(For NWB Use Only)

ADMINISTRATIVE INFORMATION

1. Environment Manager: Brad Thompson (Public Works and Gov't Svcs. Canada)
   Tel: (780) 497-3862 Fax: (780) 497-3842 E-mail: brad.thompson@pwgsc.gc.ca
2. Project Manager: Robert Martin (Indian and Northern Affairs Canada)
   Tel: (867) 979-7931 Fax: (867) 979-7939 E-mail: martinro@inac-ainc.gc.ca

3. Does the applicant hold the necessary property rights? Yes

4. Is the applicant an 'operator' for another company (i.e., the holder of the property rights)? No
   If so, please provide letter of authorization.

5. Duration of the Project
   [x] Annual
   [ ] Multi Year:
   If Multi-Year indicate proposed schedule of on site activities
   Start: _____ Completion:_____

CAMP CLASSIFICATION

6. Type of Camp
   [ ] Mobile (self-propelled)
   [x] Temporary
   [ ] Seasonally Occupied: _____
   [ ] Permanent
   [ ] Other:_____

7. What are the design population of the camp and the maximum population expected on site at one time? What will be the fluctuations in personnel?

   The camp will be occupied for approximately 28 days (with a maximum of 42 days).
   The camp will be occupied by an average of 10 people (with a maximum of 15 people) at any given time.

8. Provide history of the site if it has been used in the past.

The former DEW Line site was constructed in 1957 and subsequently closed and abandoned in 1963. The site has not been formally occupied since 1963. A hazardous materials removal program completed in 1985 and an assessment completed in 1994 have confirmed the presence of various hazardous materials and contaminated soil. A number of drum caches were identified. Many of the drums still contained product and were left in-place. In addition to drum caches, many drums were also strewn along the river, the road and in the bottom of the lake.

Environmental assessment of the Fox-C DEW Line site was initiated in 1985 when DND and Environment Canada visited the site to remove contaminants such as PCBs and POLs and identify areas of buried materials which could pose environmental risks in the future. Their findings identified a number of drum caches with many of the drums still containing product. These were left in-place. Elevated PCB concentrations were noted in soil samples near the module train and from the paint in the module train.

The site was revisited in 1993 by the Environmental Sciences Group of Royal Roads Military College at which time a detailed surface soil sampling program was completed. However, these investigations did not include assessment of hydrocarbon contamination that has the potential to be a significant source of contamination at the site.

CAMP LOCATION

9. Please describe proposed camp location in relation to biogeographical and geomorphological features, and water bodies.

Please see Section 6 of the attached CEAA assessment for a description of the biogeographical and geomorphological features and water bodies.

10. How was the location of the camp selected? Was the site previously used? Was assistance from the Regional Inuit Association Land Manager sought? Include maps and/or aerial photographs.

The camp will be sited near the beach in areas that have been previously disturbed. The exact location of the camp will be determined upon awarding of project contract.

11. Is the camp or any aspect of the project located on:

[x] Crown Lands Permit Number (s)/Expiry Date: _____

[ ] Commissioners Lands Permit Number (s)/Expiry Date: _____

[x] Inuit Owned Lands Permit Number (s)/Expiry Date: application to be submitted today

12. Closest Communities (distance in km):

The site is approximately 195 km to the south of Clyde River.

13. Has the proponent notified and consulted the nearby communities and potentially interested parties about the proposed work?

Community presentations were conducted in Clyde River and Qikiqtarjuaq in May 2004 to Hamlet Councils, Hunters & Trapper Organizations and Qikiqtani Inuit Association. Presentations were generic in scope and focused on the fact that FOX-C near Ekalugad Fjord is targeted for clean up. The community presentations were used to complete the following objectives:

• Introduce the project to the community.
•Obtain site specific information from the Inuit people who visit the site or were familiar with the on-site activities during facility operation.
•Identify resources (labour and equipment) in the community that would assist in the execution of the project.
•Identify the issues and concerns the communities had with the site.

Based on these meetings, the most common concerns from the communities of Qikiqtarjuaq and Clyde River regarding the site were:

•The potential for contamination resulting from the barrels strewn about the site, in the lake, and along the river leading from the lake to the fjord.
•The safety of the arctic char in the lake for human consumption. This lake is a popular fishing area for both communities and they would like to be sure that the fish caught in the lake are safe to eat.

The community identified issues will be considered during the preparation of the detailed 2004 work plan.

14. Will the project have impacts on traditional water use areas used by the nearby communities? Will the project have impacts on local fish and wildlife habitats?

See Section 6.5 of attached CEAA assessment. The project will have no negative impacts on traditional water use areas or local fish and wildlife habitats.

PURPOSE OF THE CAMP

15. [ ] Mining
[ ] Tourism (hunting, fishing, wildlife observation, adventure/expedition, etc.)
(Omit questions # 16 to 21)
[x] Other Environmental Site Investigation (Omit questions # 16 to 22)

16. [ ] Preliminary site visit
[ ] Prospecting
[ ] Geological mapping
[ ] Geophysical survey
[ ] Diamond drilling
[ ] Reverse circulation drilling
[ ] Evaluation Drilling/Bulk Sampling (also complete separate questionnaire)
[ ] Other: _____

17. Type of deposit:

[ ] Lead Zinc
[ ] Diamond
[ ] Gold
[ ] Uranium
[ ] Other: _____

DRILLING INFORMATION

18. Drilling Activities

[ ] Land Based drilling
[ ] Drilling on ice

19. Describe what will be done with drill cuttings?

20. Describe what will be done with drill water?

21. List the brand names and constituents of the drill additives to be used? Includes MSDS sheets and provide confirmation that the additives are non-toxic and biodegradable.

22. Will any core testing be done on site? Describe.

SPILL CONTINGENCY PLANNING

23. Does the proponent have a spill contingency plan in place? Please include for review.

See attached "Fuel Containment and Spill Contingency Plan". The contractor will be responsible for providing a more detailed spill contingency plan.

24. How many spill kits will be on site and where will they be located?

There will be four drum spill kits present at the site – two at the Upper site and two at the Lower site - each capable of absorbing 174 L of liquid hydrocarbons. The kits will be located near the fuel cache areas that will house the drummed fuel. Two standard spill packs capable of absorbing 40 L of liquid hydrocarbons will accompany the equipment on site (one at Upper site and one at Lower site).

25. Please describe the types, quantities, and method of storage of fuel and chemicals on site, and provide MSDS sheets.

All liquid fuel will be stored in barrels together on pallets within a containment area with 0.5 m berms and a hydrocarbon resistant liner. The containment area will be located on flat, even

ground at a distance of no less than 30 m away from the camp and any natural drainage area or water body.

Propane will be stored in 45 kg (100 lb) certified tanks near the kitchen tent.

Gasoline: Approximately 1025 L stored in five 205 L barrels.
Diesel: Approximately 3075 L stored in fifteen 205 L barrels.
Propane: Three 45 kg tanks.
Oil: Approximately 40 L of hydraulic oil and 40 L of motor oil stored in 20 L pails
Grease: Approximately 20 tubes in two 4 kg cases

WATER SUPPLY AND TREATMENT

26. Describe the location of water sources.

Potential water sources are the river located adjacent to the proposed base camp at the Lower Beach Site or Ekalugad Fjord.

27. Estimated demand (in L/day * person):

[x] Domestic Use: 115 Water Source: river
[ ] Drilling Units: _____ Water Source: _____
[ ] Other: _____ Water Source: _____

28. Describe water intake for camp operations? Is the water intake equipped with a mesh screen to prevent entrapment of fish? Describe:

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.

29. Will drinking water quality be monitored? What parameters will be analyzed and at what frequency?

Commercially bottled water will be used as drinking water and be transported to the site. This water will be in sealed containers and will not require testing.

30. Will drinking water be treated? How?

Drinking water will provided by a licensed facility and will be suitably treated prior to transportation to site. The commercially supplied water will have already received treatment prior to bottling, no further on-site treatment will be required.

31. Will water be stored on site?

Non-potable water may be temporarily stored in barrels or similar structures on-site, however, no reservoirs or other more permanent structures will be constructed.

WASTE TREATMENT AND DISPOSAL

32. Describe the characteristics, quantities, treatment and disposal methods for:

[x] Camp Sewage (blackwater)

The camp sewage will consist primarily of human waste from toilet use with an estimated flow of 40 L/day•person. This waste will be directed to a discharge pit excavated a minimum 100 m from the camp, any natural drainage course, or water body. Upon completion of site activities the pit will be filled in.

[x] Camp Greywater

The camp greywater will consist primarily of wastewater generated from the kitchen and bathroom sinks and showers. The estimated flow from this wastewater stream is 75 L/day•person. This waste will be directed to a discharge pit excavated a minimum 30 m from the camp, any natural drainage course, or water body. Upon completion of site activities the pit will be filled in.

[x] Solid Waste

Non-hazardous, combustible solid waste will be incinerated on-site in an enclosed container. Noncombustible solid waste will be containerized and stored at the site. This material will be included in the comprehensive remediation program scheduled to begin at the site in 2005.

[x] Bulky Items/Scrap Metal

Any bulky items or scrap metal waste generated at the site will be temporarily placed in one of the existing landfills at the site. Final disposal of this material will be included in the comprehensive remediation program scheduled to begin at the site in 2005.

[x] Waste Oil/Hazardous Waste

Waste oil and/or hazardous waste generated at the site will be containerized and stored at the site. This material will be removed from the site as part of the comprehensive remediation program scheduled to begin at the site in 2005.

[x] Empty Barrels/Fuel Drums

Empty barrels will be cleaned and crushed in accordance with the *DEW Line Cleanup Criteria for Barrels.* The crushed drums will be stockpiled at the closest drum cache area at the site. Final disposal of the drums will be included in the comprehensive remediation program scheduled to begin at the site in 2005.

[ ] Other:

33. Please describe incineration system if used on site. What types of wastes will be incinerated?

The types of waste that will be incinerated at the site consist primarily of domestic solid waste including food, paper and wood waste. These materials will be incinerated in a 205 L metal drum on a daily basis.

34. Where and how will non-combustible waste be disposed of? If in a municipality in Nunavut, has authorization been granted?

Non-combustible solid waste (glass and metal) will be containerized and stored at the site. This material will be included in the comprehensive remediation program scheduled to begin at the site in 2005.

35. Describe location (relative to water bodies and camp facilities) dimensions and volume, and freeboard for sumps (if applicable).

Not applicable.

36. Will leachate monitoring be done? What parameters will be sampled and analyzed, and at what frequency?

Not applicable.

OPERATION AND MAINTENANCE

37. Have the water supply and waste treatment and disposal methods been used and proven in cold climate? What known O&M problems may occur? What contingency plans are in place?

All on-site activities are scheduled for the summer months (August and early September) when the average daily temperature is above freezing. The water and wastewater systems are very basic so it is unlikely that any O&M problems will occur as a result of the climate. Backup pumps will be available at site, if required.

ABANDONMENT AND RESTORATION

38. Provide a detailed description of progressive and final abandonment and restoration activities at the site.

The camp will be decommissioned by the end of October, 2004. Decommissioning activities will include removal of tents, burning and/or removal of garbage, removal of equipment and general site clean-up. The site will be secured for human health and safety and environmental security.

BASELINE DATA

39. Has or will any baseline information be collected as part of this project? Provide bibliography.

[x] Physical Environment (Landscape and Terrain, Air, Water, etc.)

[x] Biological Environment (Vegetation, Wildlife, Birds, Fish and Other Aquatic Organisms, etc.)

[x] Socio-Economic Environment (Archaeology, Land and Resources Use, Demographics, Social and Culture Patterns, etc.)

[x] Other: Project itself is the completion of a "baseline" assessment for the site that will allow the clean up of the site to go ahead.

The physical, biological and socio-economic environment are described in the Environmental Screening report that is provided in Section 5 of the Water Use Licence Application.

REGULATORY INFORMATION

40. Do you have a copy of

[x] Article 13 - Nunavut Land Claims Agreement

[x] NWB - Water Licensing in Nunavut - Interim Procedures and Information Guide for Applicants

[x] NWB - Interim Rules of Practice and Procedure for Public Hearings

[x] NWTWB – Guidelines for the Discharge of Treated Municipal Wastewater in the NWT

[x] NWTWB - Guidelines for Contingency Planning

[x] DFO - Freshwater Intake End of Pipe Fish Screen Guideline

[x] Fisheries Act - s.35

[x] RWED - Environment Protection- Spill Contingency Regulations

[x] Canadian Drinking Water Quality Guidelines

[x] Public Health Act Camp Sanitation Regulations

[x] Public Health Act Water Supply Regulations

[x] Territorial Land Use Act and Regulations

You should consult the above document, guidelines, and legislation for compliance with existing regulatory requirements.

WORK PLAN FOR DETAILED SITE ASSESSMENT AND PRELIMINARY WASTE CONSOLIDATION PROGRAM AT THE FORMER FOX-C MILITARY BASE AT EKALUGAD FJORD

Prepared by: Environmental Services, Western Region
Real Property Services
Public Works and Government Services Canada

June 2004

1.0 INTRODUCTION

The Department of Indian Affairs and Northern Development (DIAND) wishes to implement a remedial action plan at the abandoned military station, intermediate DEW Line site Fox-C, located at Ekalugad Fjord. In order to develop a detailed remedial action plan, additional assessment activities are necessary to quantify the volume of contaminated soil and hazardous materials at the site and to conduct a waste audit on all non-hazardous materials. It has also been recognized as necessary to identify potential gravel and rock borrow sources and suitable locations for an engineered landfill.

The former DEW Line site was constructed in 1957 and subsequently closed and abandoned in 1963. The site has not been formally occupied since 1963. Assessments completed in 1985 and 1994 have confirmed the presence of various hazardous materials and contaminated soil.

This work plan consists of an evaluation of the existing information regarding hazardous materials and contaminated soil at the site, identification of any information gaps and the implementation of a detailed assessment plan to fill in the information gaps. The assessment will include waste consolidation of drums left on site. Approximately 10,000 drums have been identified at various locations within the site; many of these are reported to be empty. In 2004/2005 the dry empty barrels strewn around the site will be collected and returned to a central location for crushing. Barrels that contain liquid or are found in, or adjacent to, a waterway will be left in-place and included in the comprehensive remediation program to be implemented in 2005. The assessment work conducted in 2004/2005 will provide necessary details on the number of drums, their content and various locations (eg. bottom of lake, along road or river, etc.). Based on this information a remedial action plan will be developed for the site for implementation in 2005.

2.0 BACKGROUND

Environmental assessment of the FOX-C DEW Line site was initiated in 1985 when DND and Environment Canada visited the site to remove contaminants such as PCBs and POLs and identify areas of buried materials which could pose environmental risks in the future. Their findings identified a number of drum caches with many of the drums still containing product. Furthermore, numerous drums were observed to be strewn around the upper and lower site as well as along the river leading to the fjord. These were left in-place. Elevated PCB concentrations were noted in soil samples near the module train and from the paint in the module train.

The site was revisited in 1993 by the Environmental Sciences Group of Royal Roads Military College at which time a detailed surface soil sampling program was completed. Their investigations identified soil contamination exceeding Tier I and Tier II DCC near the module train, the garage, and the garage dump. However, these investigations did not include assessment of hydrocarbon contamination that has the potential to be a significant source of contamination at the site.

3.0 OBJECTIVES

The objectives of this project include:

- Review all previous information gathered for the site regarding on-site landfills, contaminated soils, and hazardous materials;
- Conduct detailed site assessment activities to:
    - Quantify the volume of contaminated soil at the site. This will include soil contaminated with heavy metals, PCBs, and petroleum hydrocarbons.
    - Quantify the volume of hazardous materials at the site, including asbestos containing materials and paint containing PCBs and/or lead.
    - Quantify the volume of non-hazardous materials at the site, including wood, metal and concrete waste.
    - Quantify the volume of liquid waste that can be incinerated on-site (hydrocarbons) or requires southern disposal (PCB-containing oil, chlorinated or metal-containing hydrocarbons).
    - Identify potential locations for an engineered landfill for the disposal of hazardous and/or non-hazardous waste.
    - Identify borrow sources to supply enough granular material for the construction of the landfill by way of a full geotechnical evaluation.
    - Complete a human health and ecological risk assessment at the site. This will likely include the collection of flora, fauna, and sediment samples.
    - Evaluate the condition of the access road connecting the beach site, lower site, drum storage area, and the upper site.
- Initiate drum consolidation and crushing program at the site. Barrels that contain liquid or are found in, or adjacent to, a waterway will be left in-place and included in the comprehensive remediation program to be implemented in 2005. The assessment work conducted in 2004/2005 will provide necessary details on the number of drums, their content and various locations (eg. bottom of lake, along road or river, etc.).
- General site clean up activities.
- Prepare a detailed design for site remediation activities.

4.0 SCOPE OF WORK

The scope of work includes, but is not limited to the following tasks:

4.1 PROJECT COORDINATION

Project coordination between DIAND and PWGSC will be crucial to the success of this project. Roles and responsibilities must be clear and communications lines mapped out and maintained.

As mentioned, communication is crucial to the success of the project and will be the cornerstone to success. In order to ensure this happens three distinct activities will be maintained throughout the project.

1. Weekly teleconferences will held between the DIAND Project leader and the PWGSC Project Manager. Although meetings may not be possible every week it is important to be diligent in trying to achieve this. PWGSC will produce a brief summary from each call.
2. Monthly Progress/achievement reports will be produced each month by PWGSC no later that the 5th of the following month starting May 5, 2004. The reports will outline progress, deficiencies and budget issues.
3. Quarterly meetings between DIAND and PWGSC will be held. Locations will rotated between Edmonton and Ottawa (other locations may be substituted as required). Other parties may be invited as required.

4.2 PLANNING AND DESIGN

A detailed review of all previous site information will be conducted in order to determine any information gaps and identify what additional site information is required for the preparation of a remediation specification. Applicable previous site information includes the assessments completed in 1985 and 1993.

Based on the review of the site information, community consultation will be initiated to introduce the objectives of this year's site activities to the communities in the surrounding area. It is important to involve the communities at the inception of the project in order to establish a working group and have them form an essential part of the project team. As part of the community consultation, DIAND and PWGSC project managers will meet with members of the community to obtain a local perspective on the current use of the facilities at the site and the availability of heavy equipment and labourers from the community. The community consultation component of this project will continue throughout the duration of the project to ensure that the community is informed about the activities, results, and plans regarding the site, and are active participants in the RAP development. An effort will be made to also meet with regulators in Iqaluit during each trip to Clyde River to provide updates of the project status and planning. The provision for an air charter to take key community members/stakeholders and regulators to the site during the 2004 field season has been built into the work program.

If possible, interviews with personnel who have previous experience at the FOX-C Intermediate Dew Line site will be conducted to obtain valuable information regarding previous site activities. These contacts will likely result from the community consultation process.

A preliminary site visit will be required to survey the terrain at the site. Previous reports have characterized the terrain at the site as high rugged hills which supports numerous rocky outcrops. The preliminary site visit will allow the project team to determine what tasks can be completed at the site this year, what equipment will be necessary to complete the work, and logistical issues associated with stocking and supporting the camp. This information will be critical for the preparation of the tender document specifying camp and equipment requirements for the work proposed at the site for 2004.

Once the detailed scope of work has been finalized, permit applications will be prepared. Permits that will likely be required will include a Land Use Permit, a Water Use Permit and a permit for all site assessment activities. As part of the permit package, an assessment as defined by CEAA will be completed regarding the proposed activities.

The final component of the planning phase will be the preparation of the tender document for the supply of a camp, heavy machinery, and labourers for support services this year during all site activities. An aboriginal set aside contract will be obtained for the support services in 2004. It will also be necessary to prepare various terms of references for the procurement of engineering services. External engineering services will be retained to complete the assessment activities proposed for the site. A quantitative human health and ecological risk assessment will be conducted and may be used to establish site specific risk based criteria that should dictate what the remedial program for FOX-C will look like. The assessment team will also include geotechnical experts, site surveyors, and PWGSC and DIAND representatives. It is anticipated that camp size will be in the order of 15 to 20 people and will be staffed from mid-July to mid-August.

4.3 FIELD PROGRAM

4.3.1 *CAMP CONSTRUCTION*

The field program will commence in early August and will consist initially of mobilizing equipment and supplies to the site and the construction of the camp. Depending on the services available near the site, this may be done either by boat or by helicopter.

4.3.2 *ASSESSMENT ACTIVITIES*

Assessment of Existing Landfills

Four landfills have been identified at various locations at the site. Three of the landfills were visually inspected in 1993 and were noted to contain domestic garbage (Main Dump), drums and waste oil containers (Garage Dump), and a mixture of wood and metal waste with some barrels (House Dump). The fourth landfill was reported to be the original landfill for the site located near the helipad; however, this area was not accessible at the time of the last assessment (1993).

Assessment activities associated with the existing landfills will include:

- Delineation of the landfill boundaries.
- Identification and quantification, if necessary, of hazardous materials in the landfill including contaminated soil.
- Determining if the landfill is releasing deleterious substances into the surrounding environment.

Contaminated Soil Delineation

Areas of soils contaminated with heavy metals, PCBs, and/or petroleum hydrocarbons have been identified at the Lake Area, the Lower Site, and at the Upper Site in previous reports. Further soil sampling is required to delineate the areal and vertical limits of the contamination on-site.

