Remediation of Aishihik Airstrip Yukon Territory

Prepared by

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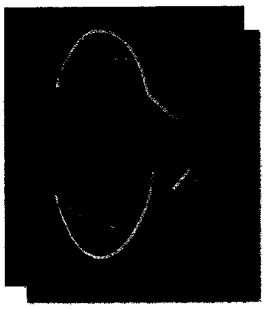

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EXECUTIVE SUMMARY

The Aishihik Airstrip in the Yukon Territory was built during the early years of World War II by the United States, handed to Canadian control in 1955, and eventually closed down in 1966. Recently the Champagne-Aishihik band has renovated the site.

Concerns arising from an Environment Canada survey reporting PCBs at the site prompted Indian and Northern Affairs Canada (DIAND) to commission an environmental assessment at the site. This work, carried out in June 1994 by the Environmental Sciences Group and reported in 1995, characterized the physical and chemical status of the area, assessed the environmental impact, and made recommendations for the cleanup of the site.

Under an agreement between DIAND and the Champaign-Aishihik Band, a cleanup based on these recommendations was undertaken at the site in the summer of 1995. The Environmental Sciences Group was the Scientific Advisor, and members of the group were involved in: delineation of contaminated areas; removal of soils contaminated with PCBs and lead; confirmatory sampling and testing; removal of paint and debris containing high concentrations of PCBs (over 50 ppm) from the powerhouse; solvent-washing of the contaminated building interiors; and packaging contaminated materials.

Elevated concentrations of PCBs had been previously identified at two areas around the powerhouse. These were excavated after delineation; confirmatory testing showed that no PCBs remained. Two battery stains in a dump were also excavated after the extent of lead contamination was delineated; confirmatory tests showed that the excavations were successful. A previously identified stain near the garage was delineated but not excavated because the low concentration of lead was restricted to an isolated area.

The powerhouse, which was highly contaminated with PCBs, was taken down to its foundations, and the materials disposed of appropriately. Excavated areas around the powerhouse were backfilled, and the solvent-washed concrete pad was covered to ensure isolation from the environment.

All soils and materials found to be contaminated in access of the criteria have now been removed. This report describes the cleanup procedure, outlines the cleanup criteria, and includes the results of assessment, delineation and confirmatory testing at Aishihik Airstrip.

ACKNOWLEDGMENTS

This project was supported by the Action on Waste component of the Arctic Environmental Strategy. We would like to acknowledge the confidence and support of several individuals in Indian and Northern Affairs Canada, in particular: Mr. Mark Palmer, Regional Manager, Mr. Brett Hartshorne, Project Manager and Mr. Rick Seaman and Ms Dorothy McLeod of the Action on Waste Program Office in Whitehorse. Mr. Rick Seaman is also thanked for his assistance in the preparation stages of the site visit, as well as his endless and creative assistance during and after the site visit. Thanks are also due to the members of the Champagne-Aishihik Band for their keen and competent assistance and for making the facilities available for accomodation and analyses during the site visit.

This project was conducted by the Environmental Sciences Group at Royal Military College, headed by Dr. Ken Reimer who assumes overall editorial responsibility. The field program was conducted by Drs Wayne Ingham and Matt Dodd, both of whom contributed to the report. Dave Pier did an excellent job of producing the maps. In addition Doug Noonan provided logistical support for the field work, Pat Fortin managed the data, and Deborah Reimer administered the project. Thanks are also due to Marjorie Cahill and John Poland for their endless editorial assistance.

The analytical work was conducted by the Analytical Services Unit at Queen's University and by AXYS Analytical Services. These labs, as they have in the past, demonstrated high professional standards which facilitated the production of this report. Particular thanks are due to Yvonne Fried, Cathy Sudeith, Katherine Kaye, Dale Hoover, Brenda Dunn, Wendy Leslie, Laurie Phillips and the laboratory technicians at AXYS, and to Paula Whitley, Mary Andrews and the laboratory technicians at the Analytical Services Unit.

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I. INTRODUCTION

A. Background

The Aishihik Airstrip was built in the early 1940s as part of the Northwest Staging Route, in order to improve air transportation to the North in support of the war effort. The airstrip was handed from U.S. to Canadian control in 1955 and was operated by the Department of Transport until 1966 when it was transferred to the Territorial Government. The Champagne-Aishihik band, which has a land claim in the area, has renovated the site for use as a cultural camp and for meetings (Photograph I-1 and Photograph I-2).

A limited environmental survey carried out by Environment Canada and reported in March 1994[1] showed that polychlorinated diphenyls (PCBs) were present on the floor of the powerhouse. The Aishihik Airstrip was visited on two occasions by the Environmental Sciences Group (ESG)[2], 11 June 1994 and 7 - 10 July 1994, and an environmental assessment report was submitted to Indian and Northern Affairs Canada (DIAND) in March 1995[3]. The main observations made by the field team were:

- most of the original facilities had been demolished, leaving only the powerhouse, garage, and airways building. Small cabins had been constructed to house summer camps and the airways building had been extended;
- physical debris around the building was limited to small pieces of pipe, wood and three transformer cases;
- barrels were cached in one area of the site and some contained fluid; and
- the landfills were not engineered and contained exposed debris.

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[1] Fax message from Brian Laird (A & ES Technical Services) to Harold Kane (Champagne-Aishihik Enterprises) dated 11 Mar 1994. DIAND file 2.4.22.1.

[2] The Environmental Sciences Group relocated to Royal Military College (RMC), Kingston, Ontario in August 1995.

[3] Environmental Sciences Group (1995) An Environmental Study of the Aishihik Airstrip Yukon Territory, prepared for Indian and Northern Affairs Canada.

Photograph I-1: Entrance to the Aishihik airstrip grounds.

Photograph I-2: The Aishihik River valley.

Chemical contamination at the site was assessed in terms of the DEW Line Cleanup Criteria (DCC)[4], the Canadian Council of Ministers of the Environment (CCME) interim Residential/Parkland (R/P) criteria and the Canadian Environmental Protection Act (CEPA).

A review of the analytical results indicated that contamination was limited to the powerhouse, and stains around the garage and at a dump site. The samples containing contaminants in excess of the applicable environmental criteria were as follows:

- three samples (one soil, two paint) taken from the interior of the powerhouse contained PCBs at concentrations over 50 parts per million (ppm). PCB concentrations in substrate that are over 50 ppm are regulated under legislation arising from the Canadian Environmental Protection Act (CEPA) which governs the storage of PCBs. (Soils containing PCBs at concentrations which violate this regulation will be referred to as CEPA soils.) The soil sample also contained levels of copper, lead and mercury in excess of DCC-II and CCME R/P criteria;
- one paint sample taken from inside the powerhouse, and one soil sample obtained from the south side of the powerhouse, contained PCBs in excess of the CCME R/P and DCC-II criteria;
- three soil samples taken from a stained area south of the powerhouse contained PCBs in excess of DCC-I;
- a soil sample taken in a stain near the garage contained lead in excess of DCC-II and CCME R/P criteria; and
- a soil sample taken in one of the dumps also contained lead in excess of DCC-I.

