ANNEX F
DOCUMENT SEGMENT: ENVIRONMENTAL CLEAN-UP STUDY OF 21 DEW LINE SITES IN CANADA VOL. 9 PIN-2 CAPE YOUNG

ENVIRONMENTAL CLEAN-UP STUDY OF 21 DEW LINE SITES IN CANADA

FINAL REPORT
June 1991

VOLUME 9
PIN-2
CAPE YOUNG, NWT

UMA Engineering Ltd.
Engineers, Planners & Surveyors

In association with

Hardy BBT Limited
CONSULTING ENGINEERING & ENVIRONMENTAL SERVICES

Jacques Whitford Group

ENVIRONMENTAL CLEAN-UP STUDY

OF

21 DEW LINE SITES IN CANADA

VOLUME 9

PIN-2 CAPE YOUNG, NWT.

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USAF File: F44650-90-C-0016
CCC File: 070C74-90-R-0015
UMA File: 6648-001-00-0671-3.6

1.0 INTRODUCTION

1.1 BACKGROUND AND OBJECTIVES

UMA Engineering Limited (UMA) in association with Hardy BBT Ltd. (HBT) and Jacques Whitford and Associates Limited (JWA) was commissioned in the spring of 1990 by the Canadian Commercial Corporation (CCC) on behalf of the United States Air Force (USAF) to carry out an environmental clean-up study of 21 Distant Early Warning (DEW) Station Sites in Canada.

The overall purpose of this study is to identify and investigate areas of the 21 DEW Station Sites as they have been affected by past waste disposal and spills. In addition, the objective of the study is to determine and evaluate decommissioning alternatives for waste disposal and spill areas, and facility demolition debris (including associated hazardous or toxic materials). Details of the overall study objectives are provided in Volume 2 (Section 1.3)

The study consisted of four phases generally following the *National Guidelines for Decommissioning Industrial Sites* (Monenco, 1989). These include:

(1) Phase I - a literature review of baseline environmental conditions and existing data on waste materials, spills and facilities at each site.
(2) Phase II/III - a combined field reconnaissance, field sample collection, and sample analysis for each site.
(3) Phase IV - an evaluation of the environmental impacts including a baseline risk assessment for each station and the identification of decommissioning options. A detailed decommissioning plan was not developed.

Details of these phases are provided in Volume 2 (Section 1.3). The final report for this study is provided in 24 volumes as follows:

(1) Volume 1 - Executive Summary.
(2) Volume 2 - General Information.
(3) Volumes 3-23 - Specific DEW Line Station Reports.
(4) Volume 24 - Quality Assurance and Quality Control.

This Volume (Volume 9) is a specific DEW Station report that presents all four phases pertaining to PIN-2), Cape Young. An overview of the site based on a review of existing literature is presented in Section 2.0. Section 3.0 provides a description of the biophysical environment, including heritage resources and land use. Section 4.0 describes the site infrastructure. Sections 5.0 and 6.0 present the observations and results of the onsite investigation. In Section 5.0, the asbestos, paint and PCB findings are detailed. Section 6.0 summarizes the soil and water sampling program for each of the facilities and features investigated. Facility decommissioning and clean-up alternatives are provided in Section 7.0. In Section 8.0, the costs of decommissioning are summarized. References cited are listed in Volume 2.

1.2 FIELDWORK AND SAMPLING

Field work at PIN-2 took place between July 16, 1990 and July 20, 1990. A brief reconnaissance was completed initially. This was followed by sampling in selected areas.

Data showing the number of soil, water, paint, asbestos, and transformer cooling oil samples taken at PIN-2 are provided in Table 1.1. Sample site descriptions are presented in Appendix B.