Hazardous Materials Inventory

A hazardous materials inventory will be completed at each of the structures remaining at the site. The inventory will identify and quantify materials which will require specialized disposal such as asbestos-containing materials, paint containing lead and/or PCBs, and PCB-containing equipment.

Drum Assessment

There are approximately 10,000 drums at the site. Some have been previously assessed to determine if they are empty or still contain a petroleum liquid. Some of the drums contain unknown liquid and solid wastes. A full assessment will be conducted to determine the type of material within each barrel. All barrels that contain unknown liquids will be sampled and the sample submitted to an accredited laboratory that can identify the liquid material type. Based on the barrel sampling program, estimates of the volume of liquid which can be incinerated on-site, shipped south for disposal, or disposed of on-site will be produced. Specialized equipment and training will be necessary to dispose of drums containing liquid, and this portion of the project will be conducted in 2005/2006.

Assessment of New Landfill Location and Borrow Sources

It is anticipated that the comprehensive remediation activities planned for this site will potentially generate a substantial volume of hazardous and non-hazardous waste. The construction of an engineered landfill at the site for the disposal of the waste is an option that may be implemented. Investigations are required to confirm if this is a viable option. Specifically, it needs to be determined if there is an appropriate location with adequate space for the volume of waste requiring disposal and if there is sufficient granular material from borrow sources to construct the landfill. A site survey will be conducted to tie in all structures, borrow sources, landfill areas and assessed locations. This survey will be useful in creating a complete drawing of the entire site including all buildings, landfills, sampling locations, impacted areas, borrow sources, etc.

Site Specific Risk Assessment

A site specific risk assessment will also be completed at the site this year to quantify the risk to human and ecological receptors at the site from the identified contamination. The results of the risk assessment may establish the level of effort required to reduce site environmental liability to an acceptable level. PWGSC – Environmental Services recommends that a site specific risk based approach be taken for all Dew Line and military sites to be reclaimed in the future. It will be DIAND's task to determine what clean up protocol will be implemented.

Lake Assessment

A sampling program will be conducted to assess the condition of lake bottom sediments in the unnamed lake located southeast of the lower site area. Sediment samples will be collected from the lake bottom and analyzed for PCBs, hydrocarbons and total metals. It will also be necessary to obtain background samples from areas of the lake that are believed to be not affected by previous site activities. An electromagnetic survey and an underwater video camera will be utilized to determine if debris has been dumped into the lake in previous years. Options will be explored to conduct the EM survey during the July 2004 site assessment activities, however this activity may be more easily conducted on the winter ice.

Access Road Evaluation

Previous assessment reports from the site have identified that the access road connecting the Beach Area, Lake Area, Lower Site and Upper Site is in poor condition and impassable at various locations. The condition of this road needs to be confirmed and the investigations completed at the site this year should address what remedial measures are necessary to return the road to a working condition. The status of this road will have a major impact on the design of the remediation plan for 2005.

4.3.3 *WASTE CONSOLIDATION*

Approximately 10,000 drums have been identified at various locations within the site; many of these are reported to be empty. Using local Inuit labourers, the dry empty barrels strewn around the site will be collected and returned to a central location for crushing.

Barrels that contain liquid or are found in, or adjacent to, a waterway will be left in-place and included in the comprehensive remediation program to be implemented in 2005. The assessment work conducted in 2004/2005 will provide necessary details on the number of drums, their content and various locations (eg. bottom of lake, along road or river, etc.). In order to minimize the risk of releasing the contents onto the ground or into the water, specialized training will be required to move the barrels containing liquid.

The benefit of initiating this activity in 2004 relates primarily to the effect it will have on the surrounding communities. The specific benefits of this task include:

- Generate local employment opportunities for Inuit.
- Allowing Inuit labourers to job-shadow during the assessment activities and provide them with a better understanding of assessment activities.
- Allowing the local communities to take an active role in cleaning up the site which will facilitate cooperation between DIAND and the community groups.

4.3.4 *OPERATIONAL ISSUES*

During the course of the assessment and waste consolidation activities, it is anticipated that other tasks will be identified which may be necessary to bring the site to regulatory compliance and reduce the associated liability that is inherent of such a site. Such tasks will be completed during the 2004 summer work program. Any additional minor work items or operational issues identified as necessary tasks in the near future may be incorporated into the work program in 2004.

4.4 USE OF LOCAL INUIT LABOUR

Any opportunity to use local labour will be included into this year's program. It has been identified that locals can participate in many of the 2004 activities such as general clean up, site assessment, job shadowing during geotechnical evaluation and risk assessment work and barrel consolidation and crushing. It will be requested that 6 labourers be hired by the general contractor supplying the camp, equipment and support services for site activities in 2004.

5.0 DETAILED DESIGN FOR SITE REMEDIATION

Based on the results and reports generated from the assessment activities a comprehensive site remediation work plan will be developed for the site. The detailed remediation design will reduce the environmental liabilities present at the site. This plan will incorporate other key factors such as DIAND policies, community concerns, clean up criteria and risk management techniques. It is anticipated that this detailed work plan and project description will be finalized in late November. This should allow sufficient time to consult with the local communities, obtain all necessary regulatory approvals and obtain a contract for the work to commence in the summer of 2005.

In order to properly identify environmental liabilities at the site, it will be necessary to finalize remediation criteria. These criteria may be site-specific risk-based criteria developed from the risk assessment activities or they may be more general criteria such those defined in the *General Protocol for DEW Line Clean Up*. This has not yet been determined by DIAND however an approach must be chosen prior to finalizing the detailed clean up plan. Once the remediation criteria have been established, the environmental liabilities can be quantified. Based on the volumes of hazardous and non-hazardous waste at the site, PWGSC can evaluate disposal options at the site. These options include the construction of an engineered landfill for hazardous and/or non-hazardous solid waste and shipment of hazardous waste south for disposal. These options will be evaluated based on the value they provide to the Crown, the fiscal resources available to the project, and the degree that they reduce the environmental liabilities at the site.

During remediation planning, representatives from the surrounding communities will be involved in order to utilize their knowledge of the site and determine the local support services available. It is imperative that the final plan meets their requirements and they are included from project planning to final site closure and future monitoring. This may include training of local labourers during the project in order to establish their buy in and involvement for the entire project. Through the community representatives, PWGSC and DIAND will be able to assess the level of community acceptance for the use of site-specific risk-based criteria at the site.

It is imperative that the successful contractor has adequate time to coordinate the mobilization of supplies to the site in 2005. In order to mobilize all equipment required for the work at the former FOX-C military base, it may be necessary to utilize the sea lift that leaves Montreal in early August 2005.

6.0 CURRENT SCHEDULE

A Gantt chart depicting the 2004 project schedule is provided as Figure 1.

Remediation of FOX-C Former Military Station
Ekalugad, Fjord, NU

ID	Task Name	OPI	Duration	Start	Finish	Predecessors
1	Review previous reports	PW	42 days	Thu 4/1/04	Fri 5/28/04	
2	Program Options Review & Selection	PW	15 days	Mon 5/10/04	Fri 5/28/04	
3	**Project Coordination**	**DIAND**	**956 days**	**Fri 4/2/04**	**Thu 11/29/07**	
4	Weekly Conference Calls	DIAND	956 days	Fri 4/2/04	Thu 11/29/07	
5	Monthly Progress Reports	DIAND	956 days	Fri 4/2/04	Thu 11/29/07	
6	Quarterly Meetings	DIAND	956 days	Fri 4/2/04	Thu 11/29/07	
7	**Community Consultations**	**DIAND**	**948 days**	**Thu 4/1/04**	**Fri 11/16/07**	
8	Establish Working Groups	DIAND	10 days	Thu 4/1/04	Wed 4/14/04	
9	Meeting #1 - Project Introduction to Communities (Clyde River & Broughton Island)	DIAND	4 days	Mon 5/17/04	Thu 5/20/04	
10	Meeting #2 - Presentation of Project Assessment Details & Preliminary Site Visit	DIAND	5 days	Mon 7/12/04	Fri 7/16/04	
11	Meeting #3 - Presentation of Assessment Results	DIAND	4 days	Tue 10/26/04	Fri 10/29/04	
12	Meeting #4 - Final Work Plan Delivery	DIAND	4 days	Tue 12/7/04	Fri 12/10/04	
13	Meeting #5 - Summary of 2005 Remediation Activities	DIAND	4 days	Tue 11/15/05	Fri 11/18/05	
14	Meeting #6 - Summary of 2006 Remediation Activities	DIAND	4 days	Tue 11/14/06	Fri 11/17/06	
15	Meeting #7 - Site Remediation Closeout meeting	DIAND	4 days	Tue 11/13/07	Fri 11/16/07	
16	**Regulatory Approvals - Assessment Activities**	**PW**	**83 days**	**Thu 4/1/04**	**Fri 7/23/04**	
17	Preparation (investigation)	PW	37 days	Thu 4/1/04	Fri 5/21/04	
18	Finalize project description	PW	12 days	Thu 5/6/04	Fri 5/21/04	
19	Prepare and submit land use and water use applications	PW/DIAND	18 days	Mon 5/10/04	Wed 6/2/04	
20	Project review by NIWB/CEAA/DFO/DOE/Land Use Board	PW	38 days	Thu 6/3/04	Fri 7/23/04	19
21	**Support Services Contract(s)**	**PW**	**56 days**	**Mon 5/31/04**	**Fri 8/13/04**	
22	Prepare Equipment & Camp Supply Spec #1 for July Site Assessment	PW	14 days	Mon 5/31/04	Wed 6/16/04	
23	French Translation for Spec #1	PW	4 days	Thu 6/17/04	Tue 6/22/04	22
24	Tender Period Spec #1	PW	23 days	Wed 6/23/04	Fri 7/23/04	23
25	Preliminary Site Inspection	PW	15 days	Mon 7/12/04	Fri 7/30/04	
26	Award Contract #1	PW	5 days	Mon 8/2/04	Fri 8/6/04	25
27	Mobilize Equipment and Camp to Ekalugad Fjord	PW	5 days	Mon 8/9/04	Fri 8/13/04	26
28	Obtain assessment contracts	PW	15 days	Mon 6/21/04	Fri 7/9/04	
29	Additional site assessment activities	PW	20 days	Mon 8/9/04	Fri 9/3/04	
30	Laboratory Analyses	PW	11 days	Mon 9/6/04	Mon 9/20/04	29
31	Obtain all reporting	PW	6 days	Mon 10/11/04	Mon 10/18/04	
32	Prepare and submit draft work plan for entire site clean up to DIAND	PW	22 days	Tue 10/19/04	Wed 11/17/04	31
33	Review and Approval of work plan by DIAND and Community Consultation Group	DIAND	10 days	Thu 11/18/04	Wed 12/1/04	32
34	Finalize work plan and project description	PW	6 days	Thu 12/2/04	Thu 12/9/04	33
35	**Regulatory Approvals - Site Construction**	**PW**	**155 days**	**Mon 11/1/04**	**Fri 6/3/05**	
36	Complete an Environmental Impact Assessment	PW	24 days	Mon 11/1/04	Thu 12/2/04	
37	Prepare & submit land/water use applications and CEAA to Agency	PW	25 days	Mon 12/6/04	Fri 1/7/05	
38	Project review by Nunavut WB/LB/NIRB/Federal Res. Authorities	PW	105 days	Mon 1/10/05	Fri 6/3/05	37
39	**Site Remediation Contract**	**PW**	**730 days**	**Mon 1/10/05**	**Fri 10/26/07**	
40	Prepare Site Remediation Specification for Entire Clean-up Program	PW	20 days	Mon 1/10/05	Fri 2/4/05	
41	Approval of Specification	PW	5 days	Mon 2/7/05	Fri 2/11/05	40
42	Prepare and submit Requisition, RMP, PAAA	PW	10 days	Mon 2/14/05	Fri 2/25/05	41
43	Procurement Plan Review and Approval	PW	5 days	Mon 2/28/05	Fri 3/4/05	42
44	Prepare Tender Documents and Post on Merx	PW	10 days	Mon 3/7/05	Fri 3/18/05	43
45	Tender Period	PW	30 days	Mon 3/21/05	Fri 4/29/05	44
46	Tender close and evaluation	PW	10 days	Mon 5/2/05	Fri 5/13/05	45
47	Recommend Award	PW	1 day	Mon 5/16/05	Mon 5/16/05	46
48	Minister Approval to Award	PW	5 days	Tue 5/17/05	Mon 5/23/05	47
49	Obtain Documents from Contractor	PW	7 days	Tue 5/24/05	Wed 6/1/05	48
50	Contract Award	PW	1 day	Thu 6/2/05	Thu 6/2/05	
51	Prepare equipment	PW	36 days	Mon 6/6/05	Mon 7/25/05	
52	Transport equipment to Ekalugad Fjord	PW	11 days	Mon 8/1/05	Mon 8/15/05	
53	2005 Remediation activities	PW	15 days	Mon 8/15/05	Fri 9/2/05	
54	2006 Remediation activities	PW	44 days	Mon 7/3/06	Thu 8/31/06	
55	2007 Remediation activities	PW	31 days	Mon 7/2/07	Mon 8/13/07	
56	Demobilization of equipment from site	PW	10 days	Mon 8/13/07	Fri 8/24/07	
57	Ship hazardous waste south for disposal	PW	10 days	Mon 8/13/07	Fri 8/24/07	
58	Obtain reporting on remediation activities	PW	5 days	Mon 10/22/07	Fri 10/26/07	

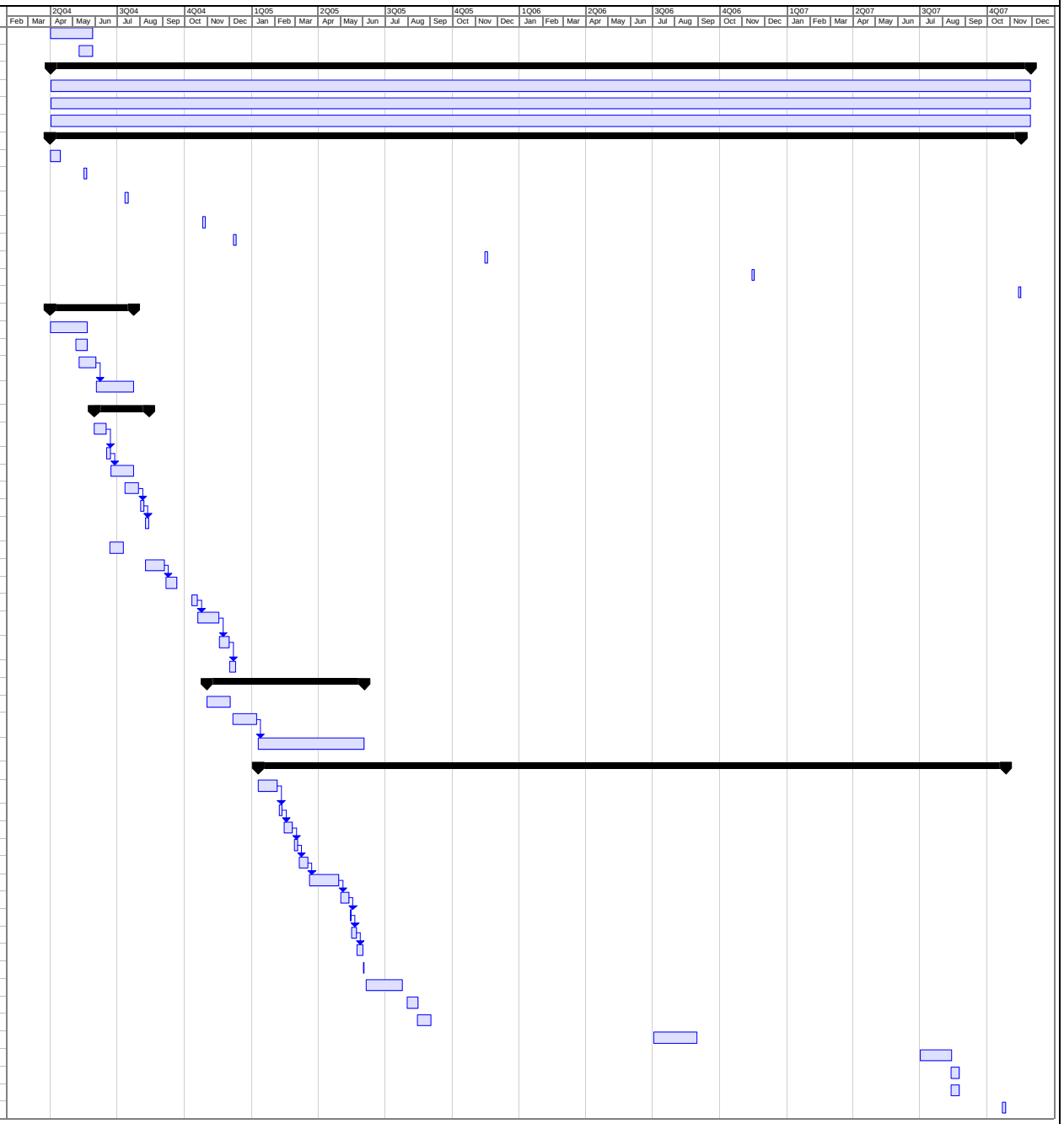

Figure 1: Proposed Project Schedule

Task | Split | Progress | Milestone | Summary | Project Summary | External Tasks | External Milestone | Deadline

Program Principles & Project Rationale

For the Clean Up of FOX-C Intermediate DEW Line Site

Submitted by: **Department of Indian Affairs and Northern Development**
Northern Affairs Program
Nunavut Regional Office

Prepared by: **Public Works and Government Services Canada**
Real Property Services
Architectural & Engineering Services
Environmental Services
Western Region

June 2004

Program Principles

As the custodian of most federal lands in the North, Department of Indian Affairs and Northern Development (DIAND) has responsibility, through the Northern Contaminated Sites Program (CSP), to manage a number of contaminated properties that are no longer maintained by the original occupant. DIAND's portfolio of contaminated sites in the North originated from private sector mining, oil and gas activities and government military activity dating back over half a century, from a time long before the environmental impacts of such activities were adequately understood.

In order to manage contaminated sites in a socially, fiscally and environmentally responsible manner, the Northern Affairs Program (NAP) and the Indian and Inuit Affairs Program collaboratively developed the Contaminated Sites Management Policy (August, 2002). This policy provides an appropriate level of direction in order to meet the requirements of the Treasury Board while supporting the principles of the Departmental Sustainable Development Strategy; it provides guidance for the management of contaminated sites located on reserve lands, on federal lands north of the 60th parallel, and on any other lands under INAC's custodial responsibility, and serves as an integral component of INAC's environmental management regimes. The Policy also requires program and project managers to follow the ten-step process of the Federal Approach to Contaminated Sites developed by the Contaminated Sites Management Working Group (CSMWG).

The objectives of the policy are as follows:

- to meet federal and departmental policy requirements and legal obligations regarding the management of contaminated sites;
- to require that, where a suspected contaminated site has been identified, the site be assessed in a timely, consistent and cost effective manner;
- to provide a scientifically valid, risk management based framework for setting priorities, planning, implementing and reporting on the management of contaminated sites;
- to remediate, based on approved resource levels, all National Classification System (NCS) Class 1 contaminated sites in the North, and Class 1 and 2 contaminated sites on reserve, on a priority basis, unless it can be demonstrated that for a specific site an alternative form of management is appropriate;
- to promote the social and economic benefits that may accrue to First Nations, Inuit and northerners when carrying out activities required by this policy; and
- to promote the federal "polluter pays" principle.

The key to the government's efforts to create and maintain a healthy and safe environment is its commitment to manage and remediate federal contaminated sites. Federal contaminated sites may be the result of previous government operations or they may be sites for which the federal government has accepted some or all of the financial

liability. Sites may vary from several square meters of soil contaminated by leaking batteries to abandoned mine sites in the North that are contaminated with heavy metals.

In 1999, Treasury Board approved the Treasury Board Federal Contaminated Sites Management Framework, a collection of policies and best practices for the management and rehabilitation of contaminated sites. While responsibility for the management and remediation of contaminated sites rests with individual custodial departments, the Treasury Board's Contaminated Sites Management Framework provides the context they require to carry out their responsibilities.

The framework embodies these three policies:

- *Treasury Board Federal Contaminated Sites and Solid Waste Landfills Inventory Policy* (2000);
- *Treasury Board Federal Contaminated Sites Management Policy* (2002); and
- *Policy on Accounting for Costs and Liabilities Related to Contaminated Sites* (2002).

In addition to the Federal Contaminated Sites Management Framework, the Treasury Board Secretariat (TBS), Environment Canada and other federal government departments developed the Federal Contaminated Sites Accelerated Action Plan (FCSAAP). FCSAAP is designed to accelerate the remediation of federal contaminated sites and reduce the government's associated financial liability. Under FCSAAP, the Secretariat intends to:

- assure consistency with Treasury Board policies related to the management of federal contaminated sites;
- implement the Accelerated Action Fund, a fund created to help departments administer the FCSAAP; and
- collaborate with Environment Canada to monitor government-wide progress on federal contaminated sites (departments will report annually on expenditures and their progress in identifying, managing and remediating contaminated sites).