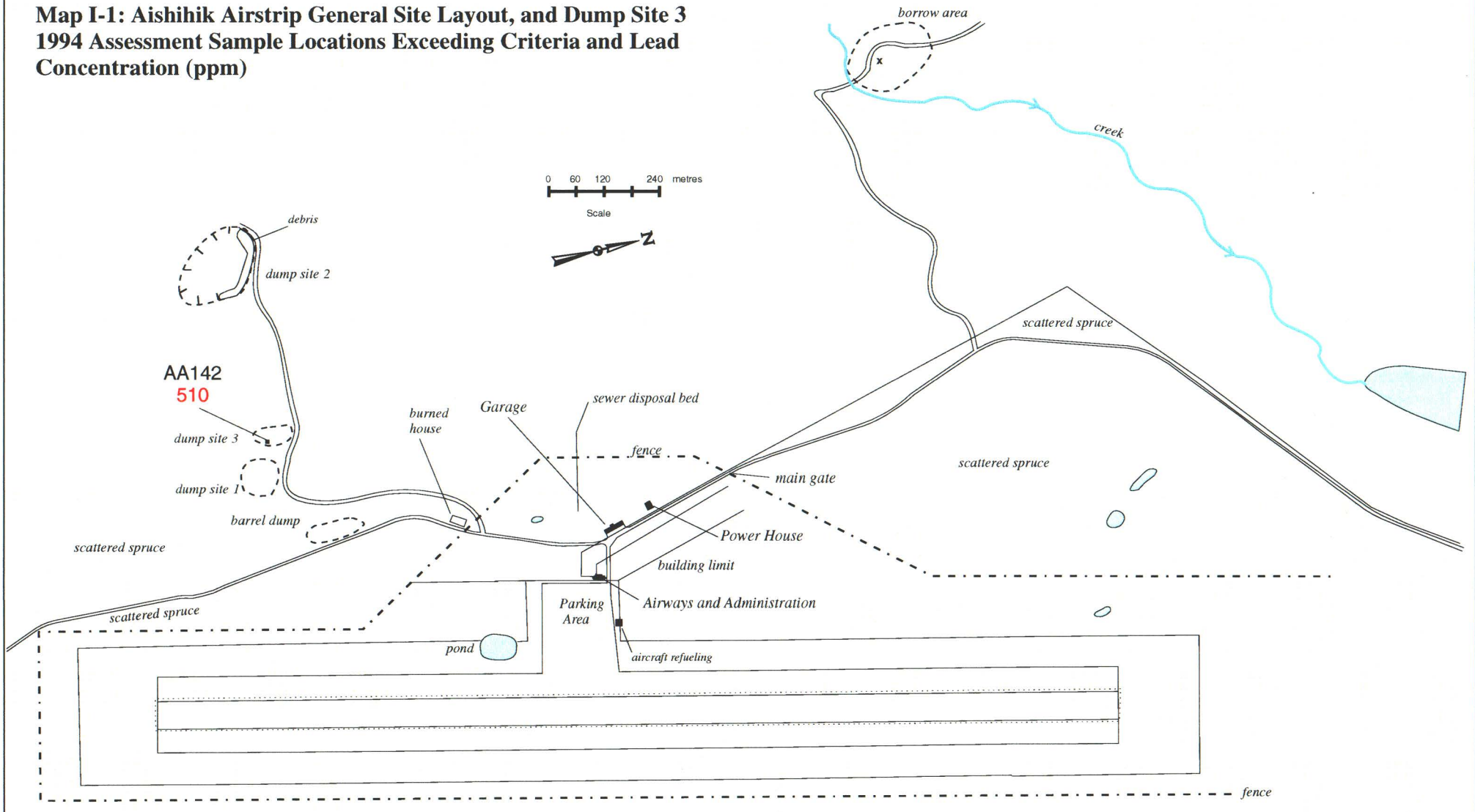
Levels of all other contaminants were generally quite low and the results from analyses of plant tissues indicated that uptake was only of concern at locations near the powerhouse and adjacent to some lead-containing batteries in one of the dumps.

[4] The DEW Line Cleanup Criteria (DCC) are a combination of the CCME R/P and Quebec B criteria, developed specifically to be protective of the Arctic environment.

Map I-1 and Map I-2 give the general site layout and include the sample locations from the 1994 investigation. The results from this investigation are summarized in Table I-1, and the a summary of the recommendations which were presented in the 1995 ESG report is given below.

The powerhouse is clearly contaminated with PCBs and should be thoroughly cleaned before any further decision is made on the future use of the building. The extent of PCB contamination in the areas around the powerhouse should be delineated using PCB test kits and the soil disposed of in an appropriate fashion. The potable water well adjacent to the powerhouse should be tested for contamination and, if any is found, a groundwater investigation should be initiated. Other soils containing contaminants at concentrations in excess of the criteria should be removed, and the three dumps should be consolidated at one location. The oil drums in the barrel cache should be removed, using the guidelines described in the DEW Line Cleanup protocol for barrels.

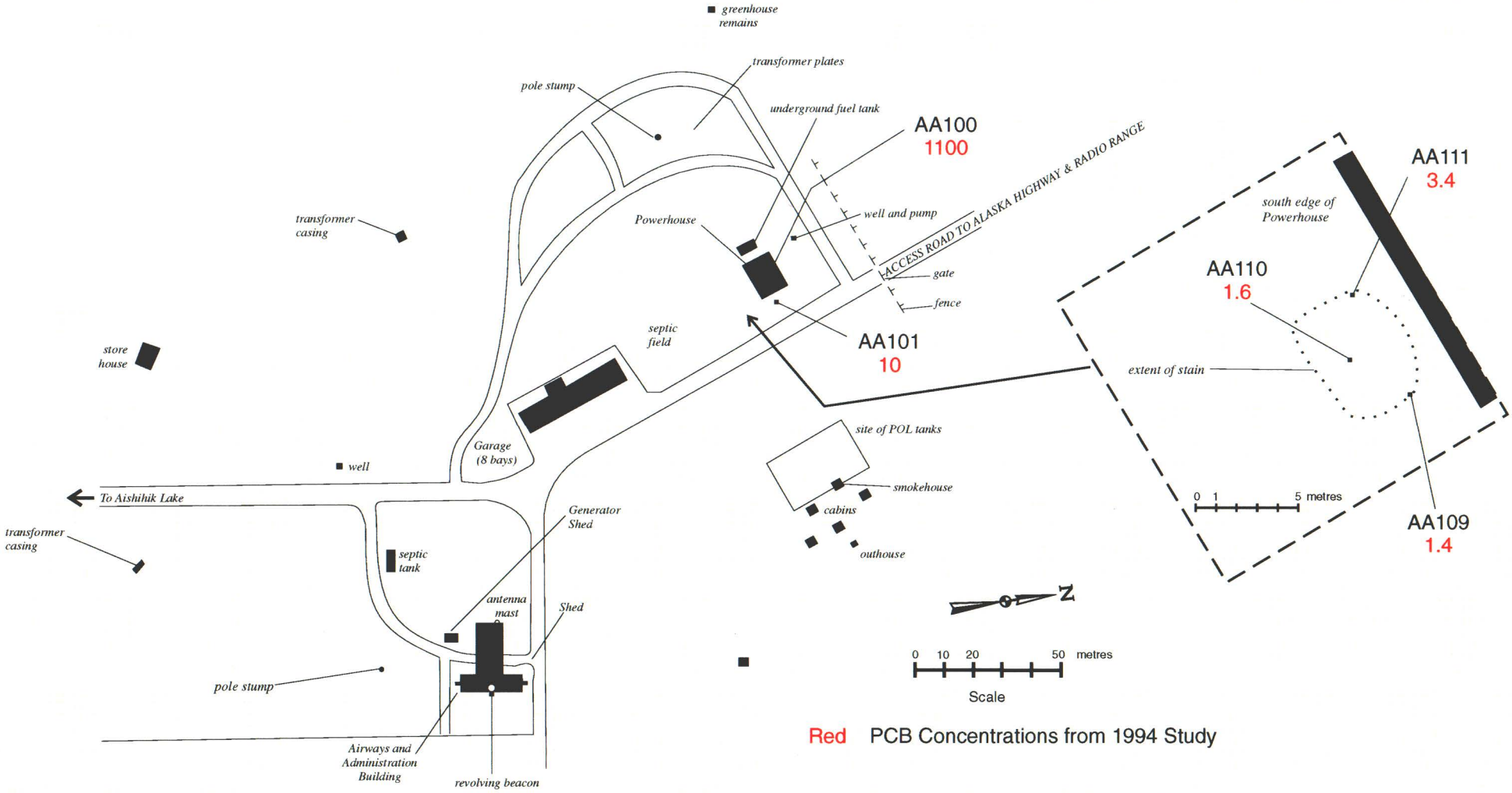
Map I-1: Aishihik Airstrip General Site Layout, and Dump Site 3 1994 Assessment Sample Locations Exceeding Criteria and Lead Concentration (ppm)