Table 1.1

PIN-2, CAPE YOUNG: NUMBER OF SAMPLES TAKEN AND NUMBER OF SAMPLES ANALYZED

Sample Type	Samples Taken*	Samples Analyzed*		Samples Not* Analyzed
		First Round	Second Round	
Soil	43	35	8	0
Water	6	6	0	0
Paint	5	5	0	0
Asbestos	5	5	0	0
Transformer Oil	1	1	0	0

* Does not include duplicates or replicates.

The general approach to field survey and laboratory analysis are described in Volume 2, Section 3.2. Quality assurance and quality control measures are described in Volume 24.

1.3 DATA ASSESSMENT CRITERIA

An assessment of the indicator chemicals was made using the Contaminated Sites Rehabilitation Policy from the Province of Quebec (Quebec Soil Guidelines) (1988) and the Guidelines for Canadian Drinking Water Quality (1987). The Quebec guidelines recommend three levels, A, B and C, for the evaluation of the degree of contamination.

Level A represents background for metals which occur naturally in the environment. For organic chemicals, Level A is the analytical detection limit. The implications of Level A are that minimal environmental impact has occurred and land use should generally be unrestricted. In this study, if the concentration of metals was greater than 50 percent of the Level A guideline, or if organic compounds were detected, the results were used in the baseline risk assessment.

Level B is defined as a point at which thorough investigation of the source and extent of contamination is warranted. The implications of Level B are that contaminants are present above background levels and that land use restrictions or mitigation may be required. For the DEW line stations, concentrations exceeding Level B were identified as potential areas requiring remediation and/or further evaluation where:

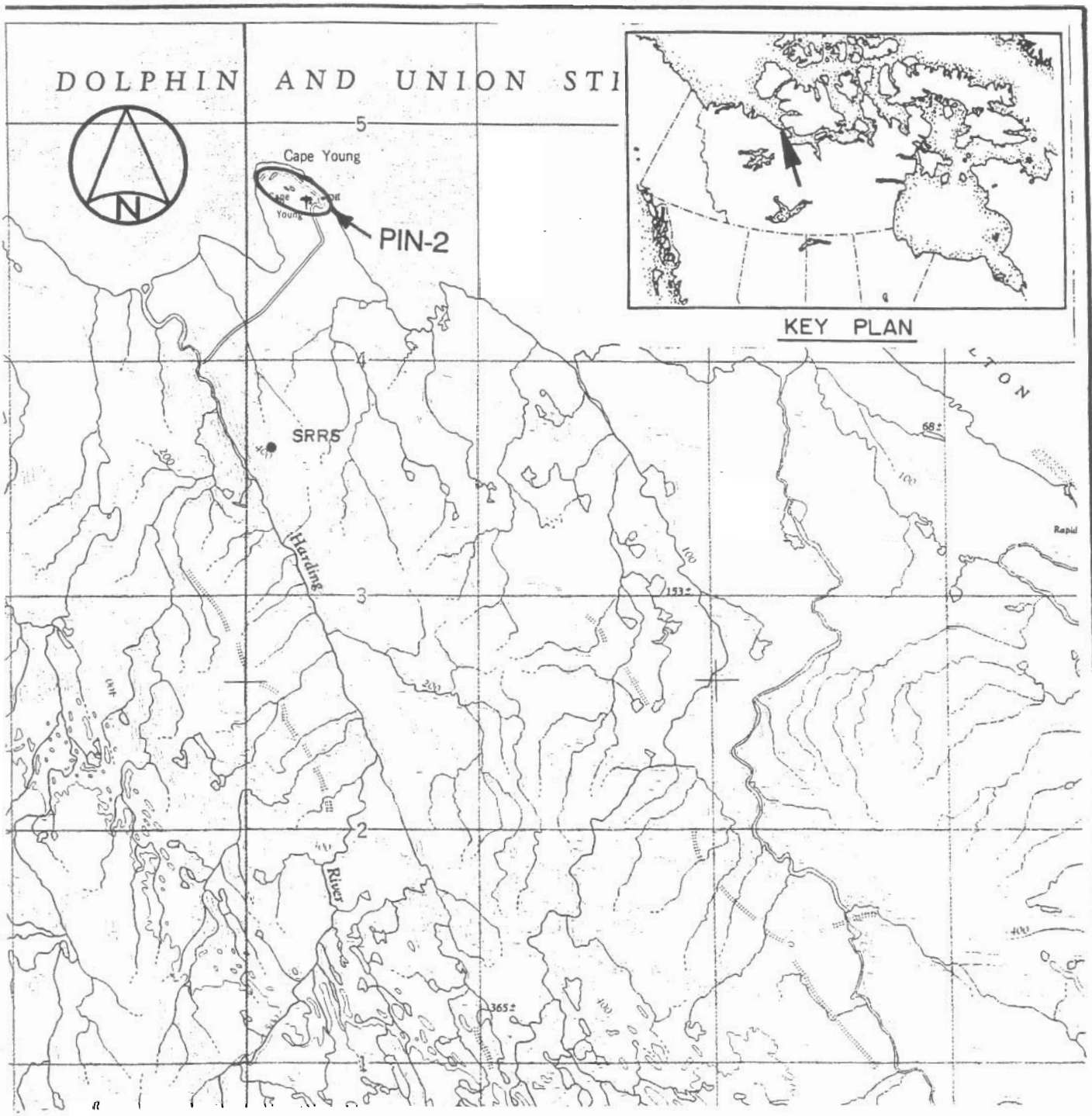
- the areal extent was expected to be large
- the compound had a significant impact on the risk assessment
- a point source was not readily definable, or;
- a sample was obtained from a location downgradient of an area which may contain higher concentrations.