Policy Statement

INAC is committed to managing contaminated sites in a cost-effective and consistent manner, to reduce and eliminate, where possible, risk to human and environmental health and liability associated with contaminated sites. INAC will:

- manage contaminated sites by following the *Treasury Board Federal Contaminated Sites Management Policy*, and by applying the Contaminated Sites Management Working Group's (CSMWG) "Federal Approach to Contaminated Sites" and its recommended guidelines and standards — including those from the Canadian Council of Ministers of the Environment (CCME) and the Canadian Standards Association (CSA);
- apply the following criteria in determining the priority for managing contaminated sites:

  - human health and safety;
  - legal and claims obligations;
  - significant impacts on the environment; and
  - concerns of First Nations, Inuit, northerners and other stakeholders.
- work collaboratively with First Nations, Inuit, northerners and other entities to manage contaminated sites located on reserve lands, on federal lands north of the 60th parallel, and on any other lands under INAC's custodial responsibility.
- manage its current and future policies and programs in order to prevent future liabilities to the Crown from the creation of new contaminated sites.
- follow the federal "polluter pays" principle.

Guiding Principles

In order to meet the above objectives, the following principles will be adopted when carrying out this policy:

1. INAC will incorporate provisions into its permits, leases, agreements and other instruments requiring that the private sector, First Nations, Inuit and northerners make every reasonable effort to avoid contaminating the environment in the course of carrying out their operations and activities and holding third parties liable for contamination that they cause on reserve lands, on federal lands north of the 60th parallel, and on any other lands under INAC's custodial responsibility.
2. INAC will ensure the assessment of all actual or potentially contaminated sites on reserve lands, on federal lands north of the 60th parallel, and on any other lands under INAC's custodial responsibility, based on available resources.
3. INAC will promote the pollution prevention and polluter pay principles in all of its regulatory interventions or decisions and will develop policies and guidelines to support this policy position in other development initiatives.
4. INAC will promote First Nation, Inuit and northerner participation and partnership in the identification, assessment, decision-making and remediation/risk management processes relating to contaminated sites.
5. INAC will plan, where appropriate, the scale and pace of remediation/risk management in keeping with the First Nation, Inuit and northerner capacity to be involved.
6. INAC will incorporate economic opportunities, to the extent possible, for First Nations, Inuit and northerners in the management and remediation of contaminated sites.

Project Rationale

FOX-C is located on the east coast of Baffin Island, Nunavut at Ekalugad Fjord. The site is approximately 1.5 km inland from the coast. The nearest community, Clyde River, is located 195 km to the south of the former DEW Line site. FOX-C was constructed as an Intermediate former military site in 1957. In 1963 the station was taken out of service and handed over to the Department of Indian Affairs and Northern Development (DIAND). In 1963 DIAND FOX-C was reserved for scientific use by government or university groups.

The beaching area is located on the south shore of Ekalugad Fjord and the main station area is located overlooking Home Bay, which is 770 m above sea level. The terrain at FOX-C consists of high rugged hills cut by rock outcrop.

Facilities constructed at the main operations site included a five module building train, warehouse, vehicle garage, Inuit house, three storage sheds, a POL (petroleum, oil, lubricants) drum storage area and a continuous wave tower. A gravel road was built linking the beaching area and the freshwater lake to the upper site. Due to the uneven terrain, an airstrip was never constructed at FOX-C. In the winter a freshwater lake served as a landing strip and a helipad was constructed at the upper site, to the east of the station buildings.

In 1985, a partial clean-up of the site was intiated by DIAND with assistance from Environmental Protection Branch of Environment Canada and the Department of National Defence (DND). The objective of the clean-up was to remove surface contaminants such as polycyclic biphenyls (PCBs) and POLs.

In 1993, the Environmental Sciences Group of the Royal Roads Military College in Victoria, British Columbia, investigated FOX-C as part of an assessment of six intermediate DEW Line sites in the Eastern Arctic. The results of the 1993 program indicated areas of soil impacted by PCBs and inorganic elements (eg. copper, lead), paint containing PCBs and building materials containing asbestos. During the 1993 work the building train, warehouse and garage were still standing but had been severely weathered. The POL tanks were still in place but the road that linked the beach area and water site to the main station was severely eroded and unstable.

To effectively utilize newly available funding under the FCSAAP, DIAND required that their contaminated sites be effectively prioritized for actioning. In September 2003, SENES Consultants Limited was retained by the DIAND to undertake Screening Level Risk Assessments (SLRAs) of the potential impacts on human health from exposure to hazards at eleven mine sites and thirteen former military sites in northern Canada. The SLRAs were to provide INAC with a basis of ranking the relative risks presented by the sites, for input to a process for prioritizing reclamation funding in future years.

One of the subject sites of these SLRAs was a former DEW Line site, FOX-C. The dominant vegetation near the main station-site was restricted to mosses and lichens and the beaching area was characterized as containing a wider variety of flora including sedges, grasses and willows. Native fauna at the site included seals, caribou, Thayer's gulls, snow goose and snow buntings.

To characterize the human health risks associated with the sites, standard approaches were developed for application to mine sites and former military sites, respectively. In both cases, the risk assessments were based on maximum likely exposures to chemical, radiological (where applicable) and physical hazards. In all cases, it was assumed that people would be on the sites for some portion of the year, even though some of the sites are at remote locations. It should be noted that risk assessment does not provide a precise measure of risk due to the fact that many assumptions must typically be made.

A SLRA for human health was carried out for existing conditions at the FOX-C site for the purpose of determining whether there were contaminant levels present in the aquatic and soil environments that may have an adverse effect on humans that either use, or may potentially use the site. The assessment included the following elements, which were proposed and readily accepted by regulatory agencies such as Environment Canada and the U.S. Environmental Protection Agency:

- receptor characterization;
- exposure assessment;
- hazard assessment; and
- risk characterization.

Measured concentrations of contaminants in soil were used in the assessment. A statistical assessment of 1993 soil data was carried out to determine the appropriate concentrations to use in the assessment.

An Ecological Risk Evaluation was also undertaken at this site, and the findings thereof included potentially unacceptable ecological risks associated with PCBs and lead levels in soils at the site. This indicates that the subject site is indeed contaminated and requires further investigation. On this basis, FOX-C was prioritized high on the list of sites to be actioned.

REPORT TO

PUBLIC WORKS AND GOVERNMENT SERVICES CANADA
WESTERN REGION

ENVIRONMENTAL SCREENING OF THE PROPOSED DETAILED SITE ASSESSMENT AND PRELIMINARY WASTE CONSOLIDATION AT THE FORMER FOX-C DEW LINE SITE AT EKALUGAD FJORD

PROJECT NO. ABC50564

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May 28, 2004

EXECUTIVE SUMMARY

Public Works and Government Services Canada (PWGSC), on behalf of Indian and Northern Affairs Canada (INAC) is planning to complete the clean up and remediation of the former FOX-C Intermediate DEW Line Site on Baffin Island. Various stages of clean up of the site has been ongoing since 1985. The first phase of PWGSC's clean up and remediation consists of a detailed site assessment and preliminary consolidation of existing wastes at the site. As required under the *Nunavut Land Claim Agreement* (*NLCA*) and the *Canadian Environmental Assessment Act* (*CEAA*), the activities proposed for CAM-F must undergo an environmental screening.

The detailed site assessment and preliminary waste consolidation at FOX-C is proposed to occur during the summer of 2004. Activities will consist of the establishment of a work camp and the investigation of the condition of the site, specifically assessing and categorizing the wastes present. Existing wastes will be consolidated. The information collected during these activities will be used to design the clean up and remediation program for the site.

The detailed site assessment and preliminary waste consolidation activities at FOX-C DEW Line Site will interact with the environment through vehicle and machinery emissions, waste disposal, surface disturbance and the provision of employment to local inhabitants. There is also the potential for spills of fuel or hazardous materials. The activities will be carried out following standard good operating practices for northern Canada, with spill prevention practices and contingency plans in place. The objectives of the activities are to assess existing contamination at the site and make preparations for site clean up and remediation. The environmental effects of the activities are assessed as being of low magnitude and not significant. The activities will benefit the area through the short-term employment of local individuals and through the commencement of clean up of the site.

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TABLES AND FIGURES

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1.0 INTRODUCTION

The former FOX-C Intermediate DEW Line Site has been undergoing various stages of clean up since 1985. Indian and Northern Affairs Canada (INAC) has requested Public Works and Government Services Canada (PWGSC) Western Region to complete the remediation of the site over the next several years. PWGSC plans to accomplish this task through a detailed site assessment, preliminary waste consolidation, and general site clean up, followed by the implementation of a remediation plan. This Environmental Screening assesses the potential impacts of the proposed detailed site assessment, preliminary waste consolidation and general site clean up of the FOX-C Dew Line Site.

2.0 REGULATORY CONTEXT

2.1 Permits, Licences, and Authorizations - Current Regulatory Regime

Development of the Project (as it is presently conceived) will involve a number of distinct undertakings and activities, requiring authorizations from a variety of federal, territorial, Inuit, and resource co-management agencies. Table 2-1 provides a preliminary listing of permits, licences, and authorizations that may be required to develop the Project. The specific permits, licences, and authorizations that will be required will depend on the final configuration of the Project and all related activities, and may include others not listed here. Regulatory procedures that must be followed differ for each permitting, licencing, or authorizing agency. The application for a permit, licence, or authorization will usually initiate a review of the Project under one or more environmental assessment processes, unless the proposed activity has been explicitly exempted from assessment.

Within Nunavut, INAC regulates land use on Crown (of federal) lands, whereas Nunavut Tungavik Incorporated (NTI) and the regional Inuit associations regulate subsurface and surface land use on Inuit Owned Lands. The Nunavut Water Board regulates water use in Nunavut. Environmental screening and assessment is the responsibility of the Nunavut Impact Review Board (NIRB). The *Nunavut Land Claim Agreement* (*NLCA*) establishes these new boards and regulatory processes, with the *Nunavut Land Claim Settlement Act* and the *Nunavut Act* being the federal legislation enabling the implementation of the provisions of the *NLCA*. Depending on the activity, environmental screening and assessment may also have to accommodate the requirements of the federal *Canadian Environmental Assessment Act (CEAA)*, in addition to the requirements of NIRB.

Table 2-1: Permits, Licences, and Authorizations That May Be Required			
Activity	**Permit/Approval**	**Legislation[1]**	**Agency**
Planning, Design, and Environmental Assessment Phase			
Site clearing, location of camps, laydown areas, miscellaneous land use	Land Use Permit	*Nunavut Land Claims Settlement Act Territorial Lands Act**	Nunavut Tungavik Incorporated, Kivalliq Inuit Association, Lands Division INAC
Water use and waste water disposal at camps	Water Licence	*Nunavut Waters Act*	Nunavut Water Board
Sewage disposal, food premises, sanitation at camps	Permit	*Public Health Act* (*Nunavut*)	Nunavut Department of Health and Social Services
Archaeological research and investigations	Archaeological Research Permit	*Nunavut Archaeological Sites Regulations* *Nunavut Land Claims Agreement Heritage Canada*	Inuit Heritage Trust, Nunavut Tungavik Inc. Heritage Canada
Wildlife studies and research in support of environmental assessment	Wildlife Research Permit	*Nunavut Wildlife Act*	Nunavut Wildlife Management Board Nunavut Department of Sustainable Development, Wildlife and Fisheries
Conduct of research and other scientific studies in support of environmental assessment	Other Scientific Research Permit	*Nunavut Scientific Research Act*	Nunavut Research Institute
Route preparation, camps, laydown and staging areas, borrow sources	Land Use Permit / Quarry Permit	*Nunavut Land Claims Settlement Act Territorial Lands Act and Regulations** *Federal Real Property Act & Regulations**	Nunavut Tungavik Incorporated, Kivalliq Inuit Association, Lands Division INAC
Water use and waste water disposal at camps, bridge crossings	Water Licence	*Nunavut Waters Act*	Nunavut Water Board
Transportation, use of heavy equipment	Vehicle Registration or Permit	*Motor Vehicles Act* (*Nunavut*)	Nunavut Department of Community Government and Transportation
Transportation of dangerous goods	Certificate / Permit	*Transportation of Dangerous Goods Act*	Transport Canada Nunavut Department of Sustainable Development
Sewage disposal, food premises, sanitation at camps	Permit / Criteria	*Public Health Act*(*Nunavut*)	Nunavut Department of Health and Social Services

[1]Indicates legislation triggering *CEAA*

2.2 Existing Environmental Assessment and Review Process

This section provides a summary of the typical regulatory provisions for environmental assessment pursuant to the *NLCA* and the *CEAA*, as outlined in the agreement, enabling legislation, guidelines, and operational procedures, that may apply to any project within Nunavut.

Article 12 of the *NLCA* establishes processes for the screening and review of project proposals on land and marine areas within the Nunavut Settlement Area (including Inuit Owned Lands, Commissioners lands, and Crown lands) and to the Outer Land Fast Ice Zone. The NIRB was established in 1996, under Article 12.2.1 of the *NLCA*, as an institution of public government with responsibilities for environmental assessment. The NIRB's primary functions are to screen and review the ecosystemic and socio-economic effects of project proposals, and to make recommendations to the federal or territorial Minister(s) responsible for authorizing such projects to proceed. The NIRB also can issue recommendations for monitoring of project effects, but the responsibility for enforcement of such provisions lies with the agency issuing a permit, licence, or authorization. The NIRB's objectives are to protect the ecosystemic integrity of Nunavut, and to protect and promote the existing and future well-being of the residents and communities of Nunavut, and of Canada.

The FOX-C Dew Line Site is on federal lands that are regulated by INAC. As the Responsible Authority, INAC requires that an environmental screening be conducted in accordance with the *CEAA*. Where a proposed project in Nunavut involves a *CEAA* trigger, federal and territorial governments and the NIRB work together to harmonize the environmental screening process. This process is intended to provide information for the federal authorities to support the screening of the project pursuant to the requirements of *CEAA*. As such, the study has been conducted in a manner that is consistent with the *NLCA* and *CEAA* and the guidance documentation of the NIRB, the Canadian Environmental Assessment Agency and INAC.

The initial step in obtaining approval for a project proposal within the Nunavut Settlement Area is the submission of an application for a permit, licence, lease, or approval to an authorizing agency (*i.e.,* government department, Designated Inuit Organization, regulatory board). It is important to note that more than one authorization may be required for undertakings and activities on land or water.

The authorizing agency is responsible for initial processing of the application. Where regional land use plans are in place, the application is forwarded to the Nunavut Planning Commission (NPC) for review of conformity with the land use plan. Where a project proposal conforms to an approved land use plan, or if a variance has been approved, the NPC forwards the project proposal application to the NIRB for screening. If no approved land use plans exist, project proposal applications are referred directly by the authorizing agency to the NIRB for screening.

The initial steps of the screening involve notification of the proponent and authorizing agencies, establishment of a timeline for a screening determination (where not specified by regulation), and distribution of the project proposal application to appropriate stakeholders. Taking into account all comments received from stakeholders regarding the project proposal, existing scientific information, Inuit traditional knowledge, and the information provided by the proponent, the NIRB then reviews the potential effects of the project and the level of public concern about and/or support for the project proposal. Once the screening has been completed, the NIRB will produce a Screening Decision Report that documents its determination as to whether the project proposal should be approved without further review, abandoned or modified by the proponent, or subject to review under Part 5 or 6 of the NLCA.

If the NIRB determines that the project proposal should proceed without further review, the NIRB may include in its Screening Decision Report terms and conditions to be attached to the authorizations to be issued. The authorizing agency will include the NIRB terms and conditions in the final authorization. However, where the authorizing agency disagrees with the recommended terms and conditions, the agency must provide the NIRB with a rationale for omissions from the final authorization. Monitoring of adherence to terms and conditions is the responsibility of the authorizing agency. The NIRB will complete its screening and issue its Screening Decision Report to the authorizing agency (or agencies) within applicable legislated timelines to allow the agencies to meet their legislative requirements. However, should an agency have no legislated time limits regarding the issuance of permits, NIRB will provide its Screening Decision Report within "an acceptable time period" (NIRB 2003a).

When the Screening Decision Report indicates that a review is required, the Minister may:

- refer the proposal to the Minister of Environment for review by a federal environmental assessment panel;
- refer the proposal back to the NIRB for a review of ecosystemic and socio-economic impacts; or
- inform the proponent that the proposal should be abandoned or modified and resubmitted to NIRB.

The scope of the project has been determined pursuant to Section 15.1 of the *CEAA*. Discussions with PWGSC were undertaken to establish the scope of the project, the scope of the environmental screening and the establishment of Valued Ecosystem Components (VECs). Factors considered in the environmental screening include those prescribed in Section 16.1 (a) to (e) of *CEAA*, listed below:

(a) the environmental effects of the project, including the environmental effects of malfunctions or accidents that may occur in connection with the project and any cumulative environmental effects that are likely to result from the project in combination with other projects or activities that have been or will be carried out;
(b) the significance of the effects referred to in paragraph (a);
(c) comments from the public that are received in accordance with this Act and the regulations;
(d) measures that are technically and economically feasible and that would mitigate any significant adverse environmental effects of the project; and

(e) any other matter relevant to the screening, comprehensive study, mediation or assessment by a review panel, such as the need for the project and alternatives to project, that the responsible authority or, in the case of a screening, the Minister after consulting with the responsible authority may require to be considered.

Cumulative environmental effects have been considered pursuant to Section 16.1(a) of *CEAA* for likely future projects. No additional factors have been prescribed under Section 16.1(e) by INAC for inclusion in the potential cumulative environmental effects assessment analysis.

The existing conditions of the project area environment, with respect to the identified VECs, are characterized in this report. Potential interactions of specific project activities with the environment are identified and the environmental effects are evaluated in consideration of appropriate mitigation measures.

3.0 ENVIRONMENTAL ASSESSMENT CONTACTS

Responsible Authority Contact: Robert Martin Contaminated Sites, Project Officer Nunavut Regional Office Bldg. 969, P.O. Box 2200 Iqaluit, NU X0A 0H0 Phone: (867) 975-4583 Fax: (867) 975-4560	***CEAA Contact:*** Brian Torrie Project Assessment Group Canadian Environmental Assessment Agency 160 Elgin Street, 22nd Floor, Ottawa, ON K1A 0H3 Phone: (613) 957-0791
Proponent Contact: Robert Martin Contaminated Sites, Project Officer Nunavut Regional Office Bldg. 969, P.O. Box 2200 Iqaluit, NU X0A 0H0 Phone: (867) 975-4583 Fax: (867) 975-4560	***Nunavut Impact Review Board:*** Jorgen Komak Environmental Assessment Officer P.O. Box 2379 Cambridge Bay, NU X0B 0C0 Phone: (867) 983-2593 Fax: (867) 983-2594 e-mail: jkomak@nirb.nunavut.ca
Environmental Consultant Contact: James Howell Jacques Whitford Suite 500, 708-11 Avenue SW Calgary, Alberta, T2R 0E4 Phone: (403) 263-7113 Fax: (403) 263-7116 email: jhowell@jacqueswhitford.com	

4.0 PROJECT DESCRIPTION

The Department of Indian Affairs and Northern Development (DIAND) wishes to implement a remedial action plan to at the abandoned military station, intermediate DEW Line site Fox-C, located at Ekalugad Fjord. In order to develop a detailed remedial action plan, office and field activities are necessary to quantify the volume of contaminated soil and hazardous materials at the site, to conduct a waste audit on all non-hazardous materials, and to initiate some general clean up of the site. Potential gravel and rock sources and suitable locations for an engineered landfill also have to be identified in the area.

The former DEW Line site was constructed in 1957 and subsequently closed and abandoned in 1963. The site has not been formally occupied since 1963. Assessments completed in 1985 and 1994 have confirmed the presence of various hazardous materials and contaminated soil.

DIAND has requested PWGSC to assume responsibility for cleaning and remediating the site. PWGSC has developed a workplan for activities in 2004 to address this responsibility. This work plan consists of an evaluation of the existing information regarding hazardous materials and contaminated soil at the site, identification of any information gaps and the implementation of a detailed assessment plan to fill in the information gaps. Based on this information a remedial action plan will be developed for the site for implementation in 2005.

4.1 Project Location

The site description and history information is extracted from Reimer et al. (1994) and PWGSC's work plan for FOX-C (2004).

FOX-C Dew Line Site (Figure 4-1) is located on the east coast of Baffin Island (68° 42′ N, 68° 33′ W) in Nunavut. The nearest community is Clyde River, 195 km to the north. The beaching area is located on the south shore of Ekalugad Fjord, while the operations station is situated about 1.5 km inland at 770 m asl, overlooking Home Bay. The general site layout is illustrated in Figure 4-2. FOX-C is located approximately halfway between two former auxiliary DEW Line stations, Dewar Lakes (FOX 3), 108 km to the west and Cape Hooper (FOX-4), 78 km to the east.