Map adapted from DND Construction Engineering Branch DWG, No. AK-0-3. 29/Nov/1949

Map I-2: Aishihik Airstrip Site, 1994 Assessment Sample Locations Exceeding Criteria and PCB Concentrations (ppm)

At the same location as AA100:
AAPC01: 22000
AAPC02: 26
AAPC03: 126



Red PCB Concentrations from 1994 Study

Map adapted from DND Construction Engineering Branch DWG, No. AK-0-3. 29/Nov/1949

Table I-1: Samples Exceeding Cleanup Criteria at Aishihik from the ESG 1994 Environmental Assessment

Sample	Location	Substance	Sample Concentration (μg/g or ppm)	Criterian Value (μg/g or ppm)	Applicable Criteria
AA100	Interior floor of powerhouse, 30 cubic cm hole in floor of room adjacent to generator room	PCBs	1100	50	CEPA
		Cu	118	100	CCME R/P, DCC-II
		Pb	620	500	CCME R/P, DCC-II
		Zn	2020	500	CCME R/P, DCC-II
AAPC01	concrete bench in southwest room of powerhouse	PCBs	22000	50	CEPA
AAPC02	floor of southeast room of powerhouse	PCBs	26	5.0	CCME R/P, DCC-II
AAPC03	floor of main powerhouse generator room	PCBs	126	50	CEPA
AA101	2 m east of large door on east side of powerhouse in slight depression in front of entrance	PCBs	10	5.0	CCME R/P, DCC-II
AA109	Northeast side of stain 2 m south of powerhouse	PCBs	1.4	1.0	DCC-I
AA110	North side of stain 2 m south of powerhouse	PCBs	1.6	1.0	DCC-I
AA111	Northwest side of stain 2 m south of powerhouse	PCBs	3.4	1.0	DCC-I
AA116	1.5 m northeast of creosote pole, 15 m west of centre of garage	Pb	200	200	DCC-I
AA142	Dump 3, easternmost pile of broken batteries, 8 m north of old truck, by metallic debris	Pb	510	500	CCME R/P, DCC-II

Note:

CEPA refers to the Storage of PCB materials regulation under the Canadian Environmental Protection Act.

CCME R/P refers to the Canadian Council of Ministers of the Environment Interim Remediation Criteria for Residential/Parkland use.

DCC refers to the DEW Line Cleanup Criteria prepared for the remediation of radar stations in the Canadian Arctic.

B. Objectives of this Report

Under an agreement between DIAND and the Champaign Aishihik Band, a cleanup of the Aishihik Airstrip was carried out in the summer of 1995. The recommendations outlined in the ESG 1994 study and listed in the previous section were used as a guideline for the implementation of a remediation program. Members of the Environmental Sciences Group were involved in various aspects of this project including:

- delineation of contaminated areas;
- removal of contaminated soils containing PCBs and lead;
- confirmatory sampling and testing after removal of contaminated soils;
- removal of paint and debris containing PCBs at concentrations exceeding 50 ppm from the powerhouse;
- cleaning of contaminated walls and concrete floors by solvent washing; and
- packaging of the contaminated materials.

DIAND contracted a local organization to perform the remaining site cleanup including the closure and capping of the water well near the powerhouse and the removal of debris from around the site.

Soil samples were collected from locations containing substrate in excess of the cleanup criteria and analyzed in the field. Based on the results, the areas of contamination were marked and soils were excavated from these locations. In order to confirm that cleanup was successful, samples were collected and analyzed after the removal of contaminated soils. This report describes the sampling and analytical methods (Chapter II) and presents the analytical results (Chapter III). The methods and procedures used in the remediation of the powerhouse are described (Chapter IV). All QA/QC data are given in Chapter V.

II. SAMPLING AND ANALYTICAL METHODS

This chapter provides information on sampling and analytical methods used for soils, paint chips and the concrete floors during the cleanup. Soil samples were analyzed in the field with immunoassay test kits and a portable X-ray fluorescence analyzer. Standard atomic absorption and gas chromatographic methods were used to determine levels of PCBs and inorganic elements in the laboratory. Details of the experimental procedures are described below, and all analytical results are presented in Chapters III and IV.

A. Sampling

1. Soils

A probabilistic approach, which involved laying out a grid and sampling at some chosen coordinates, was used to obtain samples from locations containing substrate in excess of the cleanup criteria. Two types of samples were collected; the first set (delineation samples) was to define the areas of contamination and the second set (confirmatory samples) was used to confirm that the cleanup was successful.

Soil samples from areas with inorganic element contamination and those marked for delineation were collected using plastic scoops and placed in Whirl Pak™ bags. Confirmatory samples destined for laboratory PCB analyses were obtained with stainless steel scoops (which had been pre-washed, baked and stored in baked aluminum foil to prevent organic contamination) and deposited in 1 litre amber jars fitted with Teflon-lined lids. These jars were obtained commercially (I-CHEM Ltd.) and were certified free of organic materials.

Soil samples were generally restricted to the upper 10 cm. In order to determine the depth of contamination, test pits were also dug and samples collected at specific intervals. The total number of samples collected at each location depended on the extent

of contamination; maps and photographs, depicting some of the sampling locations, are given in Chapter III.

