

CAM-F at Sarcpa Lake 2005 Annual Water Report

Appendix 3

English and Inuktitut executive summaries for the report “Screening and Proposed Site Remediation at the Former CAM-F DEW Line Site at Sarcpa Lake, Nunavut”, Jacques Whitford March 31, 2005

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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 CAM-F Intermediate DEW Line Site on Melville Peninsula. Various stages of clean up of the site have been ongoing since 1985. The first phase of PWGSC's clean up and remediation consisted of a detailed site assessment and preliminary consideration of existing wastes at the site. The second phase involves the remediation of the site. As required under the *Nunavut Land Claim Agreement (NLCA)* and the *Canadian Environmental Assessment Act (CEAA)*, the remediation activities proposed for CAM-F must undergo an environmental screening.

The remediation program at CAM-F is proposed to commence with mobilization in fall 2005 with completion of remediation in 2007 and demobilization continuing into 2008. Activities will consist of contaminated soil excavation/remediation, dump-area remediation, collection and disposal of hazardous and non-hazardous debris and demolition and disposal of site facilities.

The remediation activities at CAM-F 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 clean up and return sites to as close to natural conditions as is possible. Specifically, the remediation will mitigate and/or control the release of contaminants into the environment. 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 clean up of the site.



CAM-F at Sarcpa Lake 2005 Annual Water Report

Appendix 4

English and Inuktitut executive summaries for the report “ Human Health and Ecological Risk Assessment for CAM-F Dew Line Site, Sarcpa Lake” Jacques Whitford, February 4, 2005

[illegible]

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EXECUTIVE SUMMARY

Jacques Whitford Limited (Jacques Whitford) performed a human health and ecological risk assessment (HHERA) on the CAM-F (Sarcpa Lake) Distant Early Warning (DEW) Line Site located at 68°33' N, 83°19' W on the Melville Peninsula between Foxe Basin and Committee Bay, Nunavut. The primary objective of this study was to evaluate whether known concentrations of chemicals in surface soil and water at the site would present a significant risk to human or ecological health based on future use of the property in its current condition and after remediation.

Study Background

The current study undertook a preliminary quantitative human and ecological risk assessment of the CAM-F site. It is supported by new contaminant data for the site, based on a Phase III Environmental Site Assessment (Earth Tech 2004) which included analysis for hydrocarbons, PAHs, PCBs, and inorganic substances in soils, as well as a limited number of analyses of ground water, lake and river sediments, lake water and fish. A restricted number of background soil samples were also collected. The ERA considered a broad range of ecological receptors and incorporated the new data, while retaining the previously collected data for CAM-F. The HHERA evaluates both Phase II and the newly generated Phase III data supplied and described by Earth Tech (2004).

Data Compilation

The soil and water sample data from the Phase II and Phase III sampling programs were screened for use in this risk assessment. For the purposes of the risk assessment for both human and ecological receptors, only soil samples that accurately reflect concentrations in the upper 10 to 30 cm from ground surface are relevant to potential exposures.

The Phase II and Phase III data were screened on the basis of depth and any sample that did not intersect the surface and/or extended to a depth of greater than 0.3 m below ground surface (mbgs) was excluded. This was done to ensure that the data used were representative of surface soil and not heavily influenced by subsurface soil characteristics.

Screening of Chemicals of Potential Concern (CoPCs)

CoPCs included for consideration were the chemicals identified by Earth Tech in their Phase III Reports as exceeding generic CCME soil quality guidelines (CCME 1999). Generic CCME guidelines may be based on either ecological or human health protection and provide a protective initial screening of the site data. For the human health risk assessment (HHRA), these chemicals were screened specifically against human health based generic guidelines and for the ecological risk assessment (ERA), they were screened specifically against ecologically based generic guidelines. In order of preference, these guidelines are taken from CCME (CCME 1999), Ontario Ministry of the



Environment (OMOE 1996a), or the United States Environmental Protection Agency (US EPA).

Based on the human health based criteria screening, the chemicals carried forward to the HHRA were antimony, barium, beryllium, cadmium, copper, lead, tin, total polychlorinated biphenyls (PCBs) and total petroleum hydrocarbons (TPH) F2, F3 and F4 fractions.

The chemicals carried forward in the ERA included antimony, barium, beryllium, boron, cadmium, chromium, copper, lead, tin, zinc, total PCBs, benzene, toluene, ethylbenzene, xylene (BTEX) and TPH F1, F2, F3 and F4 fractions.

Exposure Scenarios

The study area was defined as the area including and surrounding the investigated areas at CAM-F. The site consisted of a Main Station Area, two Dump Sites and a former Construction Camp.

Infrastructure at the site included a module building train; warehouse and garage; Inuit house (dormitory); petroleum, oil, lubricant (POL) pumphouse; quonset hut; collapsed communications antenna; POL tanks; drum storage pads, sewage outfall; vehicle pile, generator site, former construction camp, shop site and two dump sites.