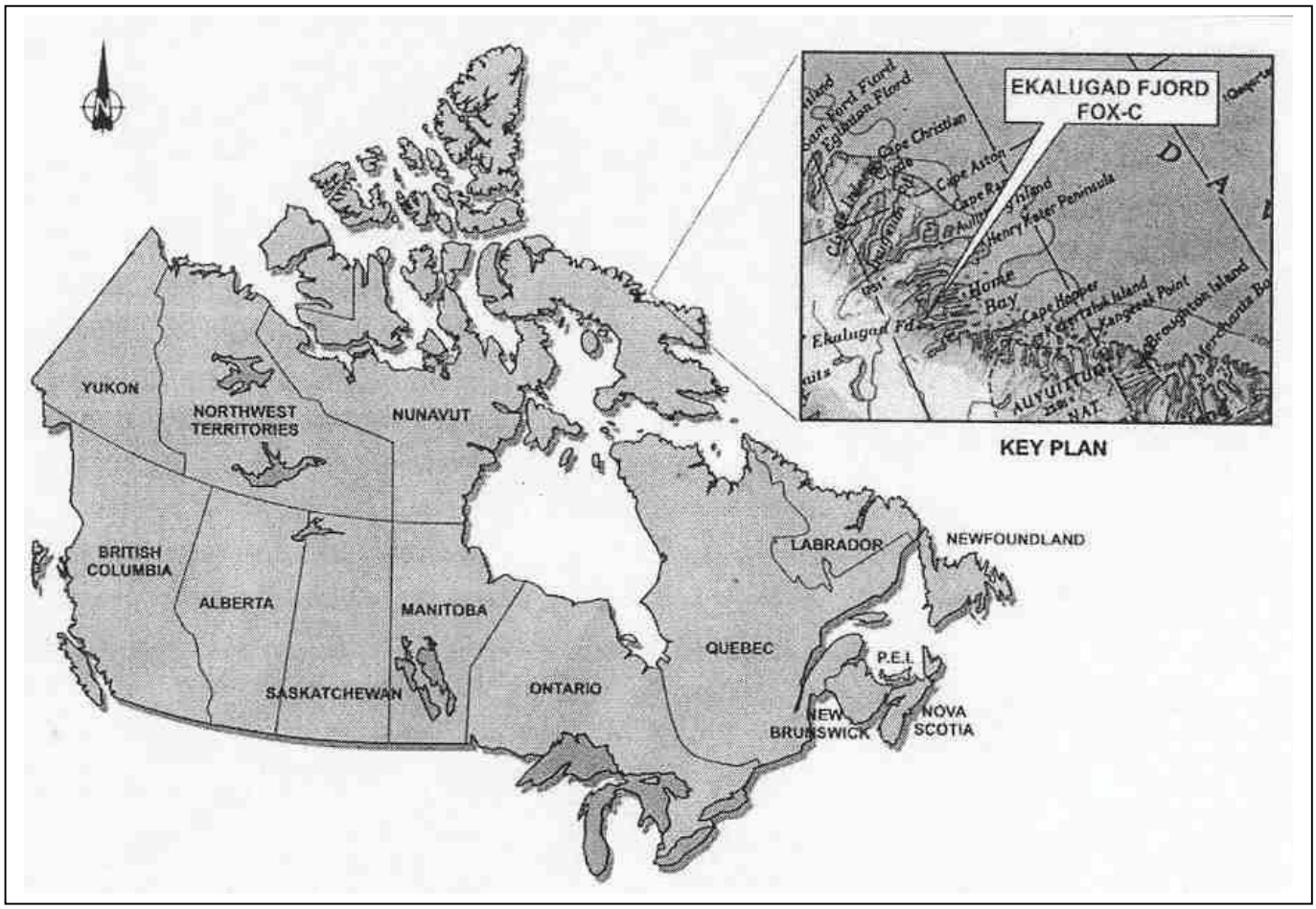

Figure 4-1: FOX-C DEW Line Site Location Map

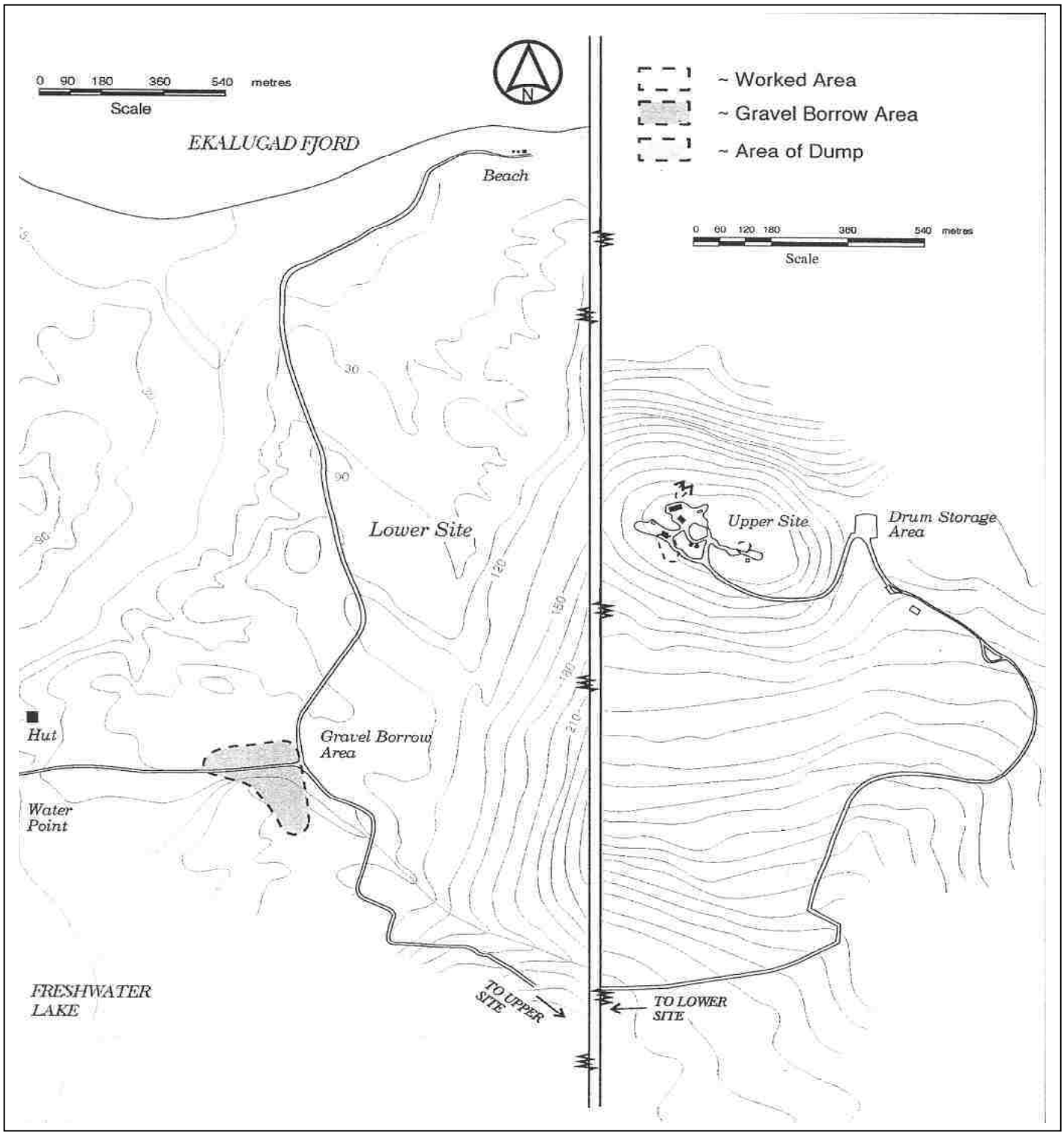

Figure 4-2: General Site Layout – FOX-C DEW Line Site

4.2 History

Ekalugad Fjord was reserved by the Department of National Defence (DND) in 1956 and FOX-C was constructed in 1957 as an intermediate DEW Line site. The station consisted of a five-module building train, a warehouse, a vehicle garage, an Inuit house, three storage sheds, a POL (Petroleum, Oil, Lubricant) drum storage facility and a continuous wave tower. In addition to the main station, a cargo beaching area was constructed as part of the site facilities. A gravel road was built linking the beaching area and the freshwater lake to the upper site. An airstrip was not constructed at this site, due to lack of adequate level terrain, although the freshwater lake served as a location for an ice airstrip during the winter. A helipad was constructed at the upper site, just east of the station buildings.

Details of the facilities and equipment that were used during the operation of this site have been documented by Andzans and Associates (1984) and are similar to those observed at other Intermediate sites. The site was abandoned as part of the DEW Line system in October 1963, and the responsibility for the site was taken over by DIAND.

In 1963, Ekalugad Fjord was reserved for scientific use by government or university groups. Although the site was never used as a research station, a botanical survey was conducted in the area in July 1967.

Environmental assessment of the FOX-C DEW Line site was initiated in 1986 when DND and Environment Canada visited the site to remove contaminants such as PCBs and POLs and identify areas of buried materials that could pose environmental risks in the future. Their findings identified a number of drum caches with many of the drums still containing product. These were left in place. Removal of PCB-containing equipment was conducted and elevated PCB concentrations were noted in soil samples at several areas. Various sampling and clean up activities have been conducted at the site during the 1990s.

The site was revisited in 1994 by the Environmental Sciences Group of Royal Roads Military College at which time a detailed surface soil sampling program was completed. Their investigations identified soil contamination exceeding Tier I and Tier II DEW Line Clean up Criteria (DCC) near the module train, garage, warehouse, dumps, crashed aircraft and construction camp. However, these investigations did not include assessment of hydrocarbon contamination that has the potential to be a significant source of contamination at the site. Analysis of paint, barrel contents and asbestos has also been conducted.

4.3 Objectives

The objectives of PWGSC's detailed site assessment and preliminary waste consolidation program at FOX-C include:

- Review all previous information gathered for the site regarding on-site landfills, contaminated soils, and hazardous materials.
- Conduct detailed site assessment activities to:
  - Quantify the volume of contaminated soil at the site. This will include soil contaminated with heavy metals, PCBs, and petroleum hydrocarbons.
  - Quantify the volume of hazardous materials at the site, including asbestos-containing materials and paint containing PCBs and/or lead.
  - Quantify the volume of non-hazardous materials at the site, including wood, metal and concrete waste.
  - Quantify the volume of liquid waste that can be incinerated on-site (hydrocarbons) or requires southern disposal (PCB-containing oil, chlorinated or metal-containing hydrocarbons).
  - Identify potential locations for an engineered landfill for the disposal of hazardous and/or non-hazardous waste.
  - Identify borrow sources to supply enough granular material for the construction of the landfill by way of a full geotechnical evaluation.
  - Complete a human health and ecological risk assessment at the site. This will likely include the collection of flora, fauna, and sediment samples.
  - Evaluate the condition of the access road connecting the beach site, lower site, drum storage area, and the upper site.
- Initiate a drum consolidation and crushing program at the site.
- Carry out a general site clean up.
- Prepare a detailed design for site remediation activities.

4.4 Scope of Work

The scope of work for activities at FOX-C during 2004 includes the following tasks relative to an environmental screening.

4.4.1 Planning and Design

A detailed review of all previous site information will be conducted in order to determine any information gaps and identify what additional site information is required for the preparation of a remediation specification. Applicable previous site information includes the assessments completed in 1985 and 1993.

Based on the review of the site information, community consultation has been initiated to introduce the objectives of this year's site activities to the communities in the surrounding area. As part of the community consultation, DIAND and PWGSC project managers have met with members of the community to obtain a local perspective on the current use of the facilities at the site and the availability of heavy equipment and labourers from the community. The community consultation component of this

project will continue throughout the duration of the project to ensure that the community is informed about the activities, results, and plans regarding the site, and are active participants in the RAP development. An effort will be made to also meet with regulators in Iqaluit during each trip to Clyde River to provide updates of the project status and planning. The provision for an air charter to take key community members/stakeholders and regulators to the site during the 2004 field season has been built into the work program.

If possible, interviews with personnel who have previous experience at the FOX-C Intermediate Dew Line site will be conducted to obtain information regarding previous site activities. These contacts will likely result from the community consultation process.

A preliminary site visit will be required to survey the terrain at the site. Previous reports have characterized the terrain at the site as high rugged hills which supports numerous rocky outcrops. The preliminary site visit will allow the project team to determine what tasks can be completed at the site this year, what equipment will be necessary to complete the work, and logistical issues associated with stocking and supporting the camp. This information will be critical for the preparation of the tender document specifying camp and equipment requirements for the work proposed at the site for 2004.

Once the detailed scope of work has been finalized, permit applications will be prepared. Permits that will likely be required will include a Land Use Permit, a Water Use Permit and a permit for all site assessment activities. This environmental screening, as defined by CEAA, forms a part of the permit package.

The final component of the planning phase will be the preparation of the tender document for the supply of a camp, heavy machinery, and labourers for support services this year during all site activities. An aboriginal set-aside contract will be obtained for the support services in 2004. It will also be necessary to prepare various terms of reference for the procurement of engineering services. External engineering services will be retained to complete the assessment activities proposed for the site. A quantitative human health and ecological risk assessment will be conducted and may be used to establish site-specific risk-based criteria that should dictate what the remedial program for FOX-C will look like. The assessment team will also include geotechnical experts, site surveyors, and PWGSC and DIAND representatives. It is anticipated that camp size will be in the order of 15 to 20 people and will be staffed from mid-July to mid-August. Table 4-1 in Section 4.8 provides a summary of these tasks and their tentative schedule.

4.4.2 Field Program

4.4.2.1 Camp Construction

The field program will commence in early July and will consist initially of mobilizing equipment and supplies to the site and the construction of the camp. Depending on the services available in Clyde River, this may be done either by boat or by helicopter.

4.4.2.2 Assessment Activities

Assessment of Existing Landfills

Four landfills have been identified at various locations at the site. Three of the landfills were visually inspected in 1993 and were noted to contain domestic garbage (Main Dump), drums and waste oil containers (Garage Dump), and a mixture of wood and metal waste with some barrels (House Dump). The fourth landfill was reported to be the original landfill for the site located near the helipad; however, this area was not accessible at the time of the last assessment (1993).

Assessment activities associated with the existing landfills will include:

- delineation of the landfill boundaries;
- identification and quantification, if necessary, of hazardous materials in the landfill including contaminated soil; and
- determination of whether the landfill is releasing deleterious substances into the surrounding environment.

Contaminated Soil Delineation

Areas of soils contaminated with heavy metals, PCBs, and/or petroleum hydrocarbons have been identified at the Lake Area, the Lower Site, and at the Upper Site in previous reports. Further soil sampling is required to delineate the areal and vertical limits of the contamination on-site.

Hazardous Materials Inventory

A hazardous materials inventory will be completed at each of the structures remaining at the site. The inventory will identify and quantify materials which will require specialized disposal such as asbestos-containing materials, paint containing lead and/or PCBs, and PCB-containing equipment.

Drum Assessment

There are approximately 10,000 drums at the site. Some have been previously assessed to determine if they are empty or still contain a petroleum liquid. Some of the drums contain unknown liquid and solid wastes. A full assessment will be conducted to determine the type of material within each barrel. All barrels that contain unknown liquids will be sampled and the sample submitted to an accredited laboratory that can identify the liquid material type. Based on the barrel sampling program, estimates of

the volume of liquid which can be incinerated on-site, shipped south for disposal, or disposed of on-site will be produced.

Assessment of New Landfill Location and Borrow Sources

It is anticipated that the comprehensive remediation activities planned for this site will potentially generate a substantial volume of hazardous and non-hazardous waste. The construction of an engineered landfill at the site for the disposal of the waste is an option that may be implemented. Investigations are required to confirm if this is a viable option. Specifically, it needs to be determined if there is an appropriate location with adequate space for the volume of waste requiring disposal and if there is sufficient granular material from borrow sources to construct the landfill. A site survey will be conducted to tie in all structures, borrow sources, landfill areas and assessed locations. This survey will be useful in creating a complete drawing of the entire site including all buildings, landfills, sampling locations, impacted areas, borrow sources, etc.

Site-Specific Risk Assessment

A site specific risk assessment will be completed at the site this year to quantify the risk to human and ecological receptors at the site from the identified contamination. The results of the risk assessment may establish the level of effort required to reduce site environmental liability to an acceptable level.

Lake Assessment

A sampling program will be conducted to assess the condition of lake bottom sediments in the unnamed lake located southeast of the lower site area. Sediment samples will be collected from the lake bottom and analyzed for PCBs, hydrocarbons and total metals. It will also be necessary to obtain background samples from areas of the lake that are believed to be not affected by previous site activities. An electromagnetic survey and an underwater video camera will be utilized to determine if debris has been dumped into the lake in previous years. Options will be explored to conduct the EM survey during the July 2004 site assessment activities, however this activity may be more easily conducted on the winter ice.

Access Road Evaluation

Previous assessment reports from the site have identified that the access road connecting the Beach Area, Lake Area, Lower Site and Upper Site is in poor condition and impassable at various locations. The condition of this road will be confirmed and the remedial measures necessary to return the road to a working condition will be identified. The status of this road will have a major impact on the design of the remediation plan for 2005.

4.4.2.3 Waste Consolidation

Approximately 10,000 drums have been identified at various locations within the site; many of these are reported to be empty. Using local Inuit labourers, the dry empty barrels strewn around the site will be collected and returned to a central location for crushing. Barrels that contain liquid or are adjacent to a

waterway will be left in-place and included in the comprehensive remediation program to be implemented in 2005.

4.4.2.4 Operational Issues

During the course of the assessment and waste consolidation activities, it is anticipated that other tasks will be identified which may be necessary to bring the site to regulatory compliance and reduce the associated liability that is inherent of such a site. Such tasks will be completed during the 2004 summer work program. Any additional minor work items or operational issues identified as necessary tasks in the near future may be incorporated into the work program in 2004.

4.4.3 Use of Local Inuit Labour

Any opportunity to use local labour will be included into this year's program. It has been identified that locals can participate in many of the 2004 activities such as general clean up, site assessment, job shadowing during geotechnical evaluation and risk assessment work and barrel consolidation and crushing. It will be requested that six labourers be hired by the general contractor supplying the camp, equipment and support services for site activities in 2004.

4.5 Existing Infrastructure

Figures 4-3 and 4-4 provide a site layout of the FOX-C Dew Line Site (Upper Site and Lower Site) with the locations of most of the facilities. Site infrastructure consists of the following:

- module train;
- warehouse and garage;
- Inuit house (dormitory);
- Petroleum, Oil, Lubricants (POL) pumphouse;
- quonset hut;
- wooden hut in the lake area;
- collapsed communications antenna;
- refuelling pipeline;
- four 75,500-L POL tanks;
- two 22,700-L mobile fuel tanks;
- upper storage shed;
- paint shed;
- lower storage shed;
- one 7,600-L fuel tank;
- four dump sites; and
- a lake airstrip.