Confirmatory samples designated for laboratory analyses were shipped by truck to Whitehorse and by guaranteed air freight either to Queen's University for inorganic analysis or to AXYS Analytical for PCB analysis. In order to conform with regulations regarding sample control, a rigorous chain of custody was maintained. For each sample, chain-of-custody forms were filled out and checked before shipment from Whitehorse, and the contents of shipments were verified upon receipt in the laboratory. The relevant documentation is available on request. Upon receipt in the laboratory, the samples were kept frozen whilst awaiting analysis.

2. Concrete Floors

Floor scrapings were collected with a scoop and placed in a Whirl Pak™ bag. These samples were shipped to Queen's University and analyzed for PCBs by Gas Chromatography with Electron Capture detection (GC/EC). The results obtained are given in Chapter IV.

3. Paint

Flakes of paint were removed from the floors of the powerhouse by means of a stainless steel scoop, placed in Whirl Pak™ bags and shipped to Queens University for analyses. The results are given in Chapter IV.

B. Field Analysis

1. Polychlorinated Biphenyls (PCBs)

Field analyses of PCBs were performed with Millipore EnviroGard™ PCB Test Kits. The kits utilize the enzyme-linked immunoabsorbent assay (ELISA) technique

which is based on antibodies that are specifically designed to bind to PCB molecules. These antibodies are bonded onto polystyrene coated test tubes. When solutions containing PCBs are incubated in the tube, the PCBs bind to the antibodies. After incubation, the test tube is washed thoroughly with water, and an enzyme-PCB conjugate added. The conjugate then binds to the unoccupied antibody binding sites. Other reagents, substrate and chromogen, are added which interact with the bound enzyme conjugate to form a coloured product. The amount of coloured product, which can be quantified by its intensity, is inversely proportional to the PCB concentration in the original sample in the test tube.

The immunoassay was carried out at Aishihik according to the manufacturer's instruction with a few minor modifications. A subsample was spread out on absorbent paper towels and allowed to air dry overnight following which a 5 g portion was weighed and extracted with 5 mL methanol. The soil-methanol mixture was filtered and a 25 μL aliquot of the extract used for subsequent analysis. Results from the previous ESG investigation indicated Aroclor 1254 was the principal constituent. As such Aroclor 1254 standards were used for calibration, rather than the Aroclor standards supplied by the manufacturer.

Results are reported as obtained by the immunoassay method assuming 100% extraction of PCBs by methanol; in the GC/ECD method described below, incomplete extraction efficiency is corrected for by the use of an internal standard. Therefore, it is expected that the immunoassay test kits would generally give lower results than the GC/ECD method. The manufacturer's standards as supplied with the immunoassay test kits are in fact 50% lower in concentration than indicated to compensate for this discrepancy. In this study, uncorrected values were obtained but interpreted to allow for incomplete PCB extraction into methanol. Thus a result of 30 ppm or more was interpreted as being >50 ppm.

2. *Inorganic Elements*

A TN Technologies, Inc. Spectrace 9000 Field Portable X-Ray Fluorescence Analyzer (FPXRF) was used for all inorganic element analysis at Aishihik. This FPXRF is equipped with a high resolution solid state (mercuric iodide) detector and fundamental parameters quantitative analysis software. Fundamental parameters quantitative analysis involves measuring all major elements present and compensating for the effects of the interferences on one another by computer calculations. This allows for a good estimate of inorganic element concentrations for all soil matrix types without the necessity for several standard samples having the same general concentrations and matrix; pure elements or standard reference materials are used for calibration standards.

The FPXRF employs three radioactive sources for X-ray generation; the sources and acquisition times used for analysis are given in Table II-1. As recommended by the manufacturer, the operation of the instrument was monitored periodically during analysis with pure element and teflon standards.

Table II-1: Count Times for FPXRF Sources

Source	Measurement Time (sec)	
	Calibration	Analysis
Fe-55	50	100
Cd-109	50	300
Am-241	50	50
Total Time	150	450

The soil samples were analyzed as follows. Subsamples were spread out on absorbent paper towels and allowed to air dry overnight. Large stones and pebbles were removed and the sample ground with a pestle and mortar. The ground sample was placed in the sample cup and covered with a Mylar film and ring. The filled sample cup was

inverted (Mylar side down), tapped gently to settle and compact the contents, placed on the probe and analyzed. Detailed results are given in Chapter III.

The limit of detection for each element - defined as the analyte concentration giving a signal equal to the blank, plus two standard deviations of the blank - was determined by using the standard deviations of analyte samples which gave concentrations close to the blank. Detection limits are given in Table II-2.

Table II-2: Detection Limits for the Determination of Copper, Lead and Zinc by FPXRF

Element	Detection Limits (ppm or μg/g)
Copper	50
Lead	20
Zinc	30

C. Laboratory Analysis

1. Polychlorinated Biphenyls (PCBs) in Soils

a) Summary

The above analysis was conducted by AXYS Analytical Services Ltd. of Sidney, B.C. using gas chromatography with electron capture detection (GC/ECD).

Each sample was clearly labelled and locked in a secure frozen storage area until retrieved by the analyst. The soil sample was thoroughly homogenized and a subsample taken for the determination of wet weight/dry weight ratio. The wet soil sample (10 - 15 g), to which an aliquot of surrogate standard (2,4,5,6-tetrachloro-m-xylene, PCB 209 and d_4-alpha endosulphan) had been added, was extracted once with 80 mL of 1:1

dichloromethane/methanol by shaking on a shaker table for 30 minutes. The extraction procedure was repeated using 80 mL of dichloromethane. The extracts were combined, washed with solvent-extracted water, dried over anhydrous sodium sulphate and concentrated by Kuderna Danish techniques. After the addition of activated copper to remove sulphur, the extract was separated on a Florisil column.

The extract was quantitatively transferred to a Florisil column and eluted with three solvent systems consisting of hexane (Fraction-1), 85:15 dichloromethane/hexane (Fraction-2) and 50:50 dichloromethane/hexane (Fraction-3). An aliquot of surrogate standard was added to each of Fraction-2 to allow quantification since the surrogate standard added at the beginning of the procedure eluted into Fraction-1 and Fraction-3. Each fraction was concentrated, transferred to a microvial, and an aliquot of recovery standard (4,4'-dibromooctafluorobiphenyl and PCB 204 to Fraction-1 and Fraction-2 and ^{13}C-PCB 153 to Fraction-3) added prior to analysis by GC/ECD.

A Hewlett Packard HP 5830A gas chromatogram equipped with a ^{63}Ni electron capture detector (GC/ECD), a 60 m DB-5 column (0.25 mm i.d x 0.1 μm film thickness) and HP 3392 integrator was used to analyze Fraction-1 for PCBs as Aroclors and PCB congeners simultaneously. Chromatographic conditions were as follows - Initial Temp: 100°C; Injection: splitless, 1 min; Initial time: 2 min; Ramp: 10 °C/min to 150 °C, 3 °C/min to 300 °C; Final time: 5 min. Column conditions were: Carrier gas, helium; Pressure, 21 psi; Flow rate, 60 mL/min; and Split ratio, 15:1. The instrument was calibrated using a solvent blank and standards of Aroclor 1242, Aroclor 1254 and Aroclor 1260. For each Aroclor, the sum of the areas of three characteristic peaks was used to calculate its response factor against the internal standard. The area of the same three peaks was used to determine the concentration of each Aroclor in the sample.