Level C constitutes a significant environmental impact as health and safety risks may be present and where prompt remedial action may be required. The DEW Line sites were evaluated as industrial sites; therefore, Level C would be the threshold concentration at which remediation would be required.

The evaluation of chemical constituents in water samples was based on the Maximum Allowable

Concentrations (MAC) indicated in the Guidelines for Canadian Drinking Water Quality (1987). Where the allowable concentration was expressed as a range, the most stringent value was applied.

The rationale of this evaluation method was given in Section 3.2.3.1 of Volume 2.



STATION DATA

LATITUDE: 68° 56' 10" N
LONGITUDE: 116° 55' 52 W
ELEVATION: 18 m
MEAN RAINFALL: 94 mm
MEAN SNOWFALL: 68 cm
ACCESS: AIR - CHARTER
WATER - BARGE SEA LIFT

PIN-2 CAPE YOUNG

LOCATION PLAN

SCALE: 1:250,000

FIGURE 2.1

3.0 BIOPHYSICAL ENVIRONMENT

3.1 CLIMATE

Cape Young is situated 18 m asl by Amundsen Gulf. Table 3.1 presents climatic normals for the site.

3.1.1 PRECIPITATION

Mean annual precipitation is 166.1 mm; 93.6 mm is received as rain and 68.4 cm as snow. On average, 61 days per year have measurable precipitation and most of the moisture falls from July to November.

3.1.2 TEMPERATURE

Mean annual temperature is -12.7 °C, while mean monthly maximum and minimums were 10.5 °C in July and -30 °C in January and February.

3.1.3 WIND AND FOG

Mean annual wind speed is 17.9 km/hr. Winds are relatively constant throughout the year and predominantly from the northwest, except in February and October when winds are westerly and southeasterly, respectively.

Information on fog and cloud conditions was unavailable.

3.2 GEOLOGY

3.2.1 OVERVIEW

PIN-2 is located at Cape Young on the shore of Dolphin and Union Strait which separates the mainland from Wollaston Peninsula of Victoria Island. Physiographically, the site is situated at the northeastern edge of Horton Plain, which is the northeasternmost physiographic division of the Interior Plains, and separated from the Arctic Lowlands by the strait. The area is underlain by sedimentary rocks, Palaezoic in age. Surficial geology in the vicinity of the station is characterized by beach ridge and terrace formation. Bedrock is exposed to southeast of the facilities.