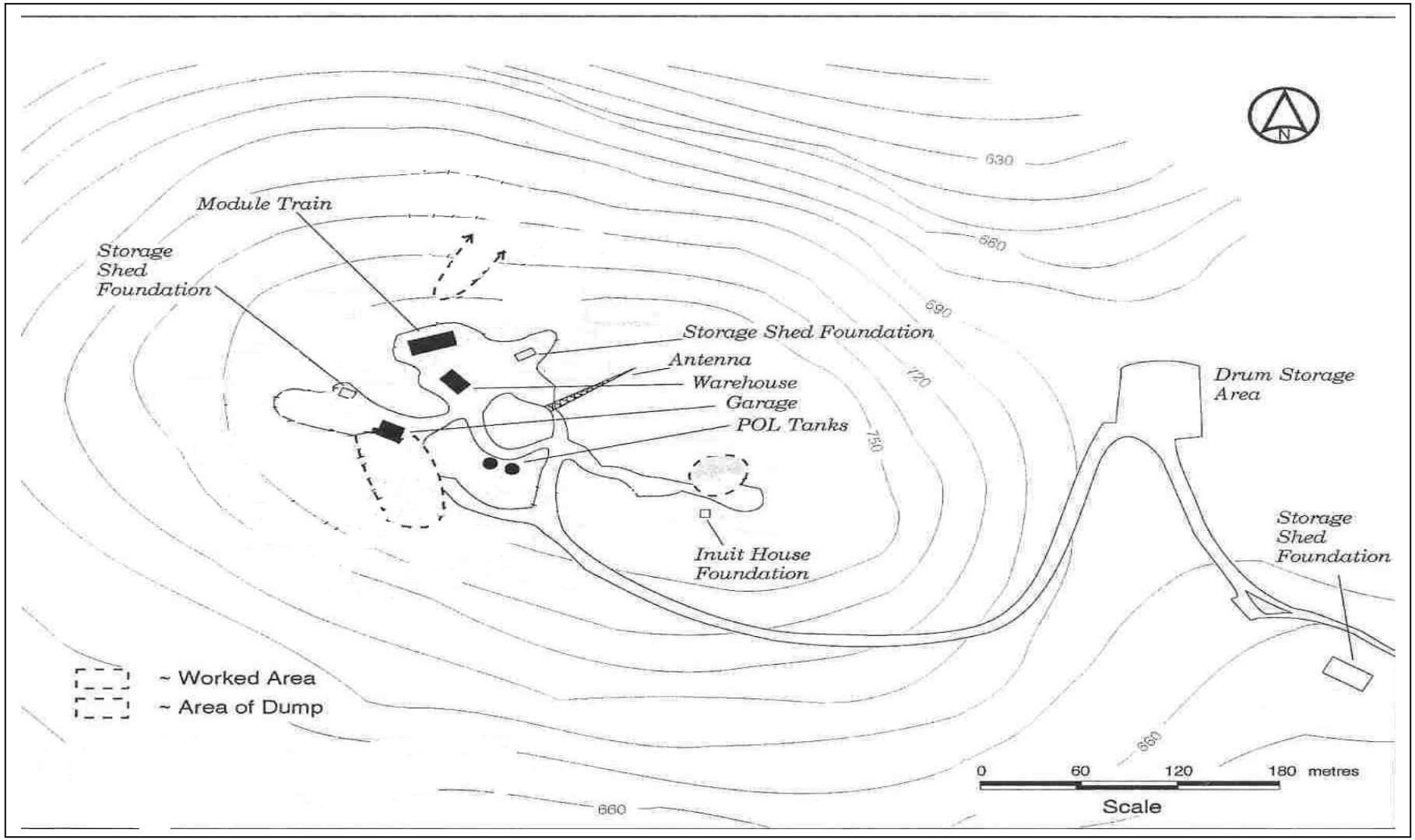

Figure 4-3: Upper Site Layout of FOX-C DEW Line Site

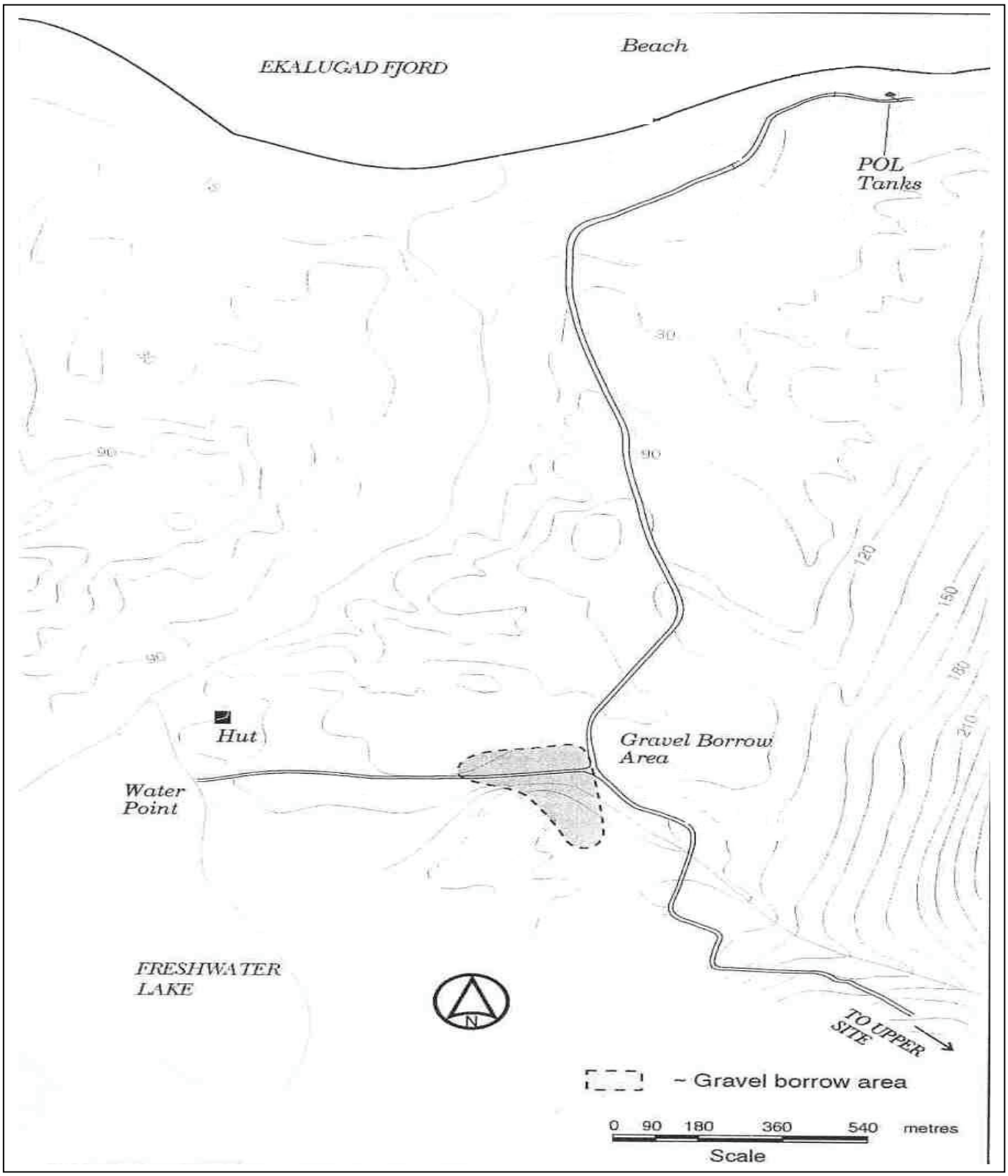

Figure 4-4: Lower Site Layout of FOX-C DEW Line Site

4.6 Waste Inventory

Wastes identified at the CAM-F Dew Line Site are identified in the following subsections.

4.6.1 Buildings and Infrastructure

Environmental issues associated with the module train, warehouse and garage include approximately 226 m^2 of asbestos insulation (>75% Chrysotile) and asbestos floor tiles (1-5% Chrysotile), as well as approximately 20 m^2 of asbestos wallboard. PCB-amended paint was also identified in the module train with a maximum concentration of 12,000 – 170,000 ng/100 cm^2. There is an estimated 51 m^3 of building components painted with PCB-amended paint.

There are four existing landfills at the site. The main dump is located north of the module train and east of the sewage outfall area. It contains tin cans, glass, metal and wood debris. PCB-contaminated soils above the CCME criteria were identified at the dump and it is suspected that it may contain PCB electrical equipment and other hazardous waste. The garage dump is located south of the garage. It contains partially buried barrels and waste oil containers. PCB contaminated soils above the CCME criteria were identified at this dump and it is suspected that it might contain PCB electrical material or other hazardous waste. The house dump is located northeast of the Inuit house. It contains barrels, wood and other debris. The original dump is located close to the helipad, and its contents are unknown.

4.6.2 Hazardous Waste

Hazardous debris is scattered throughout the site and includes:

- POL products in scattered drums, barrel caches, pipelines and fuel tanks (estimated 120,000 L of waste oils and sludge to be incinerated and 12,000 L of POL to be disposed of off site;
- batteries; and
- PCB-coated building materials.

The total estimated volume of hazardous waste to be removed is 65 drums of POL product, 51 m^3 of PCB-amended paint-covered building components, and 18 drums of miscellaneous hazardous waste.

4.6.3 Non-hazardous Waste

Scattered debris is present in the main station area, at the beach, and along the roads leading from the station to the freshwater lake and to the dumps. The debris includes:

- abandoned vehicles;
- cables;

- barrels;
- wooden pallets;
- machinery parts; and
- metal plates.

4.6.4 Barrels

Barrels are located in the main station area, on the beach and in a number of barrel dumps throughout the site. There are approximately 10,000 barrels at the site, some of which may contain product.

4.6.5 Soils

The total estimated volume of soils that exceed CCME guidelines for metals is 2,364 m^3. The total volume of soils that exceed DCC guidelines for metals is 1,652 m^3. Approximately 2,100 m^3 of hydrocarbon-contaminated soils were identified. No soils with a PCB concentration above CEPA levels were identified. The total estimated volume of soil with a PCB concentration above CCME guidelines is 24 m^3. The total estimated volume of soil with a PCB concentration above DCC guidelines is 24 m^3. A comprehensive environmental assessment will need to be conducted to confirm these volumes.

4.7 Proposed Activities

The proposed activities at the FOX-C Dew Line Site in 2004 include a preliminary site inspection, a detailed site assessment and preliminary waste consolidation, and general site clean up. These activities are summarized in Table 4-1.

Table 4-1: Task Description and Tentative Schedule – FOX-C Dew Line Site Detailed Site Assessment and Preliminary Waste Consolidation

Activity	Status	Comment
Background Review	**February –March 2004**	
Review Previous Reports	February-March 2004	Review to determine information gaps for the preparation of a remediation specification.
Program Options Review & Selection	February-March 2004	
Community Consultation	**April 1-December 10, 2004**	
Establish Working Groups	April 1-14, 2004	Consultation will be done to introduce the objectives of the site activities and to obtain perspectives on the current use of the facilities, availability of heavy equipment and local labourers.
Meeting #1 – Project Introduction to Communities, H&TO and QIA	May 18-21, 2004	
Meeting #2 - Presentation of Assessment Details and Preliminary Site Visit	July 12-16, 2004	

Table 4-1: Task Description and Tentative Schedule – FOX-C Dew Line Site Detailed Site Assessment and Preliminary Waste Consolidation		
Activity	**Status**	**Comment**
Meeting #3 – Assessment Results	October 26-29, 2004	
Meeting #4 – Final Work Plan Delivery	December 7-10, 2004	
Regulatory Approvals – Assessment Activities	**January 23-July 23, 2004**	
Preparation (Investigation)	January 23-March 26, 2004	
Finalize Project Description	March 16-31, 2004	
Prepare and Submit Land Use and Water Use Applications	May 3-June 3, 2004	
Project Review by NIWB/CEAA/DFO/DOE/Land Use Board	June 3-July 23, 2004	
Preliminary Site Inspection	**July 12-16, 2004**	
Site familiarization trip	July 12-16, 2004	Non-intrusive task to be completed prior to irrevocable (funding) decisions Essential to determine tasks that can be completed in 2004, the necessary equipment, and logistical issues for stocking and supporting the camp.
Equipment Supply Contract	**May 31-August 10, 2004**	
Prepare Equipment & Camp Supply Spec #1 for July Site Assessment	May 31-June 16, 2004	
French Translation for Spec #1	June 16-21, 2004	
Tender Period Spec #1	June 22-July 23, 2004	
Award Contract #1	July 26-30, 2004	
Mobilize Equipment and Camp	August 4-7, 2004	Principally by aircraft (transport plane and helicopter).
Camp Construction	August 8-10, 2004	The camp will be constructed following delivery of supplies to the site in early August.
Detailed Site Assessment and Preliminary Waste Consolidation	**June-November, 2004**	
Obtain Assessment contracts	June 21-July 30, 2004	
Assessment of Existing Landfills	Summer 2004	Including delineation of landfill boundaries; identification and quantification of hazardous materials in landfills, including contaminated soil; and determining if the landfill is releasing deleterious substances into the surrounding environment. Will include a geotechnical evaluation.
Contaminated Soil Delineation	Summer 2004	Areas of soils contaminated with heavy metals, PCBs, and/or petroleum hydrocarbons have been identified at the Lake Area, the Lower Site, and at the Upper Site. Further soil sampling required to delineate the aerial and vertical limits on contamination.
Hazardous Materials Inventory	Summer 2004	Will identify and quantify materials requiring special disposal such as asbestos-containing materials, paint containing lead and/or PCBs, and PCB-containing equipment.
Assessment of New Landfill Location and Borrow Sources	Summer 2004	Investigation required to confirm if this is viable. A survey will be conducted to tie in all site structures, borrow sources, landfill areas and assessed locations.

Table 4-1: Task Description and Tentative Schedule – FOX-C Dew Line Site Detailed Site Assessment and Preliminary Waste Consolidation		
Activity	**Status**	**Comment**
Site Specific Risk Assessment	Summer 2004	Will be completed to quantify the risk to human and ecological receptors at the site from contamination. The results may establish the level of effort required to reduce site environmental liability to an acceptable level.
Lake and River Assessment	Summer 2004	Will be completed to assess the condition of the lake bottom sediments in the un-named lake. Sediment samples will be analyzed for PCBs, hydrocarbons and total metals. An electromagnetic survey and underwater video camera ill be used to determine if debris has been dumped into the lake.
Access Road Evaluation	Summer 2004	The access road connecting the Beach Area, Lake Area, Lower Site and Upper Site is in poor condition. Site investigations will confirm what remedial measures are necessary to return the road to working condition. This will have a major impact on the design of the remediation plan for 2005.
Waste Consolidation	Summer 2004	There are approximately 10,000 drums on site. Some have been previously assessed to determine if they are empty or still contain a petroleum liquid. Some contain unknown liquid and solid wastes. A full assessment will be conducted to determine the type of material within each. All barrels containing unknown liquids will be sampled and tested at an accredited lab to identify the liquid material. Based on the barrel sampling program, volume estimates to determine what can be incinerated on-site, shipped south for disposal, or disposed of on-site will be produced.
Laboratory Analyses	September 6-20, 2004	
Obtain all Reporting	October 11-18, 2004	
Submit Draft Work Plan for Entire Site Clean Up to DIAND	October 18-November 17, 2004	
Finalize Work Plan and Project Description	November 17-30, 2004	

4.8 Work Camp

A work camp will be established at the FOX-C Dew Line Site to carry out the detailed site assessment and preliminary waste consolidation. The camp will be owned by the primary contractor who will be responsible for:

- food services;
- heating;
- lighting;
- fuel;
- domestic water systems;
- sewage collection, treatment and disposal system;
- waste, refuse and garbage collection and disposal;
- camp fire prevention, alarm and fire fighting system;

- camp safety and security service;
- sleeping and washroom facilities;
- bedding and bedding laundry service;
- janitorial service;
- personnel laundry facilities; and
- snow removal.

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

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

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

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

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

4.9 Personnel

Personnel involved with the project in the summer of 2004 will include, but are not limited to:

- 2 PWGSC employees;
- 2 INAC employees;
- 2 site and risk assessment specialists;

- 2 geotechnical evaluation specialists;
- 1 surveyor;
- 1 backhoe driver;
- 1 site supervisor/mechanic;
- 5 labourers;
- 1 cook; and
- 1 cook's helper.

4.10 Equipment

Equipment required for the 2004 project activities will include, but is not limited to:

- 1 backhoe;
- 5 quads;
- 1 water pump;
- 1 portable generator;
- 1 boat and motor;
- 1 barrel crusher;
- cutting torches;
- adequate fuel and tanks, oil, grease, antifreeze, etc.;
- safety supplies (*e.g.,* tyvek suits, nitrile gloves, hard hats, respirators);
- survey rod and level;
- survey wheel;
- portable radios, satellite phone, GPS;
- spill kit and absorbent material;
- over pack drums; and
- paddles.

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 INAC, the Government of Nunavut, 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 rational for their selection is provided in Table 5-1. Table 3 summarizes the interaction and potential impacts between VECs and the various activities associated with the clean up.

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 Affects

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 investigation and 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. Potential interactions between the project and the identified VECs are described in the sub-sections below.

6.1 Regional Setting

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

6.2 Public Consultation

In May 2004, community presentations were conducted in Clyde River and Qikiqtarjuaq to Hamlet Councils, Hunters & Trapper Organizations and Qikiqtani Inuit Association. Presentations were generic in scope and focused on the fact that FOX-C near Ekalugad Fjord is targeted for clean up. The community presentations were used to complete the following objectives:

- introduce the project to the community;
- obtain site-specific information from the Inuit who visit the site or were familiar with the on-site activities during facility operation;
- identify resources (labour and equipment) in the community which would assist in the execution of the project; and
- identify the issues and concerns the communities had with the site.

Based on these meetings, the most common concerns from the communities of Qikiqtarjuak and Clyde River regarding the site were:

- the potential for contamination resulting from the barrels strewn about the site, in the lake, and along the river leading from the lake to the fjord; and
- the safety of the arctic char in the lake for human consumption. (This lake is a popular fishing area for both communities and they would like to be sure that the fish caught in the lake are safe to eat.)

The community-identified issues will be considered during the preparation of the detailed 2004 work plan. Resources for on-going communications, as requested by the communities, have been budgeted for.

A second meeting is planned for July to discuss the proposed investigation in detail with the communities and to conduct a preliminary site visit, potentially with community representatives, in order to obtain a better understanding of the site conditions.

6.3 Air Quality

6.3.1 Existing Environment

The climate on the east coast of Baffin Island is humid and extremely cold and is marked by very short, cold summers. The mean annual temperature is approximately -11.5°C with a summer mean of 1°C and a winter mean of -23°C. The mean annual precipitation ranges from 200 mm to 400 mm (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 around Ekalugad Fjord. The temporal boundary is the detailed site assessment and preliminary waste consolidation field work period.

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 for review by NIRB and other federal departments through the normal CEAA process. 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 detailed site assessment and preliminary drum consolidation activities, there will be minor 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. 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
Detailed Site Assessment and Preliminary Waste Consolidation	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					

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.

2 = 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 summarises the residual environmental effects of the project activities on air quality. The effects of vehicle and equipment emissions during the detailed site assessment and preliminary waste consolidation 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.

Table 6-2: Residual Environmental Effects Summary Matrix: Air Quality

Phase	Residual Adverse Environmental Effect Rating	Likelihood (of significant adverse environmental effects)	
		Probability of Occurrence	Scientific Uncertainty
Detailed Site Assessment and Preliminary Waste Consolidation	NS		
Removal and Transport of Hazardous Material and Fuel	P		

KEY:

Residual Environmental Effects Rating:

S =Significant Adverse Environmental Effect
NS =Not Significant Adverse Environmental Effect
P =Positive Environmental Effect

Probability of Occurrence: based on professional judgement:

1 = Low
2 = Medium
3 = High
n/a = effect not predicted to be significant

Scientific Uncertainty: based on scientific information, and statistical analysis or professional judgement:

1 = low level of confidence
2 = medium level of confidence
3 = high level of confidence
n/a = effect not predicted to be significant

6.3.2.5 Summary of Environmental Effects on Air Quality

Detailed site assessment and preliminary waste consolidation at FOX-C Intermediate Dew Line Site will not have a significant impact on the air quality. The FOX-C Intermediate Dew Line Site investigation and remediation will have a positive impact on air quality in terms of removing contaminated soil from the environment, thereby reducing the risk of dust from this soil affecting air quality.

6.4 Soil Quality

6.4.1 Existing Environment

Dominant soils in the FOX-C Intermediate Dew Line Site area are Turbic Cryosols developed on a discontinuous colluvial, alluvial and morainal deposits. Bare bedrock is common (Ecological Stratification Working Group, 1995). Soils consist of sand and gravel with small amounts of clay and organic material that are imperfectly drained and lack profile development (Qikiqtaaluk Corporation 2001).

6.4.2 Soil Quality Impact Assessment

6.4.2.1 Study Area Boundaries

The spatial boundary for the assessment of project effects on soil quality is the FOX-C Intermediate Dew Line Site and the extent beyond the site in which soil contaminates may be expected to migrate. The temporal boundary is the detailed site assessment and preliminary waste consolidation field-work period.

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 for review by NIRB and other federal departments through the normal CEAA process.

Technical boundary of the soil quality assessment is the limited time frame associated with the environmental screening.

6.4.2.2 Identification of Issues, Interactions and Potential Effects

The FOX-C lower site is located on the beach in Qarmaralik Cove. The main environmental concerns in this area are the approximately 6,600 drums as some still contain POL (petroleum, oils, and lubricants). The site also contains a wooden hut, two POL tanks, and a refuelling pipeline. Significant amounts of POL-contaminated soil may also have to be moved (Qikiqtaaluk Corporation 2001) and further contamination during consolidation of drums to a central location may also be an issue.

The FOX-C upper site, 770 m above sea level, is located 6.5 km inland from Qarmaralik Cove. Approximately 3,400 drums, some still containing POL, and numerous patches of POL- and metal-contaminated soil represent a significant environmental concern. In addition, the site contains one Quonset hut, three buildings, two POL tanks, and one collapsed antenna on the site need to be demolished and disposed of. PCB- and asbestos-contaminated building material and waste material from four existing dumps are also issues that may need to be addressed. Abandoned construction equipment and hardware are also present (Qikiqtaaluk Corporation 2001).

The detailed site assessment and preliminary waste consolidation phase of the Project has the potential to interact with soil quality through the exposure of hazardous materials and contaminated soil to leaching during investigations and through accidental events such as spills. The operation of the work camp will include treatment and disposal of waste, and could negatively affect soil quality if not carried out properly. Table 6-3 is an environmental assessment matrix for the Soil Quality VEC.

Table 6-3: Environmental Effects Assessment Matrix: Soil 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
Detailed Site Assessment and Preliminary Waste Consolidation	Hazardous materials or contaminated soils may be exposed to leaching during investigations (A).	• Investigators will have reviewed previous site assessments and activities near known areas of contamination will be carried out in a manner to minimize disturbance to the contaminated materials.	1	2	2/1	R	2
	Accidental spills may result in soil degradation (A).	• Proper handling, storage and transportation procedures for hazardous materials will be implemented. • All workers will be trained in proper handling procedures for all hazardous materials on site. • Hazardous materials or fuel will not be stored in the beach area. • Spill contingency plans have been developed and will be implemented as necessary. • Contingency plans related to all materials and equipment will be available on site. • All fuel will be handled in accordance with the Contingency Plan.	1	2	2/1	R	2
	The operation of the construction camp will include treatment and disposal of waste, which could degrade soil quality (A).	• Hazardous materials will not be disposed of in the camp waste system. • All hazardous materials will be removed from the site for disposal. • All sewage will be disposed of in accordance with applicable regulations and guidelines.	1	2	2/1	R	2

Table 6-3: Environmental Effects Assessment Matrix: Soil 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
Removal and Transport of Previously Containerized PCB Wastes.	The potential exists for accidental release of hazardous materials, contaminated soil and/or fuels that could impact soil quality (A).	• Proper handling, storage and transportation procedures for hazardous materials will be implemented. • All workers will be trained in proper handling procedures for all hazardous materials on site. • Hazardous materials or fuel will not be stored in the beach area. • Spill contingency plans have been developed and will be implemented as necessary. • Contingency plans related to all materials and equipment will be available on site. • All fuel will be handled in accordance with the Contingency Plan. • Options for long-term storage of some material may be considered.	1	2	3/1	R	2

KEY:

Magnitude:

1 = Low: Soil chemical composition is not altered to the extent that vegetation currently present is affected.
2 = Moderate: Soil chemical composition is altered such that a moderate percentage of the vegetation is affected.
3 = High: Soil chemical composition is altered such that all vegetation is degraded and/or contaminants leach to groundwater.