2. Polychlorinated Biphenyls (PCBs) in Paint Chips and Concrete Samples

The concentration of PCBs in paint chips and concrete samples was determined by GC/ECD at the Analytical Services Unit, Queen's University, Kingston, Ontario.

Samples were analyzed by taking approximately 5 g, spiking it with an internal standard solution (decachlorobiphenyl) and extracting with approximately 300 mL dichloromethane in a soxhlet extractor for six hours. The sample was concentrated to 1-2 mL, solvent exchanged for hexane and applied to a Florisil column (Supelco SPE tube). The resulting eluent was then analyzed using an HP 5890 gas chromatograph equipped with electron capture detector. A 30 mm DB5 capillary column was used and the instrument was calibrated with Aroclor 1254 standards. The detection limit for Aroclor 1254 was 0.3 ppm.

3. Inorganic Elements in Soils

Inorganic elements were analyzed by atomic absorption spectroscopy (AAS) at the Analytical Services Unit, Queen's University, Kingston, Ontario.

The analyses were carried out using the following procedure. Samples were air-dried and ground to a fine powder with a mortar and pestle; large stones were removed as they would not be expected to contain any anthropogenic environmental contamination. Approximately 0.5 g of this dried material was heated with 2 mL HNO_3 and 6 mL HCl overnight so that the volume was reduced to 1-2 mL. The resulting solution was then made up to 25 mL and analyzed by AAS. While it is recognized that the digestion procedure used may not bring all metals into solution (some metals may be locked into silicate minerals), it was felt that the metals released into solution are of greater environmental significance than true total metals. Analyses were done in batches of 36 which comprised 28 samples, 2 blanks, 4 duplicates and 2 samples of reference material (National Research Council standard reference material BCSS-1). The limits of detection for the metals were 3 ppm for copper, 10 ppm for lead and 1 ppm for zinc.

D. Quality Assurance/Quality Control (QA/QC)

A quality assurance/quality control program was implemented to allow monitoring of data quality. Functions carried out included replicate analyses, spiked

standard reference materials and comparison of field results to laboratory data. Aspects relevant to soil analyses are given in Chapter V.

III. DELINEATION, EXCAVATION AND CONFIRMATORY TESTING OF CONTAMINATED SOILS

This chapter describes sampling procedures and analytical results for samples used to delineate the extent of contamination, and those used to confirm the removal of contaminated substrate. Samples were collected from locations where contaminant concentrations in substrate were in excess of the cleanup criteria. These were analyzed at Aishihik for PCBs and metals by using immunoassay test kits and a field portable X-ray fluorescence analyzer, respectively. Based on the results, the extents of contamination were marked and soils were excavated from these locations. Samples were collected after the removal of contaminated soils, and analyzed in the field to confirm cleanup. A selected number of samples were reanalyzed in the laboratory in order to correlate field data with laboratory results. A map of the site, and tables indicating samples exceeding the criteria are presented in Chapter I. Details of the sampling and analytical procedures are given in Chapter II.

Excavated CEPA soils and waste were placed in 205 L metal barrels and appropriately labelled. Excavated soils and waste determined to be in excess of CCME R/P criteria, or DCC-II were also placed in labeled 205 L barrels. Filled barrels were shipped to Whitehorse and then to a waste disposal facility. Excavated soil and waste determined to be less than CCME R/P criteria, or DCC-II was placed in the landfill on site.

A. Location AA101

1. Previous Investigation

Location AA101 was a slight depression in front of the entrance of the large door on the east side of the powerhouse. Subtrate at this location contained 10 ppm of PCBs, which exceeded the CCME R/P criteria or the DCC-II.

2. Delineation

Forty-one samples (A1- A41) were taken along a 1 m grid and analyzed with the immunoassay test kit in the Yukon to delineate the extent of contamination at this location. These included four subsurface samples (A38 - A41) taken at depths of up to 20 cm. The sample locations are shown on Map III-1. Based on the results (Table III-1) the area of contamination was marked with pegs and flag tape (Photograph III-1).

Map III-1: Delineation Sample Locations and PCB Concentrations (ppm) at AA101, the Powerhouse East Stain