General considerations for development of a landfill in permafrost areas were summarized in Section 6.3.3 of Volume 2. The availability of the capping materials required to insulate the landfill contents and prevent frost heaving of debris from the landfill is discussed in Section 3.2.3 of this Volume.

3.2.2 TERRAIN UNITS

The terrain units in the vicinity of the facilities are provided in Figure 3.1 and are described in the following sections.

3.2.2.1 Terrain Unit 1

Terrain Unit 1 contains the main station and the airstrip (Figure 3.1). The terrain is typically flat and low lying. The area is predominantly vegetated with several linear sand units outcropping which may be remnants of ancient beach ridges. The surface material is sandy gravel.

TABLE 3.1 CLIMATE NORMALS FOR PIN-2 CAPE YOUNG

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
Precipitation													
Mean Rainfall	0.0	0.0	0.0	0.0	1.5	14.2	28.6	32.5	16.4	0.4	0.0	0.0	93.6
Mean Snowfall	3.8	3.5	3.4	5.7	6.6	0.8	0.2	1.0	6.5	17.7	12.7	6.5	68.4
Mean Total	3.8	3.5	3.4	9.2	8.6	15.1	28.8	33.5	23.0	18.0	12.7	6.5	166.1
1 No. Days w/meas rain	0	0	0	0	1	4	7	8	6	*	0	0	26
No. Days w/meas snow	3	2	3	3	3	1	0	1	4	8	6	4	38
No. Days w/meas precip	3	2	3	3	4	4	7	8	9	8	6	4	61
Greatest rain in 24 hrs	0.0	0.0	0.0	T	6.9	17.5	41.1	35.1	17.3	4.1	T	0.0	41.1
Greatest snow in 24 hrs	5.4	7.6	5.1	23.5	11.4	5.1	4.6	6.4	9.4	12.7	11.8	12.7	23.5
Greatest precip in 24 hrs	5.4	7.6	5.1	23.5	11.4	17.5	41.1	35.1	17.3	12.7	11.8	12.7	41.1
Temperature (C)													
Mean Daily Max	-26.2	-27.7	-23.4	-14.5	-3.3	5.6	10.5	9.8	3.6	-4.5	-15.6	-21.7	-9.0
Mean Daily Min	-34.2	-34.4	-32.7	-24.4	-11.2	-0.8	2.7	3.1	-0.9	-10.4	-23.5	-30.2	-16.4
Mean Daily	-30.3	-31.6	-27.9	-19.3	-7.2	2.4	6.6	6.5	1.4	-7.5	-19.6	-25.6	-12.7
Extreme Max	-3.9	-5.5	-5.0	4.4	13.3	23.3	29.4	25.6	20.6	8.3	5.6	-2.8	29.4
Extreme Min	-48.3	-47.8	-46.7	-43.3	-30.6	-15.0	-4.0	-3.3	-15.0	-30.0	-38.9	-44.4	-48.3
Wind													
Mean Wind Speed (km/hr)	20.8	17.0	15.1	16.8	17.7	17.2	16.5	18.5	19.7	20.5	19.4	16.0	17.9
and prevailing direction	NW	W	NW	NW	NW	NW	NW	NW	NW	SE	NW	NW	NW
Mean Vector Speed (km/hr	11.7	13.0	5.3	3.0	3.4	3.6	7.3	7.5	5.4	1.9	3.2	4.8	5.3
and direction	30.0	29.0	31.0	30.0	2.0	36.0	33.0	32.0	31.0	22.0	32.0	30.0	31.0

1. measurable rain > 0.2 mm — rainfall in mm
measurable snow >0.2 cm — snowfall in cm
measurable precipitation >0.2 mm water equivalent — total precip in mm water equivalent

T = trace

M = missing data

* less than 0.5 greater than 0.0