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.

2 = Evidence of adverse effects.

N/A =Not Applicable

6.4.2.3 Mitigation

During the detailed site assessment and preliminary waste consolidation activities, Project personnel will be appraised of known locations of hazardous waste and disturbance of these sites will be kept to a minimum. Spill prevention and spill contingency plans will be in effect during all activities.

Proper handling procedures will be implemented for the storage and transportation of hazardous materials. All workers will be trained to properly handle all hazardous materials on site, and no hazardous materials or fuel will be stored on the beach area. Contingency plans for spills will be followed, and will be available on site, and all fuel will be handled in accordance with the contingency plan.

Hazardous materials will not be disposed of in the camp waste system. The disposal of all sewage will be in accordance with applicable regulations and guidelines.

6.4.2.4 Residual Environmental Effects

Definition of Significance

Significant Impacts are defined as those altering soil such that one or both of the following occurs:

- soil chemical composition is altered such that it will not support vegetation in areas where vegetation previously grew and the extent is greater than 1 km from the facility.
- soil chemical composition is altered such that it is a threat to groundwater and surface water.

Residual Environmental Effects Summary

Table 6-4 summarises the residual environmental effects of the project activities on soil quality. Activities during the detailed site assessment and preliminary waste consolidation phase are not expected to affect soil quality significantly.

Table 6-4: Residual Environmental Effects Summary Matrix: Soil Quality

Phase	Residual Adverse Environmental Effect Rating	Likelihood (of significant adverse environmental effects)	
		Probability of Occurrence	Scientific Uncertainty
Detailed Site Assessment and Preliminary Waste Consolidation	NS		
Removal and Transport of Hazardous Material and Fuel	NS		

KEY:

Residual Environmental Effects Rating:

S =Significant Adverse Environmental Effect
NS =Not Significant Adverse Environmental Effect
P =Positive Environmental Effect

Probability of Occurrence: based on professional judgement:

1 = Low
2 = Medium
3 = High
n/a = effect not predicted to be significant

Scientific Uncertainty: based on scientific information, and statistical analysis or professional judgement:

1 = low level of confidence
2 = medium level of confidence
3 = high level of confidence
n/a = effect not predicted to be significant

6.4.2.5 Summary of Environmental Effects on Soil Quality

Activities associated with the detailed site assessment and preliminary waste consolidation at FOX-C Intermediate Dew Line Site are assessed as not having a significant effect on the environment.

The potential exists for an accidental release of hazardous materials, contaminated soil and/or fuels that could impact soil quality. However, proper handling procedures for hazardous materials will be implemented for their storage and transportation. Also, all workers will be trained to properly handle hazardous materials on site, and no hazardous materials or fuel will be stored on the beach areas. Spill contingency plans will be followed, and will be available on site. All fuel will be handled in accordance with the contingency plan.

The operation of the work camp will include the treatment and disposal of waste, and has the potential to degrade soil quality. However, hazardous materials will not be disposed of in the camp waste system, and the disposal of all sewage will be in accordance with applicable regulations and guidelines.

6.5 Water Quality

6.5.1 Existing Environment

There is an unnamed freshwater lake to the immediate west of the lower site that is approximately 3 km long and 1 km wide. It is fed primarily by melt water the Fox Charlie Glacier, snow melt, and a larger lake 2 km to the west. The lake discharges into Ekalugad Fjord through a river approximately 1.5 km long. Previous work at FOX-C used the small freshwater lake as a source of drinking water (Qikiqtaaluk Corporation 2001).

6.5.2 Water Quality Impact Assessment

6.5.2.1 Study Area Boundaries

The spatial boundary for the assessment of the effects of project activities on the water quality of the area is the local watershed for the site. The temporal boundary is the detailed site assessment and preliminary waste consolidation field-work period.

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 for review by NIRB and other federal departments through the normal CEAA process. Technical boundaries of the water quality assessment are the lack of site-specific water quality data and the limited time frame associated with the environmental screening.

6.5.2.2 Identification of Issues, Interactions and Potential Effects

Interactions between the detailed site assessment and preliminary waste characterization phase and the water quality environment will be similar to those for the soil quality environment, *i.e.,* the potential for leachate from exposed hazardous materials and contaminated soil, and the potential for spills of fuel and hazardous materials. Table 6-5 is an environmental assessment matrix for the Water Quality VEC.

Table 6-5: Environmental Effects Assessment Matrix: Water Quality

Project Activity	Potential Positive (P) or Adverse (A) Environmental Effect	Mitigation	Evaluation Criteria for Assessing Environmental Effects				
			Magnitude	Geographic Extent	Duration/Frequency	Reversibility	Ecological/Socio-Cultural and Economic Context
Detailed Site Assessment and Preliminary Waste Consolidation	Hazardous materials or contaminated soils may be exposed to leaching during investigations; the leachate may degrade water quality (A).	• Investigators will have reviewed previous site assessments and activities near known areas of contamination will be carried out in a manner to minimize disturbance to the contaminated materials.	1	2	2/1	R	1
	Accidental spills may result in water quality degradation (A).	• Proper handling, storage and transportation procedures for hazardous materials will be implemented. • All workers will be trained in proper handling procedures for all hazardous materials on site. • Hazardous materials or fuel will not be stored in the beach area. • Spill contingency plans have been developed and will be implemented as necessary. • Contingency plans related to all materials and equipment will be available on site. • All fuel will be handled in accordance with the Contingency Plan.	1	2	2/1	R	1
	The operation of the construction camp will include treatment and disposal of waste, and could degrade water quality (A).	• Hazardous materials will not be disposed of in the camp waste system. • All sewage will be disposed of in accordance with applicable regulations and guidelines.	1	2	2/1	R	1

KEY:

Magnitude:

1 = Low: *e.g.,* Minor changes to water quality but not to the extent that aquatic life is affected or water that was previously potable is now non-potable.

2 = Medium: *e.g.,* Moderate changes to water quality, affecting aquatic life at a local level or decreasing the quality of potable water (*e.g.,* odour problem).

3 = High: *e.g.,* Major changes to water quality, affecting aquatic life at a regional level or rendering previously potable water non-potable.

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 = 1-7 months
3 = 8-36 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.

2 = Evidence of adverse effects.

N/A= Not Applicable

6.5.2.3 Mitigation

During the detailed site assessment and preliminary waste consolidation phase, disturbance to known areas of hazardous waste will be minimized. Material handling and spill contingency plans will be in place and the disposal of camp wastes will meet all regulatory standards.

Proper handling procedures will be implemented for the storage and transportation of hazardous materials. All workers will be trained to properly handle all hazardous materials on site, and no hazardous materials or fuel will be stored on the beach area. Contingency plans for spills will be followed, and will be available on site, and all fuel will be handled in accordance with the contingency plan.

Hazardous materials will not be disposed of in the camp waste system. The disposal of all sewage will be in accordance with applicable regulations and guidelines. The freshwater lake adjacent to the lower site will likely be used for drinking water. Camp personnel will ensure that the applicable water quality guidelines are met and withdrawal does not adversely affect fish habitat.

6.5.2.4 Residual Environmental Effects

Definition of Significance

A significant impact to water quality is defined as one of sufficient magnitude so as to alter the quantity or quality of water to a degree that will result in a significant impact on aquatic life as defined in the impact significance definitions for other related VECs.

Residual Environmental Effects Summary

Table 6-6 summarizes the residual environmental effects of the project activities on water quality. Activities during the detailed site assessment and preliminary waste consolidation phase are not expected to affect water quality significantly.

Table 6-6: Residual Environmental Effects Summary Matrix: Water Quality

Phase	Residual Adverse Environmental Effect Rating	Likelihood (of significant adverse environmental effects)	
		Probability of Occurrence	Scientific Uncertainty
Detailed Site Assessment and Preliminary Waste Consolidation	NS		

KEY:

Residual Environmental Effects Rating:

S = Significant Adverse Environmental Effect
NS = Not Significant Adverse Environmental Effect
P = Positive Environmental Effect

Probability of Occurrence: based on professional judgement:

1 = Low
2 = Medium
3 = High
n/a = effect not predicted to be significant

Scientific Uncertainty: based on scientific information, and statistical analysis or professional judgement:

1 = low level of confidence
2 = medium level of confidence
3 = high level of confidence
n/a = effect not predicted to be significant

6.5.2.5 Summary of Environmental Effects on Water Quality

The effects of the FOX-C Intermediate Dew Line Site detailed site assessment and preliminary waste consolidation on water quality will not be significant.

6.6 Terrain

The terrain VEC includes surficial geology, soils and vegetation. The soils component refers to the physical characteristics of the surficial material; soil quality is addressed as a separate VEC in Section 6.3.

6.6.1 Existing Environment

6.6.1.1 Geology and Soils

Surficial Geology

The geology in the FOX-C DEW Line Site area is comprised largely of high, rugged hills and is characterized by large boulders and slabs of rock. The upper site is situated at the summit and is surrounded by steep outwash valleys to the south and west, a small chain of lakes to the east, and Ekalugad Fjord to the north. The upper site is primarily bedrock (consisting of granite and quartz monzonite) and colluvium, while the lower site is a combination of bedrock, alluvium deposits from the river, till, and coarse beach sediments. The area is well drained and permafrost is widespread and continuous (Qikiqtaaluk Corporation 2001).

Soils

The FOX-C site is located in the Baffin Mountain ecoregion where bare bedrock is common and Turbic Cryosols developed in discontinuous morainal, alluvial, and colluvial deposits are commonly found. Soils at the FOX-C site could be classified as cryosolic and regosolic and consisting of sand and coarse rock with small amounts of organic material and clay in some locations (Qikiqtaaluk Corporation 2001).

6.6.1.2 Vegetation

The high-arctic climate limits the vegetation to herbaceous species only due to extreme cold, high winds and lack of soil cover. Higher elevations are largely devoid of vegetation cover other than lichens and mosses. Lower mountain slopes and coastal margins provide some vegetative cover, which consists of herbaceous tundra communities. Dominant species include sedges and cottongrass (Ecological Stratification Working Group 1995).

The lower site has a higher diversity of vegetation compared to the upper site. Grasses (*Alopecurus* sp.), sedges (*Carex* sp.) and willows (*Salix* sp.) dominate the lower site, particularly the outwash valley, while the upper site is restricted to small, isolated patches of mosses and lichens (Reimer et al. 1994).

There are over 1,000 species of vascular plants in Nunavut. Of these only 18 species have been reviewed as to their general status in the territory. To date no rare or endangered vegetation species have been identified (Department of Sustainable Development, 2001). A botanical survey was completed for the site in 1967. Table 6-7 provides a list of species that occur around the site.

Table 6-7: Vegetation species identified at Ekalugad Fjord

Family	Scientific Name	Common Name
Lichens	*Rhizocarpon geographicum* DC.	Map Lichen
	Thamnolia subuliformis	Worm Lichen
	Cladonia rangiferina Web.	Reindeer Lichen
	Umbilicaria sp.	Rock Tripe
	Xanthoria elegans	Jewel Lichen
Mosses	*Rhacomtrium lanuginosum* (Hedw.) Brid.	
	Rhodobryum roseum (Weis) Limpr.	
Equisetaceae (Horsetail Family)	*Equisetum arvense* L.	Common Horsetail
Lycopodiaceae (Club-moss Family)	*Lycopodium selago* L.	Club Moss
Poaceae (Grass Family)	*Alopecurus alpinus* J.E. Smith	Foxttail
	Arctagrostis latifolia (R.Br.) Griseb sp. *latifolia*	Polargrass
	Deschampsia cespitosa (L.) Beauv. spp. *brevifolia* (R.Br.) Tzvelev	
	Festuca ovina L. var. *brachyphylla* Piper	Fescue
	Hierchloe alpina (Sw.) R.&S.	Holygrass
	Phippsia algida (Sol.) R.Br.	
	Poa arctica R.Br. spp. *arctica*	Arctic Bluegrass
	Trisetum spicatum (L.) Richt. *s.lat.*	
Cyperaceae (Sedge Family)	*Carex bigelowii* Torr.	
	Carex misandra R.Br.	
	Eriophorum scheuchzeri Hoppe	Cottongrass
	Eriophorum triste (Th.Fr.) Hadac & Love	Cottongrass
Juncaceae (Rush Family)	*Juncus castaneus* Sm.	
	Juncus biglumis L.	
	Luzula confusa Lindebl.	
Salicaceae (Willow Family)	*Salix arctica* Pall. *s.lat.*	Arctic Willow
	Salix herbacea L.	Least Willow
Polygonaceae (Buckwheat Family)	*Oxyria digyna* (L.) Hill	Mountain Sorrel
	Polygonum viviparum L.	Bistort
Caryophyllaceae (Pink Family)	*Cerastium alpinum* L. *s.lat.*	Mouse-ear Chickweed
	Cerastium sp.	
	Silene acaulis L. ssp. *acaulis*	Moss-campion
Ranunculaceae (Crowfoot Family)	*Ranunculus nivalis* L.	
	Ranunculus sabinii R.Br.	Buttercup
Papaveraceae (Poppy Family)	*Papaver radicatum* Rottb.	Arctic Poppy
Brassicaceae (Mustard Family)	*Draba alpina* L.	
	Draba fladnizensis Wulf.	
	Draba nivalis Lilj. var. *elongata* Wats.	
Saxifragaceae (Saxifrage Family)	*Saxifraga cernua* L.	
	Saxifraga nivalis L.	Alpine Saxifrage
	Saxifraga oppositifolia	Purple Saxifrage
Rosaceae (Rose Family)	*Dryas integrifolia* M. Vahl	Mountain Avens
	Potentilla hyparctica Malte var. *hyparctica*	Cinquefoil
	Potentilla pulchella R.Br.	Cinquefoil
	Potentilla vahliana	Cinquefoil
Ericaceae	*Arctostaphylos alpina* (L.*) Spreng.*	Alpine Bear Berry
	Cassiope tetragona (L.) D.Don ssp. *tetragona*	Arctic White Heather
	Vaccinium uliginosum L. spp. *pubescens* (Wormsk.) Young	Blueberry
Scrophulariaceae (Figwort Family)	*Pedicularis hirsuta* L.	Hairy Lousewort

6.6.2 Terrain Impact Assessment

6.6.2.1 Study Area Boundaries

The spatial boundary for the assessment of the effects of project activities on the terrain of the area include the area immediately surrounding the FOX-C Intermediate Dew Line Site facilities. The temporal boundary is the detailed site assessment and preliminary waste consolidation field-work period.

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 for review by NIRB and other federal departments through the normal CEAA process. Technical boundaries of the terrain assessment are the lack of site-specific terrain data and the limited time frame associated with the environmental screening.

6.6.2.2 Identification of Issues, Interactions and Potential Effects

During the detailed site assessment and preliminary waste consolidation activities, interactions with the terrain will be restricted to minor disruption by vehicle movement. Movement will be restricted to existing tracks and already-disturbed areas as much as possible. Most of the waste appears to have been deposited directly on the ground and only minor quantities have been buried. However, field reports indicate that while a large amount of the waste has been deposited directly on the ground, there are four landfills surrounding the upper site and several drum storage areas which may have severe soil contamination. Furthermore, some material is located on ledges or deep ravines and is quite inaccessible and other material has been covered in snow during previous site visits (Qikiqtaaluk Corporation 2001).

The majority of the terrain in the immediate vicinity of the site facilities is already heavily disturbed. The herbaceous vegetation community would likely recolonize in the area, however given the harsh growing conditions of the area this may not be noticed for a number of years. Local vegetation may be effected by fugitive dust during the clean up and waste consolidation activities. Mitigation measures used to reduce the levels of fugitive dust will reduce impacts to local vegetation.

Table 6-7 is an environmental assessment matrix for the Terrain VEC.

Table 6-7: Environmental Effects Assessment Matrix: Terrain

Project Activity	Potential Positive (P) or Adverse (A) Environmental Effect	Mitigation	Evaluation Criteria for Assessing Environmental Effects				
			Magnitude	Geographic Extent	Duration/Frequency	Reversibility	Ecological/Socio-Cultural and Economic Context
Detailed Site Assessment and Preliminary Waste Consolidation	Vehicle movements could disturb the ground surface (A).	• Movement will be restricted to existing tracks and already-disturbed areas as much as possible.	1	2	2/1	R	2
Contractor Support	Movement of contractor's equipment and personnel around the site has the potential to disturb the tundra (A).	• Existing roads will be used for movement around the site.	1	2	2/1	R	2

KEY:

Magnitude:

1 = Low: Erosion, permafrost degradation and destruction of vegetation is minor and limited in extent.

2 = Medium: Erosion, permafrost degradation and destruction of vegetation is more intense and widespread.

3 = High: Extensive erosion, permafrost degradation and destruction of vegetation.

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 = 1-7 months
3 = 8-36 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.

2 = Evidence of adverse effects.

N/A = Not Applicable

6.6.2.3 Mitigation

During the detailed site assessment and preliminary waste consolidation activities, vehicles and workers will use existing tracks for travel, whenever possible. Mitigation measures to reduce to levels of fugitive dust will also benefit local terrestrial vegetation.

6.6.2.4 Residual Environmental Effects

Definition of Significance

A significant environmental effect on the terrain VEC is one that results in permafrost degradation, surface erosion, sliding or slumping such that a significant effect results upon one of the water quality, biological, heritage resource, or socio-economic VECs or when the population of a vegetation species is sufficiently affected to cause a decline in abundance and/or change in distribution beyond which natural recruitment would not return the population to its former level within several growing seasons.

Residual Environmental Effects Summary

Table 6-8 summarises the residual environmental effects of the project activities on terrain. Activities during the detailed site assessment and preliminary waste consolidation phase are not expected to affect terrain significantly.

Table 6-8: Residual Environmental Effects Summary Matrix: Terrain

Phase	Residual Adverse Environmental Effect Rating	Likelihood (of significant adverse environmental effects)	
		Probability of Occurrence	Scientific Uncertainty
Detailed Site Assessment and Preliminary Waste Consolidation	NS		
Contractor Support	NS		

KEY:

Residual Environmental Effects Rating:

S =Significant Adverse Environmental Effect
NS =Not Significant Adverse Environmental Effect
P =Positive Environmental Effect

Probability of Occurrence: based on professional judgement:

1 = Low
2 = Medium
3 = High
n/a = effect not predicted to be significant

Scientific Uncertainty: based on scientific information, and statistical analysis or professional judgement:

1 = low level of confidence
2 = medium level of confidence
3 = high level of confidence
n/a = effect not predicted to be significant

6.6.2.5 Summary of Environmental Effects on Terrain

Detailed site assessment and preliminary waste consolidation are assessed as not having significant effects on the terrain of the FOX-C Intermediate Dew Line Site area.

The removal of site debris has the potential to further disturb the existing terrain. Vehicles and workers will use existing tracks for movement around the site to minimize disturbance to the tundra.

6.7 Terrestrial Animals and Habitat

6.7.1 Existing Environment

6.7.1.1 Wildlife

Wildlife in the region is dependent on suitable habitat for survival and given the sparse presence of vegetation in the region low densities and diversity of wildlife in the area are expected. There are however several species that may ulitize the area for certain life stages such as breeding or migrating. Based on existing information the keystone wildlife species expected in the area are highlighted below. It should be noted that all existing information for the area has been collected after the FOX-C facilities were already in place.

Mammals

Large terrestrial mammals include polar bear, arctic wolf and caribou. Smaller resident mammals include arctic hare, arctic fox, ermine, and collared lemmings. Walrus, ringed and bearded seal, narwhal, and bowhead whale typifies the marine environment (Ecological Stratification Working Group 1995).

Polar Bear

The polar bear is considered a sensitive species in Nunavut (Department of Sustainable Development, 2001) and in 2002 it was listed as a species of Special Concern (COSEWIC 2003). Movements of polar bears are normally dictated by sea ice characteristics, climate and the presence of prey species, especially ringed seals (Taylor et al. 2001). In Nunavut, polar bears are common in the coastal areas, especially in the summer. They move inland to find denning sites, where females will spend the winter with their new-born young.

FOX-C Intermediate DEW Line Site is located within the Baffin Bay polar bear population which is estimated to be 2,200 animals. This population is shared with Greenland (IUCN 2004). Within this population, polar bears exhibit site fidelity to these regions because of discontinuities in movement influenced by land-mass and open-water impediments. Most individuals within this population will spend the open water season on Baffin Island (Taylor et al. 2001). While occurrences of polar bears in the FOX-C Intermediate Dew Line Site region are likely to be low, they could be met there occasionally at any time throughout the year.

Caribou

Caribou on Baffin Island are usually seen in smaller groups compared to the migratory barren-ground caribou that winter below the treeline on the mainland. Ekalugad Fjord lies within the range of the Northeast Baffin Caribou Herd. The population of this herd is estimated to be over 10,000 individuals. Caribou adapt their migrations according to snow conditions and forage availability. They can deplete the food supply in an area, and change their migration routes to utilize new browsing areas. They are particularly sensitive to disturbances during calving and post-calving periods. During May, caribou migrate into the fiord valleys where the bulls will remain through the summer. The cows continue across the mountains to give birth at higher elevations. After calving they move to summer feeding areas in valleys. Calving areas on central Baffin Island have been recorded at a barren plateau east of Dewar Lakes (Elliott 1971), which are approximately 125 km west of Ekalugad Fjord.

Caribou are known to utilize the area around Ekalugad Fjord as tracks and droppings have been recorded on previous visits to the site (Reimer et al. 1994). However, little information exists on the distribution and movement of caribou in the vicinity of the site. Given the habitat features of the site, the area is not expected to be suitable for calving or a major migratory route.