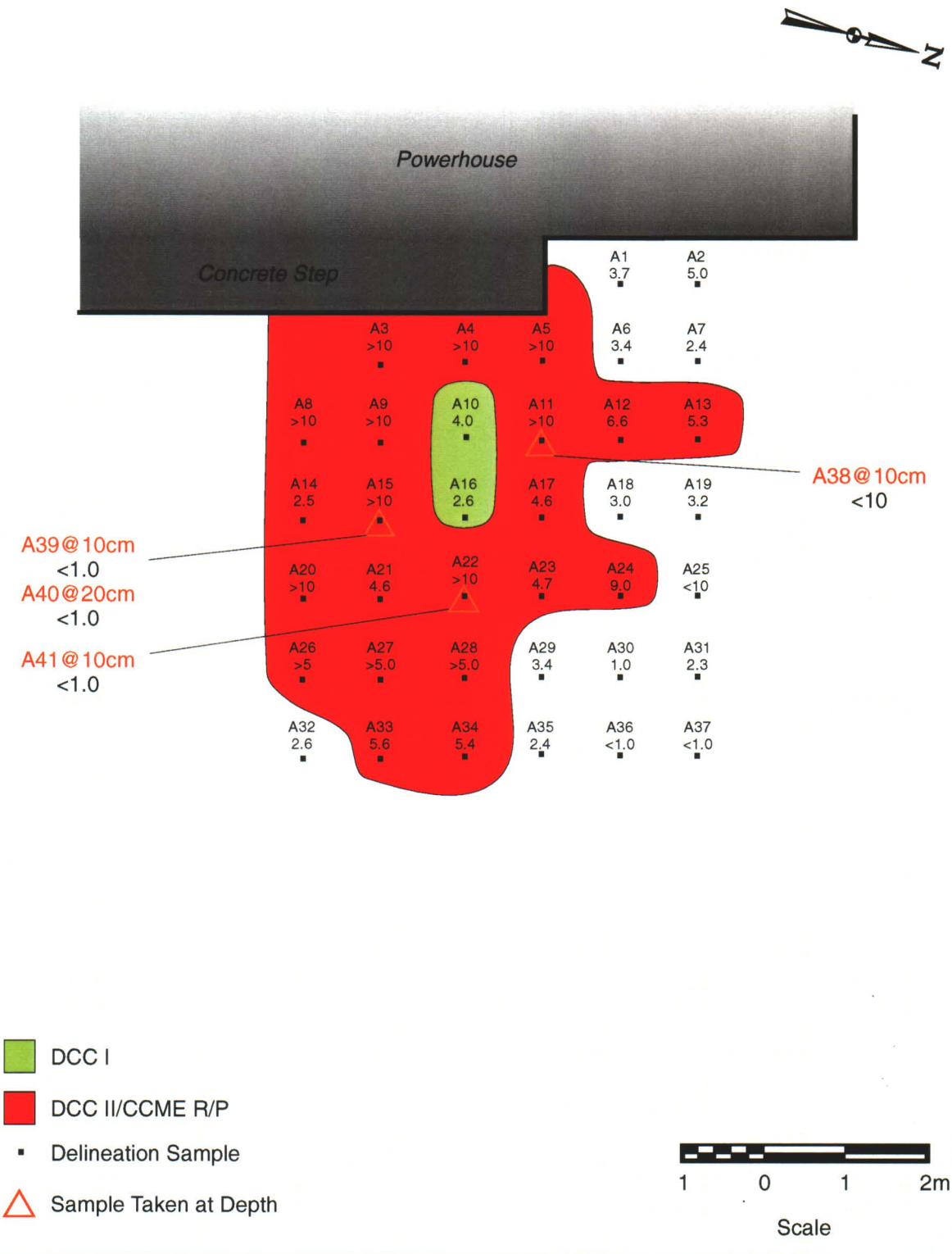


Table III-1: Concentration of PCBs in Soil Samples Used to Delineate Contamination at AA101

Sample #	Concentration of PCBs (ppm or μg/g)	Sample #	Concentration of PCBs (ppm or μg/g)
A1	3.7	A21	4.6
A2	5.0	A22	>10
A3	>10	A23	4.7
A4	>10	A24	9.0
A5	>10	A25	<1.0
A6	3.4	A26	>5.0
A7	2.4	A27	>5.0
A8	>10	A28	>5.0
A9	>10	A29	3.4
A10	4.0	A30	1.0
A11	>10	A31	2.3
A12	6.6	A32	2.6
A13	5.3	A33	5.3
A14	2.5	A34	5.4
A15	>10	A35	2.4
A16	2.6	A36	<1.0
A17	4.6	A37	<1.0
A18	3.0	A38	<1.0
A19	3.2	A39	<1.0
A20	>10	A40	<1.0
		A41	<1.0

3. Excavation and Confirmatory Sampling

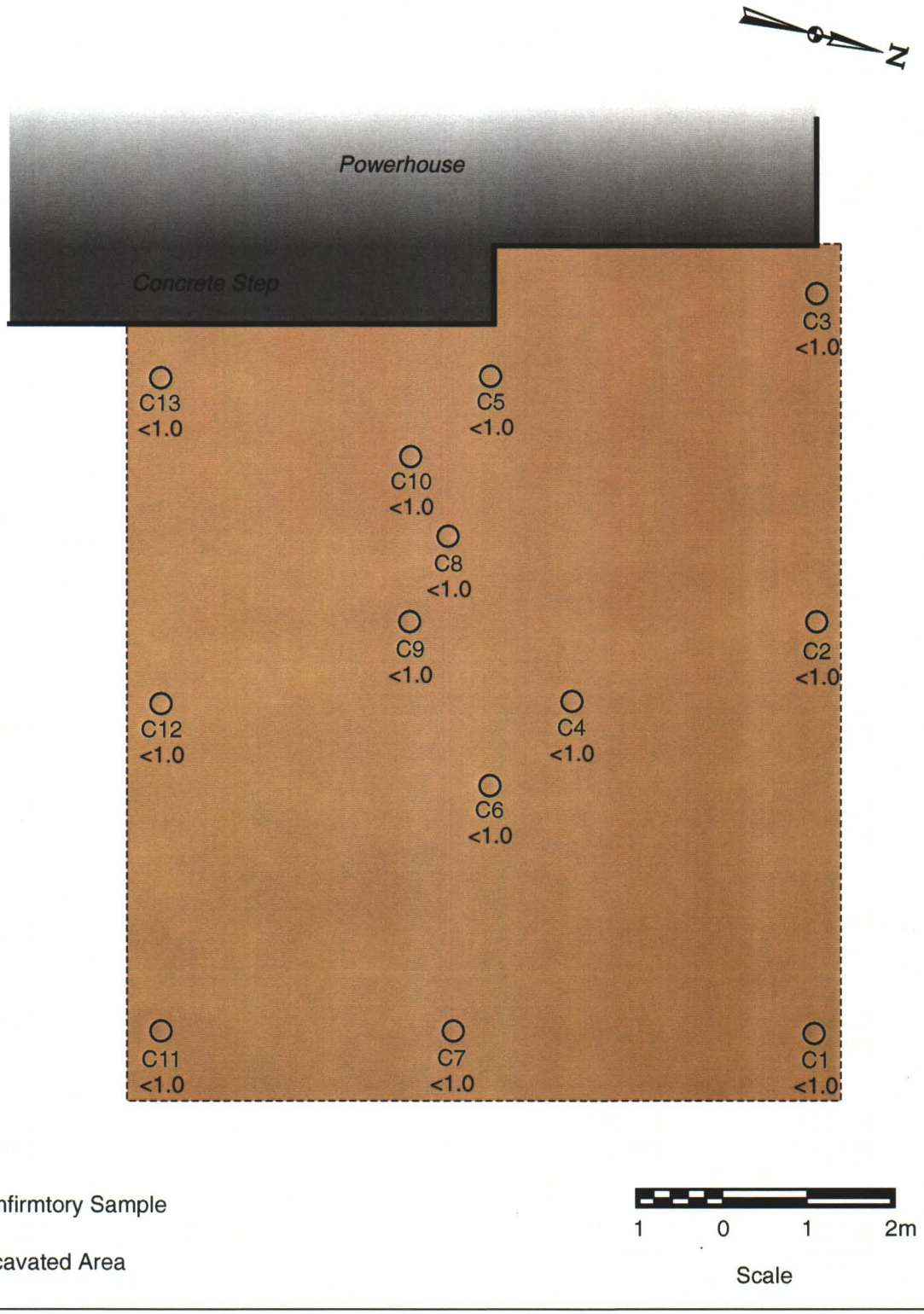
Soils containing PCBs in excess of DCC-II (1.8 m^3) were excavated using shovels and placed in barrels (Photograph III-2) prior to shipping off site. DCC-I soils were excavated with a front-end loader. All the DCC-I excavated soils (36 m^3) were placed in the landfill on site. An area of 9 m by 9 m, to a maximum depth of 40 cm, was removed (Photograph III-3), and all excavated areas were backfilled.