Due to the northern location of the CAM-F and the probable use of the site by Inuit for traditional purposes, the conventional land use categories (residential, parkland, commercial, and industrial) were expanded to incorporate the

Traditional Inuit Land Use. The parameters of this land use are discussed in detail in Gartner Lee and Cantox (1998), and were developed after consultation with residents of the Eastern Arctic, the Quikitaalik Corporation and DIAND.

The current assessment adopted the Traditional Land Use for the CAM-F site, as set out by Gartner Lee and Cantox (1998). The Traditional Land Use designation consists of Inuit families residing on the land, in tents for periods up to 3 months. It was assumed that during this period the Inuit engaged in traditional hunting, fishing and gathering activities. It was also assumed that all time spent on site was in the non-snow covered months, which resulted in the most extensive exposure scenario for the human receptors. Detailed exposure values are discussed in Section 4.3, and in the Gartner Lee and Cantox report (1998).

Based on this land use, the following conceptual models were developed:

Human Health

The conceptual model that forms the basis for the derivation of the human health soil quality site-specific target levels was as follows:

Traditional Site Use Scenario:

- A toddler aged six months to four years is exposed to surface soil contaminated with non-carcinogenic antimony, barium, beryllium, cadmium, copper, lead, tin, total PCBs and TPH F2, F3 and F4 fractions by inadvertent ingestion / dermal contact / dust inhalation, ingestion of wild game (caribou



and arctic hare) and lake trout, and by ingestion and dermal contact with surface water.

- A person visits the site yearly from birth to 75 years of age and is exposed to carcinogenic beryllium and cadmium by inadvertent dust inhalation and total PCBs by inadvertent ingestion / dermal contact / dust inhalation, ingestion of wild game (caribou and arctic hare) and lake trout, and by ingestion and dermal contact with surface water, throughout their lifetime.

Ecological Health

The risks of exposure to contaminated soils were the focus of the ecological risk assessment (ERA). The potential exposure media for intake of metals included direct ingestion of soils, as well as metal uptake from eating terrestrial plant material, drinking water, ingesting terrestrial invertebrates, and terrestrial mammals. The major exposure pathway considered was ingestion. Inhalation and dermal absorption were also possible exposure pathways, but these were considered to be relatively minor by comparison to ingestion, and were not included as direct pathways in the ERA. Soil that adheres to fur or feathers is, for the most part, ingested by preening/licking activity and was included in the estimate of direct soil ingestion.

The receptors selected in the ERA were the Ermine, Arctic Hare, Ptarmigan, Lemming, Snowy Owl, Arctic Fox, and Caribou. These receptors are considered to be representative of indigenous wildlife at the CAM-F site. Other valued ecosystem components (VECs) were considered for the sites (discussed in

Section 5.2.4) but these receptors were chosen to be protective of all VECs potentially on site.

Risk Characterization

The above-noted exposure scenarios were evaluated to identify the potential for adverse effects to human or ecological receptors, with the following outcomes:

- Maximum concentrations of lead, TPH F2 and F4 Fractions resulted in a HQ greater than 0.2 and the maximum total PCB concentration resulted in an Incremental Excess Lifetime Cancer Risk (IELCR) greater than 1×10^{-5} , indicating that exposure to the site could result in potential to produce adverse effects in human receptors under the exposure scenarios included in the risk assessment.
- Surface soil exposure point concentrations (EPCs) of the identified chemicals are not anticipated to produce adverse effects in ecological receptors under the exposure scenarios included in the risk assessment.

Site specific target levels (SSTLs) were calculated for each of the chemicals identified as a potential risk in the HHRA. The SSTLs were calculated by setting the HQ at 0.2 and the IELCR at 1×10^{-5} , and determining the corresponding surface soil EPC for that target value, using a backward calculation.



Remediation

Specific localized areas have been identified as "hot spots" where concentrations of selected CoPCs were elevated. Even though, these areas do not pose a significant human or ecological risk, they were selected to be removed for aesthetic reasons as well as to remove any remaining and obvious soil stained/contaminated areas. These areas will be excavated and removed from contact of all receptors. The consequential removal of these selected areas resulted in drops of EPCs for human health of 14% (antimony), 52% (barium), 20% (beryllium), 86% (cadmium), 93% (copper), 19% (lead), 87% (tin), 95% (total polychlorinated biphenyls (PCBs)), 94% (total petroleum hydrocarbon (TPH) F2 fraction) and 40% (TPH F4 fraction). The EPC for human health represents a drop in the maximum concentrations found on site. This resulted in a subsequent drop in the calculated total hazard quotients associated with the site of 36% (barium), 16% (beryllium), 69% (cadmium), 39% (copper), 78% (lead), 2% (tin), 48% (PCBs), 94% (TPH F2 fraction) and 64% (TPH F4 fraction).