Caribou protection measures are likely to be attached to land use permits in the region. These measures will likely be based on proposed measures outlined in the North Baffin Regional Land Use Plan that states, in general, development activities shall be prohibited within all caribou calving areas during calving season or if activities block or cause substantial diversion to caribou migration. At this time there is little information regarding traditional use of the area for hunting although there is evidence of past camps on the lakeshore near the lower site.

Wolves

Little information exists on the status of wolves in Nunavut but they are expected to occur in low densities (COSEWIC 2003). Wolves are considered a sensitive species in Nunavut and are considered rare on Baffin Island (Department of Sustainable Development 2001). They are usually found in association with caribou herds and have been reported in association with caribou around Dewar Lakes (Elliott 1971). One of the biggest threats to the long-term persistence of wolves are humans and their associated activities that cause habitat alteration and exploitation (Cluff et al. 2002).

Wolverines

The wolverine is listed as a species of Special Concern by COSEWIC and is considered sensitive in Nunavut (COSEWIC 2003; Department of Sustainable Development 2001). There are limited data available on the distribution, abundance, and ecology of wolverines in Nunavut (Mulders 2000). Based on reports from Inuit, the wolverine is likely rare on this part of Baffin Island (Mallory et al. 2001) and are expected to be at low densities compared to other regions in Nunavut. Like wolves, they are usually found in association with caribou herds however odours and waste from human developments have acted as an attraction for these animals.

Fox

The Red Fox and the Arctic Fox occur on Baffin Island, both of which are considered secure in Nunavut (Department of Sustainable Development 2001). Red foxes have adapted well to arctic tundra habitats and compete with arctic foxes. In the arctic, foxes primarily prey upon lemmings and nests of waterfowl species. The cyclic nature of lemming populations influences the populations and behaviour of foxes.

Foxes prefer vegetated soft ground for denning so the potential for dens exists in the FOX-C Intermediate DEW Line Site region. Foxes are territorial and rarely den less than a mile apart. If foxes are present in the FOX-C Intermediate DEW Line Site region they would likely have only one or two dens.

The curious nature of foxes often brings them in contact with human developments (Anand-Wheeler 2002). Potential interactions with the Project exist if proper waste and odour management strategies for the facilities are not developed. These strategies must identify and describe details of design features, operational measures, employee/contractor staff awareness and training, for handling of food, food waste and other wastes throughout the site and specifically for the kitchen and personnel quarters.

Arctic Hare

The arctic hare occurs on Baffin Island and is known to inhabit the area around Ekalugad Fjord (Qikiqtaaluk Corporation 2001), however population numbers and density are unknown. They are considered secure in Nunavut (Department of Sustainable Development 2001). They have small home ranges that allow them to build up a series of runways and escape routes from predators (Anand-Wheeler 2002). They are a main prey species for carnivores and are important for maintaining predator-prey relationships in this harsh environment. The presence of arctic hare in a region can act as an indicator to the presence of predator species, such as foxes, in the region.

Birds

In the Arctic, the presence of birds is for the most part a seasonal phenomenon. Nunavut contains the northern limits of breeding ranges for numerous species of migratory birds, colonial seabirds, shorebirds and waterfowl. Besides being important for subsistence harvesting, birds are also valuable components of the landscape. There have been no bird surveys conducted at the site, however incidental observations have been documented and are discussed below.

Waterfowl and Seabirds

The east coast of Baffin Island has topography that is steep and rugged that makes suitable nesting colonies for many seabirds. Species include Arctic Terns, Common Eiders, Northern Fulmar, Common Murre, and Black Guillemot. There are two small islands in Home Bay, at the mouth of Ekalugad Fjord, that are the only reported breeding sites for Dovekies in Canada (Alexander et al. 1991), although these islands are several kilometres from the site. Thayer's Gulls have been observed at the site, in addition to Snow Goose droppings (Reimer et al. 1994) suggesting that Ekalugad Fjord may act as a migratory stopover for snow geese migrating to northern Baffin Island.

Raptors

The east coast of Baffin Island offers suitable cliffs for nesting raptors along with seabirds. Seabirds may form an important part of raptors' diet here. The peregrine falcon is classified as "May be at Risk" in Nunavut (Department of Sustainable Development 2001) and is listed as a species of Special Concern by COSEWIC (COSEIWC 2003). The major cause of decline of peregrine falcon populations was the presence of agricultural pesticides in the environment. These compounds cause eggshell thinning, egg breakage, and reduced hatching success, brood-size and breeding success. Current threats include the small population size and the diminishing quality of habitat. Human intrusion and disturbance near nest sites may affect peregrine falcons. The species is protected from hunting in Nunavut, except by native people, who hunt the peregrine only rarely for ceremonial purposes. Nunavut also legally protects the falcon from live possession and trade (Environment Canada 2003). It is likely that peregrine falcons nest sparingly throughout the Baffin Region. However result from previous surveys suggest that peregrine falcon populations on Baffin Island have remained stable or increased over the past century (Mallory et al. 2001).

The gyrfalcon is the largest of all falcons, preying on mammals and birds up to the size of arctic hares and geese. They begin nesting in May and return to the same cliffs for many years, leaving a build-up of white guano that becomes encrusted with orange lichen. Average gyrfalcon densities on southern Baffin Island were one territory per 1,300 km^2 (Bromley and McLean 1986).

Rough-legged Hawks are at the limit of their natural range in south Baffin Island, so large numbers would not be expected near the site (Bromley and McLean 1986).

Other Birds

Other birds that have been recorded in the area include Snow Buntings, Redpolls, and Ptarmigan. These species are likely breeding in the area however exact breeding locations are unknown and may vary annually.

Species at Risk

The federal *Species at Risk Act* (*SARA*) was passed by Parliament on December 12, 2002. As of June 5, 2003, most of the Act has come into force. *SARA* applies to all aquatic species and migratory birds wherever they are found and to all species listed as endangered, threatened or extirpated species on federal lands (which includes territorial lands) by COSEWIC. In addition, *SARA* amends the definition of "environmental assessment" in the *Canadian Environmental Assessment Act* to include any change that the project may cause to a listed species, its critical habitat or the residences of individuals of that species. Subsequently, any project requiring an environmental assessment under federal law that is likely to affect a listed species or its critical habitat needs to identify the adverse effects, and, if the project goes forward, steps must be taken to avoid or lessen those effects and to monitor them.

The polar bear, wolverine and peregrine falcon are three wildlife species that are listed by COSEWIC (2003) as species at risk. The status of these species has been highlighted in the subsections above. Activities at the site are not expected to impact these species at risk or their habitat in any substantial manner.

6.7.2 Terrestrial Animals and Habitat Impact Assessment

6.7.2.1 Study Area Boundaries

Given the wide ranging characteristics of most wildlife species, the spatial boundary for the assessment of the effects of project activities on the terrestrial animals should include the footprint of the FOX-C Intermediate Dew Line Site facilities plus the surrounding area. This boundary may extend to the nearest communities (Clyde River to the north and Qikiqtarjuag to the south) and to the western limits of Baffin Island, depending on the type of wildlife species. The temporal boundary is the detailed site assessment and preliminary waste consolidation fieldwork period.

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 for review by NIRB and other federal departments through the normal CEAA process. Technical boundaries of the terrestrial animals and habitat assessment are the limited time frame associated with the environmental screening.

6.7.2.2 Identification of Issues, Interactions and Potential Effects

Most wildlife species are likely to exhibit some degree of sensitivity to human disturbance and from noise associated with heavy equipment and aircraft during the detailed site investigation and preliminary waste consolidation. This sensitivity varies based on aspects of their behaviour, including the degree to which they adapt and habituate to human disturbance. This disturbance could result in temporary displacement of certain species from preferred habitat; abandonment of nests, dens or breeding areas; destruction of nests or eggs; or stress-related reduction in reproductive success.

Potential interactions with wildlife, such as polar bear, wolves, wolverine and foxes, and the Project exist if proper waste and odour management strategies for the facilities are not developed. These strategies must identify and describe details of design features, operational measures, and employee/contractor staff awareness and training for handling of food, food waste and other wastes throughout the clean up site and specifically for the incinerator, landfill site, kitchens, camps and personnel quarters.

Major threats to polar bears are occurring at the global scale. Bio-accumulation of pollutants and climate change are effecting the overall survival of this species. Data suggest that the Baffin Bay population is being over-harvested; however, better data from Greenland is required to verify this assumption (IUCN 2004). Co-management discussions between Greenland and Canada are to continue to ensure this population remains stable. A strategy for dealing with polar bear interactions at the site should be implemented to ensure that no bears are unnecessarily destroyed as a result of the project.

Accidents, malfunctions and unplanned events such as collisions between wildlife and Project-related vehicles or hazardous material spills may interact with wildlife in a manner that results in the alteration of habitat, changes in wildlife movement patterns and/or the loss of individual animals. It should be noted that the removal of hazardous materials and contaminated soil from the environment reduces the risk of exposure to terrestrial animals. Table 6-10 is an environmental assessment matrix for the terrestrial animals VEC.

Table 6-10: Environmental Effects Assessment Matrix: Terrestrial Animals and Habitat

Project Activity	Potential Positive (P) or Adverse (A) Environmental Effect	Mitigation	Evaluation Criteria for Assessing Environmental Effects				
			Magnitude	Geographic Extent	Duration/Frequency	Reversibility	Ecological/Socio-Cultural and Economic Context
Detailed Site Assessment and Preliminary Waste Consolidation	The movement of humans and vehicles around the site has the potential to disturb wildlife or destroy bird nests or eggs (A).	• Workers will be instructed to avoid encounters with animals. • Vehicle movement will be restricted to existing tracks wherever possible.	1	2	2/1	R	1
General Clean Up Activities	The use of heavy equipment during the clean up has the potential to disturb wildlife (A).	• Remediation activities will commence prior to breeding season. • Known wildlife colonies or bird nesting areas will be avoided, if possible. • Minimum distance/height restrictions for transportation activities will be applied. • An Environmental Protection Plan will be prepared.	1	2	4/1	R	1

KEY:

Magnitude:

1 = Low: *e.g.,* a few individuals. Species and or habitats affected occasionally.

2 = Medium: *e.g.,* a moderate percentage/number of individuals, species and or habitats affected within the LSA for a period of more than one month.

3 = High: *e.g.,* a large percentage/ number of individuals, species and or habitats within LSA affected for a period of more than one month.

4 = Very High *e.g.,* long-term regional effects on wildlife abundance distribution and biodiversity (*e.g.,* impact to an endangered species).

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 = 1-7 months
3 = 8-36 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.

2 = Evidence of adverse effects.

N/A = Not Applicable

6.7.2.3 Mitigation

During detailed site assessment and preliminary waste consolidation, workers will receive wildlife awareness training and will be instructed to avoid wildlife encounters. To reduce disturbance to breeding birds, a small amount of activities will begin prior to the breeding season, with most of the detailed site assessment and preliminary waste consolidation occurring after breeding season. Birds will likely move to different areas to begin breeding.

The Migratory Birds Regulations, Section 6(a), states that: *no person shall*
(a) disturb, destroy or take a nest, egg, nest shelter, eider duck shelter or duck box of a migratory bird…

During the Project activities, efforts will be made to avoid known wildlife colonies and bird nesting areas. Where applicable, minimum distance and height restrictions will be employed for transportation activities. Also, the appropriate wildlife officer will be contacted for guidance to ensure that the disturbance of wildlife is minimised and the *Migratory Birds Regulations* are met.

Caribou protection measures are likely to be attached to land use permits. These measures will likely state that project activities shall be prohibited within all caribou calving areas during calving season or if activities block or cause substantial diversion to caribou migration. Since FOX-C Intermediate DEW Line Site is outside of these areas such measures should not effect the project schedule. Helicopter movement during the Project may disturb caribou present in the area. Helicopter pilots will be instructed to avoid caribou when travelling around the site.

There is the potential for accidental events to adversely affect wildlife and wildlife habitat. To minimize the possibility of an accidental event, including collisions, spills, or fires, an environmental protection plan should be implemented that contains a number of sections that will minimize and mitigate potential effects of such an event on wildlife and wildlife habitat. These include Wildlife Protection Measures and Hazardous Materials and Spill Contingency Procedures.

6.7.2.4 Residual Environmental Effects

Definition of Significance

A significant environmental effect of the project activities on terrestrial animals occurs when the population of a species is sufficiently affected by the Project to cause a decline in abundance and/or change in distribution beyond which natural recruitment (reproduction and immigration from unaffected areas) would not return the population to its former level within several generations.

Residual Environmental Effects Summary

Table 6-11 summarises the residual environmental effects of the project activities on terrestrial animals and habitat. Effects of the Project on terrestrial animals and habitat, for both the detailed site assessment and preliminary waste consolidation activities are assessed as not significant. The removal and disposal of hazardous materials will have a positive effect on terrestrial animals.

Table 6-11: Residual Environmental Effects Summary Matrix: Terrestrial Animals and Habitat			
Phase	**Residual Adverse Environmental Effect Rating**	**Likelihood (of significant adverse environmental effects)**	
		Probability of Occurrence	**Scientific Uncertainty**
Detailed Site Assessment and Preliminary Waste Consolidation	NS		
General Clean Up Activities	NS		

KEY:

Residual Environmental Effects Rating:

S = Significant Adverse Environmental Effect
NS = Not Significant Adverse Environmental Effect
P = Positive Environmental Effect

Probability of Occurrence: based on professional judgement:

1 = Low
2 = Medium
3 = High
n/a = effect not predicted to be significant

Scientific Uncertainty: based on scientific information, and statistical analysis or professional judgement:

1 = low level of confidence
2 = medium level of confidence
3 = high level of confidence
n/a = effect not predicted to be significant

6.7.2.5 Summary of Environmental Effects on Terrestrial Animals and Habitat

During project activities, efforts will be made to avoid known wildlife colonies or bird nesting areas. Where applicable, minimum distance and height restrictions will be employed for transportation activities. All disturbed areas will be re-graded and reshaped to match existing terrain to facilitate recovery of ecosystem components. Prior to demolition, facilities will be inspected for use by wildlife (*i.e.,* nests in structures). Should any active nests be discovered, waste consolidation will be postponed until nesting is complete. Also, the appropriate wildlife officer will be contacted for guidance to ensure that the disturbance of wildlife is minimised.

Wildlife protection measures that include provisions to reduce attractants through proper waste disposal, education and awareness of potential wildlife interactions and hazardous materials and spill contingency procedures will be adhered to. The effects of the detailed site assessment and preliminary waste consolidation on the terrestrial animals and habitat are assessed as not significant.

6.8 Aquatic Animals and Habitat

6.8.1 Existing Environment

Little information exists about fish species near the project site. Fish have been observed in the unnamed freshwater lake adjacent the site but have not been identified (Reimer et al. 1994). The previous environmental screening for the site has identified Arctic Char *(Salvelinus alpinus*) as a species known to inhabit the area (Qikiqtaaluk Corporation 2001). Arctic Char is the most important fish species to the people of Baffin Island. Char are fished during their spring run out of the rivers and during the fall run back into the rivers. Char are usually caught in estuaries as the fish wait there to acclimatise to a change in water salinity.

Approximately 30 marine fish species have been reported from Davis Strait and Baffin Bay. Arctic cod are by far the most abundant and ecologically important. It is the major food source for many species of seabirds and marine mammals, especially the narwhal, beluga and harp seal.

Several species of marine mammals are expected to be in Ekalugad Fjord. Species include walrus, harbour seal, ringed seal, harp seal, hooded seal, beluga whale, narwhal, bowhead whale and killer whale. Ekalugad Fjord has not been identified as a critical area for any species of marine mammals.

6.8.2 Aquatic Animals and Habitat Impact Assessment

6.8.2.1 Study Area Boundaries

The spatial boundary for the assessment of the effects of project activities on the aquatic animals is the freshwater lake adjacent the site and the river flowing into Ekalugad Fjord. The fjord itself is also considered within the spatial boundary for this screening. The temporal boundary is the detailed site assessment and preliminary waste consolidation field-work period.

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 for review by NIRB and other federal departments through the normal CEAA process. Technical boundaries of the aquatic animals and habitat assessment are the lack of site-specific information and limited time frame associated with the environmental screening.

6.8.2.2 Identification of Issues, Interactions and Potential Effects

Water from the freshwater lake drains into Ekalugad Fjord so it will be critical that deleterious substances (pollution and sedimentation) are kept out of the lake. The potential exists for an accidental release of hazardous materials, contaminated soil and/or fuels, which could affect aquatic habitat. Table 6-12 is an environmental assessment matrix for the aquatic animals and habitat VEC.

Table 6-12: Environmental Effects Assessment Matrix: Aquatic Animals and Habitat

Project Activity	Potential Positive (P) or Adverse (A) Environmental Effect	Mitigation	Evaluation Criteria for Assessing Environmental Effects				
			Magnitude	Geographic Extent	Duration/Frequency	Reversibility	Ecological/Socio-Cultural and Economic Context
Detailed Site Assessment and Preliminary Waste Consolidation	Accidental spills of fuel may enter the aquatic environment (A).	• Spill prevention and spill contingency plans will be in effect during the project activities.	1	2	1/1	R	1
Hazardous Materials Removal	The removal of hazardous materials from areas close to waterbodies, reduces the risk of exposure to aquatic animals (P).	• N/A	N/A	N/A	N/A	N/A	N/A
Removal and Transport of Hazardous Material and Fuel	Accidental releases of hazardous materials and/or fuels may enter the aquatic environment (A).	• A spill prevention and contingency plan will be in effect during activities.	2	2	2/1	R	1

KEY:

Magnitude:

1 = Low: <1% loss of critical fish habitat or <1% change in fish population abundance.

2 = Medium: 1-20% loss of critical fish habitat or 1-20% change in fish population abundance.

3 = High: >20% loss of critical fish habitat or >20% change in fish population abundance.

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 = 1-7 months
3 = 8-36 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.

2 = Evidence of adverse effects.

N/A = Not Applicable

6.8.2.3 Mitigation

Spill prevention and contingency plans will mitigate effects of the Project on aquatic animals and habitat during the detailed site assessment and preliminary waste consolidation.

6.8.2.4 Residual Environmental Effects

Definition of Significance

A significant environmental effect of the project activities on aquatic animals occurs if a population or portion thereof is affected in such a way as to cause a decline or change in abundance or distribution of the population over one or more generations. Natural recruitment may not re-establish the population to its original level. A significant effect on aquatic habitat may alter the valued habitat, physically, chemically or biologically, in quality or extent, to such a degree that there is a decline in the diversity of

the habitat. This effect would be reflected by a decline in abundance and/or change in distribution of the benthic community within the area, beyond which natural recruitment would not return that population to its former level within several generations.

Residual Environmental Effects Summary

Table 6-13 summarizes the residual environmental effects of the project activities on aquatic animals and habitat. The implementation of the mitigative measures proposed to protect the aquatic animals and habitat will result in the residual effects being not significant or, in the case of the removal of existing hazardous materials, positive.

Table 6-13: Residual Environmental Effects Summary Matrix: Aquatic Animals and Habitat

Phase	Residual Adverse Environmental Effect Rating	Likelihood (of significant adverse environmental effects)	
		Probability of Occurrence	Scientific Uncertainty
Detailed Site Assessment and Preliminary Waste Consolidation	NS		
Hazardous Materials Removal	P		
Removal and Transport of Hazardous Material and Fuel	NS		
Contractor Support	NS		

KEY:

Residual Environmental Effects Rating:

S =Significant Adverse Environmental Effect
NS =Not Significant Adverse Environmental Effect
P =Positive Environmental Effect

Probability of Occurrence: based on professional judgement:

1 = Low
2 = Medium
3 = High
n/a = effect not predicted to be significant

Scientific Uncertainty: based on scientific information, and statistical analysis or professional judgement:

1 = low level of confidence
2 = medium level of confidence
3 = high level of confidence
n/a = effect not predicted to be significant

6.8.2.5 Summary of Environmental Effects on Aquatic Animals and Habitat

Effects of the Project on aquatic animals and habitat are associated with the potential deposition of eroded material from borrow excavations and water quality affects from landfill leachates and fuel and chemical spills. The implementation of mitigation measures such as berms, silt fences and/or silt booms will prevent deleterious substances from entering the aquatic environment. Spill prevention and contingency plans will mitigate the effects of accidental spills.

6.9 Health and Safety

6.9.1 Existing Environment

SENES Consultants Limited (2003) conducted a human health screening-level risk assessment for the FOX-C site. The assessment, conducted using conservative assumptions that lead to an overestimation of potential exposure, found that although contaminants are present in the soil, none of the contaminants of concern exceed the hazard quotient value (for non-carcinogenic effects) or risk level (for carcinogenic effects) designated for acceptable exposure limits at the site. Physical hazards identified at the site

included the presence of asbestos in the piping and tiles of the buildings, the physical topography of the site, scattered debris, and hazards associated with use of the current dumps on site.

6.9.2 Health and Safety Impact Assessment

6.9.2.1 Study Area Boundaries

The spatial boundary for the assessment of the effects of project activities on health and safety is the FOX-C Intermediate Dew Line Site vicinity (immediate area) and the living quarters of the workers performing the site investigations and remediation. The temporal boundary is the detailed site assessment and preliminary waste consolidation field-work period and the remediation period.