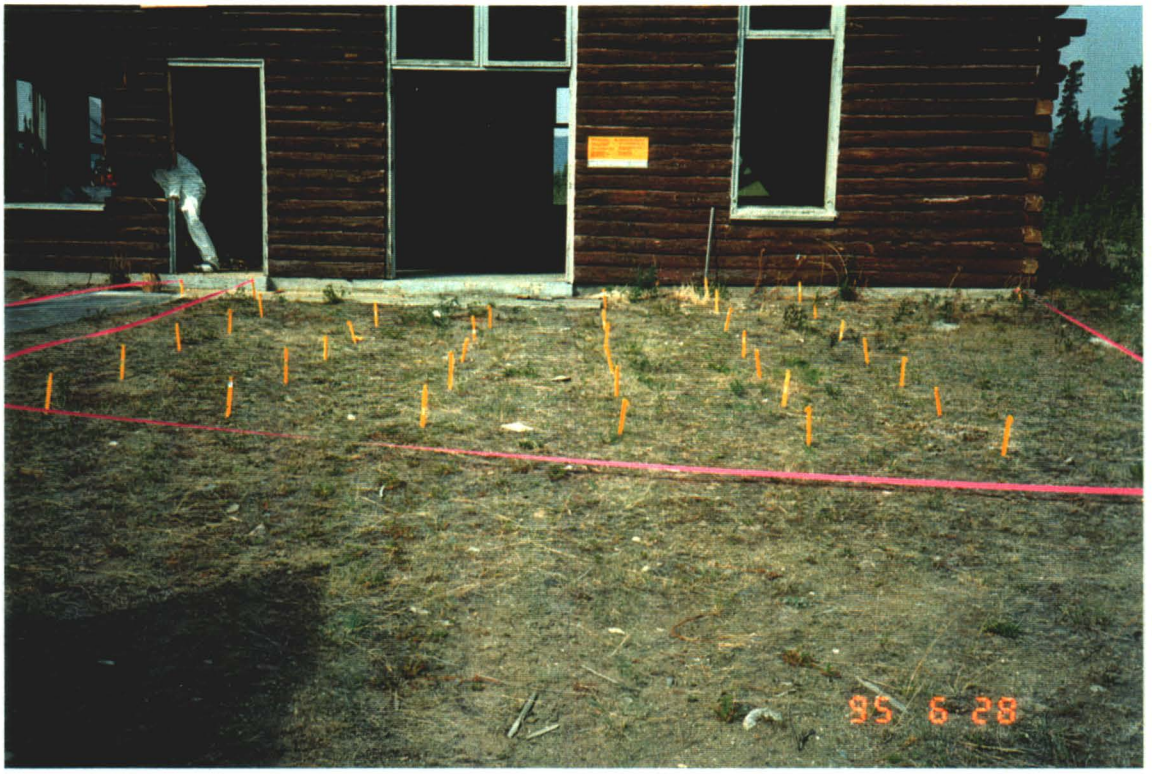
Thirteen soil samples (C1 to C13) were collected after soil removal and prior to backfilling, and analyzed with the test kits; eight of these were later analyzed in the laboratory by gas chromatography with electron capture detector (Table III-2). The confirmatory sample locations (C1 to C13) and actual area of soil removed are presented on Map III-2. All excavated areas were filled. These results indicated that the PCB-contaminated soil at the east entrance of the powerhouse (AA101) had been removed.

Table III-2: Concentration of PCBs in Samples Collected from AA101 after Removal of PCB-Contaminated Soils

Sample #	Conc. of PCBs (ppm or μg/g)	
	Field Test Kit	GC/ECD
C1	<1.0	
C2	<1.0	<0.1
C3	<1.0	<0.1
C4	<1.0	
C5	<1.0	
C6	<1.0	0.08
C7	<1.0	0.04
C8	<1.0	
C9	<1.0	0.6
C10	<1.0	
C11	<1.0	0.1
C12	<1.0	0.07
C13	<1.0	

Map III-2: Confirmatory Testing Sample Locations and PCB Concentrations (ppm) at AA101, the Powerhouse East Stain





Photograph III-1: Delineation and demarcation of contaminated area at AA101, the powerhouse east stain.

Photograph III-2: Excavation and barrel containment of DCC-II/CCME R/P PCB-contaminated soils at AA101, the powerhouse east stain.

Photograph III-3: Excavated area at AA101, the powerhouse east stain, after removal of DCC-I contaminated soil.

B. Locations AA108 to AA115

1. Previous Investigation

Samples were collected from a stained area south of the powerhouse, in an area containing eight pole stumps which were previously used for a transformer stand. Three of the samples contained PCBs at concentrations (up to 3.4 ppm) in excess of the DCC-I.