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 for review by NIRB and other federal departments through the normal CEAA process. Technical boundaries of the health and safety assessment are the lack of site-specific information and limited time frame associated with the environmental screening.

6.9.2.2 Identification of Issues, Interactions and Potential Effects

The exposure of potentially hazardous materials during assessment of the landfills, the collection and disposal of potentially hazardous debris, the removal of hazardous materials from facilities, the general handling of hazardous materials, and travel around the site have the potential to impact health and the safety of workers. Ultimately, the removal of contaminated soil and other hazardous materials from the environment reduces the risk of exposure to people. Table 6-14 is an environmental assessment matrix for the Health and Safety VEC.

Table 6-14: Environmental Effects Assessment Matrix: Health and Safety

Project Activity	Potential Positive (P) or Adverse (A) Environmental Effect	Mitigation	Evaluation Criteria for Assessing Environmental Effects				
			Magnitude	Geographic Extent	Duration/Frequency	Reversibility	Ecological/Socio-Cultural and Economic Context
Detailed Site Assessment and Preliminary Waste Consolidation	Investigations and disturbance to existing hazardous waste storage areas has the potential to expose workers to hazardous substances (A).	• Workers will be provided with safety training for the handling of the materials expected to be encountered. • Personel Protective Equipment will be provided to all workers. • A comprehensive health and safety plan will be developed and implemented.	1	N/A	1/1	R	N/A
General Clean Up Activities	The excavation of potentially hazardous materials from the landfills, the collection and disposal of potentially hazardous debris, the removal of hazardous materials from facilities and the general handling of hazardous materials has the potential to impact health and the safety of workers (A).	• Transportation of any hazardous materials will be in accordance with Transportation of Dangerous Goods Regulations. • A comprehensive health and safety plan will be developed and implemented. • Workers will be required to wear and use appropriate personal protective equipment. • Workers will be trained in the use of personal protective equipment and proper handling procedures for hazardous materials.	1	N/A	1/1	R	N/A
Contaminated Soil Disposal/Hazardous Materials Removal	The removal of contaminated soil and other hazardous materials from the environment reduces the risk of exposure to people. (P)	• N/A	N/A	N/A	N/A	N/A	N/A

KEY:

Magnitude:

1 = Low: No more than a few individuals are affected with minor, short-term health problems.

2 = Medium: A small portion of the local community are affected with minor, short-term health problems.

3 = High: An individual is affected with a chronic health problem or a large portion of the local community is affected with minor, short-term health problems.

Geographic Extent:

N/A

Duration:

1 = <1 month
2 = 1-7 months
3 = 8-36 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.

2 = Evidence of adverse effects.

N/A = Not Applicable

6.9.2.3 Mitigation

The transportation of any hazardous materials will be in accordance with the Transportation of Dangerous Goods Regulations. A comprehensive health and safety plan will be developed and implemented with requirements for workers to wear and use appropriate personal protective equipment. Workers will also be trained in the use of personal protective equipment and proper handling procedures for hazardous materials.

6.9.2.4 Residual Environmental Effects

Definition of Significance

A significant environmental effect of the project activities on health and safety occurs if an individual is injured on site and requires medical evacuation, or is killed, or develops a chronic health problem as a result of working on the Project.

Residual Environmental Effects Summary

Table 6-15 summarizes the residual environmental effects of the project activities on health and safety.

Table 6-15: Residual Environmental Effects Summary Matrix: Health and Safety

Phase	Residual Adverse Environmental Effect Rating	Likelihood (of significant adverse environmental effects)	
		Probability of Occurrence	Scientific Uncertainty
Detailed Site Assessment and Preliminary Waste Consolidation	NS		
General Clean Up Activities	NS		
Contaminated Soil Disposal/Hazardous Materials Removal	P		

KEY:

Residual Environmental Effects Rating:

S =Significant Adverse Environmental Effect
NS =Not Significant Adverse Environmental Effect
P =Positive Environmental Effect

Probability of Occurrence: based on professional judgement:

1 = Low
2 = Medium
3 = High
n/a = effect not predicted to be significant

Scientific Uncertainty: based on scientific information, and statistical analysis or professional judgement:

1 = low level of confidence
2 = medium level of confidence
3 = high level of confidence
n/a = effect not predicted to be significant

6.9.2.5 Summary of Environmental Effects on Health and Safety

The collection and disposal of potentially hazardous debris, the removal of hazardous materials from facilities and the general handling of hazardous materials has the potential to affect the health and the safety of workers. To help mitigate this risk, the transportation of any hazardous materials will be in accordance with Transportation of Dangerous Goods Regulations. Additionally, a comprehensive health and safety plant will be developed and implemented, which will require workers to wear and use appropriate personal protective equipment. Workers will also be trained in the use of personal protective equipment and proper handling procedures for hazardous materials. The effects of the detailed site assessment and preliminary waste consolidation are assessed as not significant.

6.10 Archaeological and Heritage Resources

6.10.1 Existing Environment

Information on the archaeological and heritage resources of the FOX-C Intermediate Dew Line Site has not been examined. The recent history of the site is as a DEW Line facility.

6.10.2 Archaeological and Heritage Resources Impact Assessment

6.10.2.1 Study Area Boundaries

The spatial boundary for the assessment of the effects of project activities on archaeology and heritage resources is the facility and access route footprint. The temporal boundary is the detailed site assessment and preliminary waste consolidation field-work period.

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 for review by NIRB and other federal departments through the normal CEAA process. Technical boundaries of archaeological and heritage resources assessment are the lack of site-specific information and limited time frame associated with the environmental screening.

6.10.2.2 Identification of Issues, Interactions and Potential Effects

The presence and movement of people around the site has the potential to disturb the archaeological resources identified around the site. Table 6-16 is an environmental assessment matrix for the archaeology and heritage resources VEC.

Table 6-16: Environmental Effects Assessment Matrix: Archaeology and Heritage Resources								
Project Activity	**Potential Positive (P) or Adverse (A) Environmental Effect**	**Mitigation**	**Evaluation Criteria for Assessing Environmental Effects**					
			Magnitude	**Geographic Extent**	**Duration/Frequency**	**Reversibility**	**Ecological/Socio-Cultural and Economic Context**
Detailed Site Assessment and Preliminary Waste Consolidation	Any excavations associated with activities may disturb heritage resources present (A).	• Known archaeological and heritage resource sites will be marked prior to assessment and consolidation activities. • Authorities will be contacted if new artifacts or a site are discovered and work will be stopped until the site can be assessed.	1	1	1/1	I	N/A

KEY:

Magnitude:

1 = Low: *e.g.,* loss of a minor proportion of data at site, local or regional level; after low impact, interpretative capacity of the remains is virtually intact, limited only by loss of minor items and/or features.

2 = Medium: *e.g.,* a proportion of the data at the site, local or regional level is lost but a significant proportion remains unimpaired; after medium impact, the interpretative capacity of the remains is hindered by loss of basic data about cultural descriptions and lifestyles.

3 = High: *e.g.,* a significant proportion of data at the site, local or regional level is lost; interpretative capacity of the remains following impact is minimal.

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 = 1-7 months
3 = 8-36 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.

2 = Evidence of adverse effects.

N/A = Not Applicable

6.10.2.3 Mitigation

No archaeological sites have been identified in the study area. If, during the course of the detailed site assessment and preliminary waste consolidation archaeological resources are discovered, the relevant authorities will be contacted.

6.10.2.4 Residual Environmental Effects

Definition of Significance

A significant environmental effect of the project activities on archaeology and heritage resources would involve the destruction or disturbance of all or part of an archaeological, historic or palaeontological site considered to be of local, regional territorial, national, or international value. This effect, if not controlled through mitigative investigation and documentation would result in the permanent loss of part of the non-renewable heritage resource base.

Residual Environmental Effects Summary

Table 6-17 summarizes the residual environmental effects of the project activities on archaeology and heritage resources. Residual effects are assessed as not significant or positive for the detailed site assessment and preliminary waste consolidation, and the remediation activities.

Table 6-17: Residual Environmental Effects Summary Matrix: Archaeology and Heritage Resources

Phase	Residual Adverse Environmental Effect Rating	Likelihood (of significant adverse environmental effects)	
		Probability of Occurrence	Scientific Uncertainty
Detailed Site Assessment and Preliminary Waste Consolidation	NS/P		

KEY:

Residual Environmental Effects Rating:

S =Significant Adverse Environmental Effect
NS =Not Significant Adverse Environmental Effect
P =Positive Environmental Effect

Probability of Occurrence: based on professional judgement:

1 = Low
2 = Medium
3 = High
n/a = effect not predicted to be significant

Scientific Uncertainty: based on scientific information, and statistical analysis or professional judgement:

1 = low level of confidence
2 = medium level of confidence
3 = high level of confidence
n/a = effect not predicted to be significant

6.10.2.5 Summary of Environmental Effects on Archaeology and Heritage Resources

The presence and movement of people around the site has the potential to disturb any archaeological or heritage resources that may be present. In the event that a new resource is discovered, the relevant authorities will be contacted. The effects of the Project on archaeology and heritage resources are assessed as not significant.

6.11 Land Use

6.11.1 Existing Environment

The FOX-C Intermediate Dew Line Site facilities have been in place since 1957. The site was used as an intermediate DEW line site until 1963. Assessments were completed for the site in 1985 and 1994. A hunting and fishing camp was located at the mouth of the river that leads from the freshwater lake. All that remains of the camp is wood and metal debris. It is unknown when the camp was occupied and for how long it was used. Residents of Clyde River indicated in a community meeting held for the purposes of announcing this Project in May 2004 that the site is part of a traditional hunting area.

6.11.2 Land Use Impact Assessment

6.11.2.1 Study Area Boundaries

The spatial boundary for the assessment of the effects of project activities on land use is the Ekalugad Fjord and adjacent land areas. The temporal boundary is the detailed site assessment and preliminary waste consolidation field-work period.

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 for review by NIRB and other federal departments through the normal CEAA process. No technical boundaries have been recognized for the assessment of the project on land use.

6.11.2.2 Identification of Issues, Interactions and Potential Effects

Detailed site assessment and preliminary waste consolidation may disturb traditional land use such as hunting and fishing activities that potentially occur during the summer months. Table 6-18 is an environmental assessment matrix for the land use VEC.

Table 6-18: Environmental Effects Assessment Matrix: Land Use

Project Activity	Potential Positive (P) or Adverse (A) Environmental Effect	Mitigation	Evaluation Criteria for Assessing Environmental Effects				
			Magnitude	Geographic Extent	Duration/Frequency	Reversibility	Ecological/Socio-Cultural and Economic Context
Detailed Site Assessment and Preliminary Waste Consolidation	Clean up activities may disturb traditional land use such as hunting and fishing activities that occur during the summer months (A).	• The local hunter and trapper organization will be notified of the scheduling of clean-up activities.	1	2	2/1	R	N/A
General Clean Up Activities	Clean up activities may disturb traditional land use such as hunting and fishing activities that occur during the summer months (A).	• The local hunter and trapper organization will be notified of the scheduling of clean-up activities.	1	2	3/1	R	N/A

KEY:

Magnitude:

1 = Low: *e.g.,* a few land or water use activities precluded.

2 = Medium: *e.g.,* a moderate number of land or water uses precluded.

3 = High: *e.g.,* a large number of land or water uses precluded.

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 = 1-7 months
3 = 8-36 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.

2 = Evidence of adverse effects.

N/A = Not Applicable

6.11.2.3 Mitigation

In order to minimize impacts to traditional land use such as hunting and trapping activities, local hunter and trapper organizations will be identified and notified of the scheduling of site investigation and preliminary waste consolidation activities.

6.11.2.4 Residual Environmental Effects

Definition of Significance

A significant environmental effect of the project activities on land use occurs if traditional land use activities are not permitted to occur.

Residual Environmental Effects Summary

Table 6-19 summarizes the residual environmental effects of the project activities on land use. The effect of detailed site assessment and preliminary waste consolidation are assessed as being not significant.

Table 6-19: Residual Environmental Effects Summary Matrix: Land Use

Phase	Residual Adverse Environmental Effect Rating	Likelihood (of significant adverse environmental effects)	
		Probability of Occurrence	Scientific Uncertainty
Detailed Site Assessment and Preliminary Waste Consolidation	NS		
General Clean Up Activities	NS		

KEY:

Residual Environmental Effects Rating:

S =Significant Adverse Environmental Effect
NS =Not Significant Adverse Environmental Effect
P =Positive Environmental Effect

Probability of Occurrence: based on professional judgement:

1 = Low
2 = Medium
3 = High
n/a = effect not predicted to be significant

Scientific Uncertainty: based on scientific information, and statistical analysis or professional judgement:

1 = low level of confidence
2 = medium level of confidence
3 = high level of confidence
n/a = effect not predicted to be significant

6.11.2.5 Summary of Environmental Effects on Land Use

Clean up activities may disturb traditional land use such as hunting and fishing activities that occur during the summer months. In order to minimize these effects, local hunter and trapper organizations will be notified of the scheduling of clean-up activities. The effects of the Project on land use are assessed as not significant.

6.12 Aesthetics

6.12.1 Existing Environment

The FOX-C Intermediate DEW Line site is located on arctic tundra. The facilities interrupt a natural arctic landscape view with one of a former military operation.

6.12.2 Aesthetic Impact Assessment

6.12.2.1 Study Area Boundaries

The spatial boundary for the assessment of the effects of project activities on aesthetics is the FOX-C Intermediate Dew Line Site facility. The temporal boundary is the detailed site assessment and preliminary waste consolidation field-work period and the remediation period.

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 for review by NIRB and other federal departments through the normal CEAA process. No technical boundaries have been recognized for the assessment of the project on aesthetics.

6.12.2.2 Identification of Issues, Interactions and Potential Effects

Ultimately, the clean up activities will improve the aesthetics of the site by removing unsightly debris and restoring the site to a more natural state. However, the detailed site assessment and preliminary waste consolidation is not expected to have any interaction with the aesthetics of the area. Table 6-20 is an environmental assessment matrix for the aesthetics VEC.

Table 6-20: Environmental Effects Assessment Matrix: Aesthetics

Project Activity	Potential Positive (P) or Adverse (A) Environmental Effect	Mitigation	Evaluation Criteria for Assessing Environmental Effects				
			Magnitude	Geographic Extent	Duration/Frequency	Reversibility	Ecological/Socio-Cultural and Economic Context
Detailed Site Assessment and Preliminary Waste Consolidation	No interaction expected	• N/A					

Table 6-20: Environmental Effects Assessment Matrix: Aesthetics

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

KEY:

Magnitude:

1 = Low: *e.g.,* MEPA water quality standards met and/or little drawdown of the UER aquifer.

2 = Medium: *e.g.,* MEPA water quality guidelines met and/or moderate drawndown of the UER aquifer.

3 = High: *e.g.,* MEPA water quality guidelines not met and/or significant drawndown of the UER aquifer.

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 = 1-7 months
3 = 8-36 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.

2 = Evidence of adverse effects.

N/A = Not Applicable

6.12.2.3 Mitigation

No mitigation is required since there are no project-aesthetic interactions identified.

6.12.2.4 Residual Environmental Effects

Definition of Significance

A definition of significance for residual effects on aesthetics is not required since no interactions have been identified.

Residual Environmental Effects Summary

Table 6-21 summarizes the residual environmental effects of the project activities on aesthetics.

Table 6-21: Residual Environmental Effects Summary Matrix: Aesthetics			
Phase	**Residual Adverse Environmental Effect Rating**	**Likelihood (of significant adverse environmental effects)**	
		Probability of Occurrence	**Scientific Uncertainty**
Detailed Site Assessment and Preliminary Waste Consolidation	No interaction		

KEY:

Residual Environmental Effects Rating:

S = Significant Adverse Environmental Effect
NS = Not Significant Adverse Environmental Effect
P = Positive Environmental Effect

Probability of Occurrence: based on professional judgement:

1 = Low
2 = Medium
3 = High
n/a = effect not predicted to be significant

Scientific Uncertainty: based on scientific information, and statistical analysis or professional judgement:

1 = low level of confidence
2 = medium level of confidence
3 = high level of confidence
n/a = effect not predicted to be significant

6.12.2.5 Summary of Environmental Effects on Land Use

The detailed site assessment and preliminary waste consolidation activities are not expected to interact with the aesthetic environment.

6.13 Socio-Economics

6.13.1 Existing Environment

FOX-C, located on the central Baffin Island, is in the Qikiqtaaluk region of Nunavut. The closest communities include Clyde River (195 km north) and Qikiqtarjuaq (235 km south). Population of the communities, according to the 2001 census was 785 in Clyde River and 519 in Qikiqtarjuaq. The economy of the region is based on hunting and fishing and on the tourist industry.

6.13.2 Socio-Economic Impact Assessment

6.13.2.1 Study Area Boundaries

The spatial boundary for the assessment of the effects of project activities on socio-economics is Nunavut, as labour and equipment may be required from Iqaluit, Clyde River and/or Qikiqtarjuaq. The temporal boundary is the detailed site assessment and preliminary waste consolidation field-work period.

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 for review by NIRB and other federal departments through the normal CEAA process. No technical boundaries have been recognized for the assessment of the project on socio-economics.

6.13.2.2 Identification of Issues, Interactions and Potential Effects

The Department of National Defence (DND) and Nunavut Tunngavik Incorporated (NTI) have signed a *DND/NTI Agreement for the Clean Up and Restoration of the DEW Line Sites within the Nunavut Settlement Area* outlining the economic provisions. The agreement includes a Minimum Inuit Content (MIC) for the clean up contract and requirements for training, specifically related to the clean up activities. Generally, the contracts for the clean up of DEW Line sites include clauses requiring the contractor to maximize Inuit Involvement. Inuit involvement in the detailed site assessment and preliminary waste consolidation activities will include both employment and business (contracting) opportunities, and local purchases.

Table 6-22 is an environmental assessment matrix for the socio-economic VEC.

Table 6-22: Environmental Effects Assessment Matrix: Socio-Economics

Project Activity	Potential Positive (P) or Adverse (A) Environmental Effect	Mitigation	Evaluation Criteria for Assessing Environmental Effects				
			Magnitude	Geographic Extent	Duration/Frequency	Reversibility	Ecological/Socio-Cultural and Economic Context
Detailed Site Assessment and Preliminary Waste Consolidation	Nunavut residents will have employment opportunities during the field work (P).	• N/A					

KEY:

Magnitude:

1 = Low: *e.g.,* Few individuals affected.

2 = Medium: *e.g.,* A moderate number of individuals affected.

3 = High: *e.g.,* A large number of individuals affected.

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 = 1-7 months
3 = 8-36 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.

2 = Evidence of adverse effects.

N/A = Not Applicable

6.13.2.3 Mitigation

During any remediation project, whenever possible, DIAND strives to support and enhance the development of healthy, sustainable communities by leveraging local skills and knowledge into their approach to addressing environmental issues associated with contaminated sites. By these means core competencies are maximized and deployed. Whenever possible, the project will also adopt solutions tailored to the northern environment and its inhabitants. This includes leveraging local knowledge and the incorporation of provisions accounting for the unique needs of northerners and the needs of the environment in which they live into the development and implementation of policies and procedures. For the site assessment and preliminary waste consolidation field-work, it will be requested that at least six Inuit labourers be hired by the general contractor supplying the camp, equipment and support services for the site activities in 2004.

The benefit of initiating waste consolidation in 2004 relates primarily to the effect it will have on the surrounding communities. The specific benefits of this task include:

- the generation of local employment opportunities for Inuit;
- allowing Inuit labourers to job-shadow during the assessment activities and provide them with a better understanding of assessment activities; and
- allowing the local communities to take an active role in cleaning up the site which will facilitate cooperation between DIAND and the community groups.

6.13.2.4 Residual Environmental Effects

Definition of Significance

A definition of significance for residual effects on socio-economics is not required since effects are positive.

Residual Environmental Effects Summary

Table 6-23 summarizes the residual environmental effects of the project activities on socio-economics.

Table 6-23: Residual Environmental Effects Summary Matrix: Socio-Economics			
Phase	**Residual Adverse Environmental Effect Rating**	**Likelihood (of significant adverse environmental effects)**	
		Probability of Occurrence	**Scientific Uncertainty**
Detailed Site Assessment and Preliminary Waste Consolidation	P		

KEY:

Residual Environmental Effects Rating:

S =Significant Adverse Environmental Effect
NS =Not Significant Adverse Environmental Effect
P =Positive Environmental Effect

Probability of Occurrence: based on professional judgement:

1 = Low
2 = Medium
3 = High
n/a = effect not predicted to be significant

Scientific Uncertainty: based on scientific information, and statistical analysis or professional judgement:

1 = low level of confidence
2 = medium level of confidence
3 = high level of confidence
n/a = effect not predicted to be significant

6.13.2.5 Summary of Environmental Effects on Socio-Economics

The contractor will be required to have a minimum Inuit content in the workforce for the detailed site assessment and preliminary waste consolidation work. This will provide employment benefits, training and related economic benefits.

6.14 Impact of the Environment on the Project

The implementation of a clean up project in an Arctic environment has unique logistical issues. Equipment and personnel must either be flown in or shipped in during the ice-free season. The potential exists for delays in the clean up associated with bad weather. These delays may include work stoppage on-site or delays in the transportation to and from the site of personnel and supplies. Conditions related to the Arctic climate, such as ice and frozen ground may also delay clean up activities. Ice may delay marine transport to and from the site. Clean up activities which are best completed at maximum thaw may be delayed depending on seasonal climate changes.

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