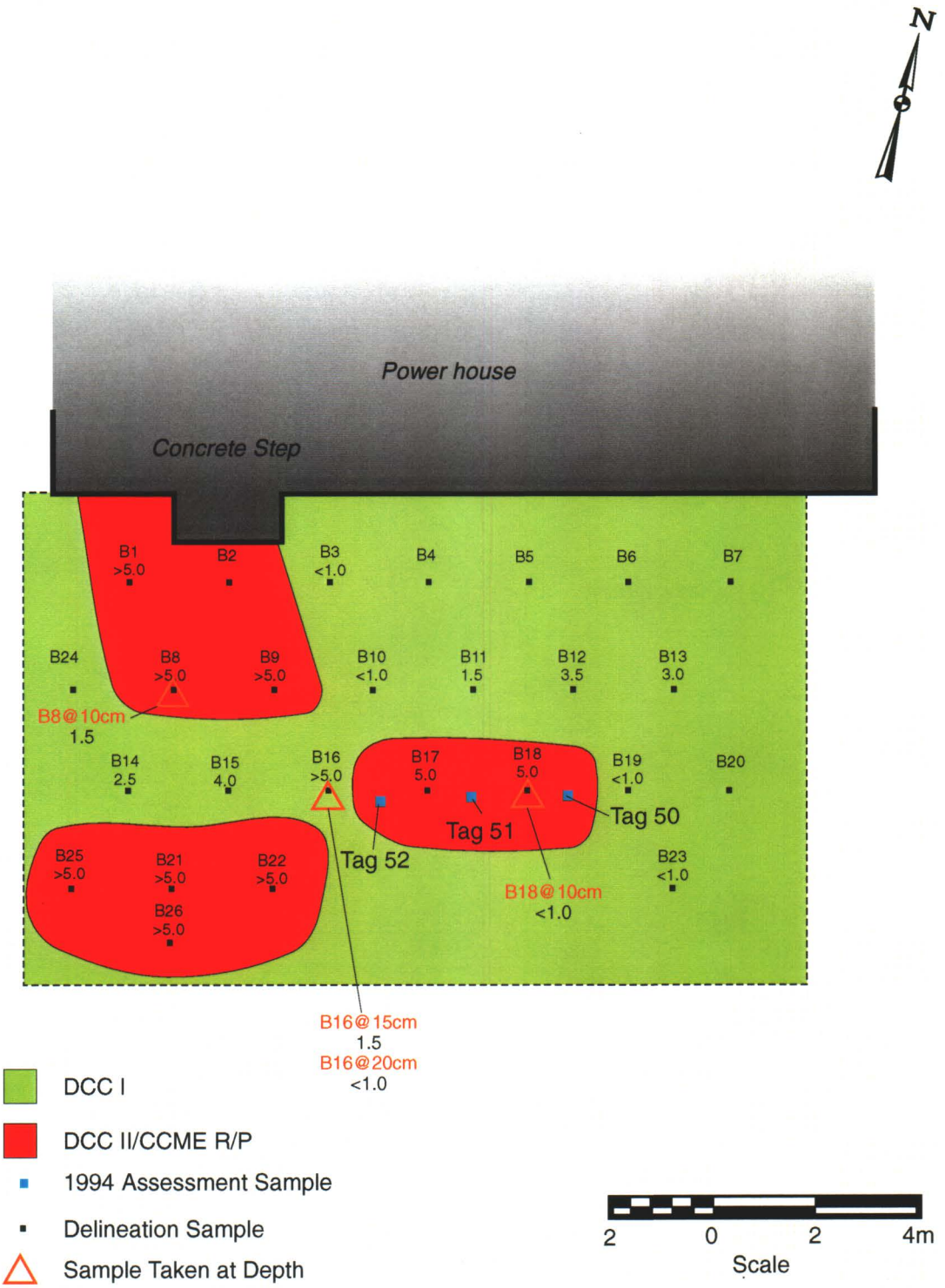
2. Delineation

Samples (B1 to B26) were collected from various coordinates along a 2 m by 1 m grid (Photograph III-4). Three test pits were also dug and samples taken at various depths. All the samples were analyzed at Aishihik using immunoassay PCB test kits. Sampling points are indicated on Map III-3. The concentrations of PCBs in the samples are shown on Map III-3 and in Table III-3.

Table III-3: Concentration of PCBs in Soil Samples Used to Delineate Contamination at AA108 to AA115

Sample #	Concentration of PCBs (ppm or μg/g)	Sample #	Concentration of PCBs (ppm or μg/g)
B1	>5.0	B16, 15 cm	1.0
B3	<1.0	B16, 20 cm	<1.0
B8	>5.0	B17	5.0
B8, 10cm	1.5	B18	5.0
B9	>5.0	B18, 10 cm	<1.0
B10	<1.0	B19	<1.0
B11	1.5	B21	>5.0
B12	3.5	B22	>5.0
B13	3.0	B23	<1.0
B14	2.5	B24	>5.0
B15	4.0	B25	>5.0
B16	>5.0	B26	>5.0

Map III-3: Delineation Sample Locations and PCB Concentrations (ppm) at AA108 and AA115, the Powerhouse South Stain



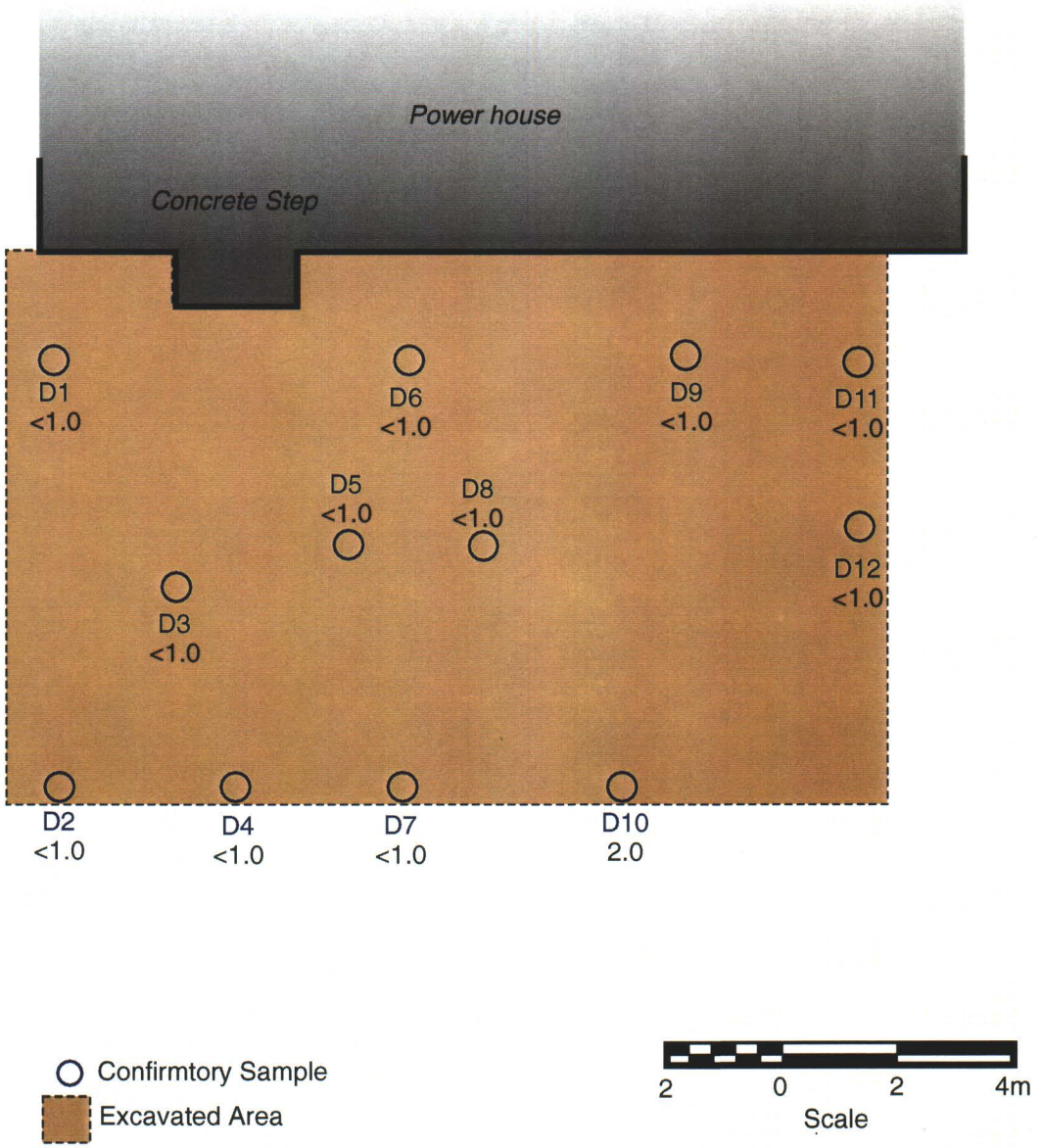
3. *Excavation and Confirmatory Sampling of DCC Tier II Contamination at AA108 to AA115*

The DCC Tier II /CCME R/P contaminated soil (4.6m^3) was removed to a maximum depth of 10 cm and placed in barrels. The DCC-I soils were then removed with a front-end loader and placed in the landfill. An area of 14 m by 4 m to a maximum depth of 0.6 m was excavated. Following this, 12 samples (D1 to D12) were taken and analyzed with the test kits; six of these were later analyzed by GC/ECD in the laboratory. The results obtained (Table III-4) indicated that the DCC Tier II soils had been successfully removed, but that DCC-I contaminated soils were still present on the west side of the excavated area. The transformer poles on the west boundary of the excavated area were removed and a front-end loader was used to extend the excavated area a further three metres to 14 m by 7 m and to a depth of 0.6 m (60 m^3) to ensure contaminant removal to levels below DCC-I. The area excavated and the sample locations are shown in Map III-4 (Photograph III-5). All excavated areas were backfilled.

Table III-4: Concentration of PCBs in Samples Collected from AA108 - AA115 after Removal of Contaminated Soils

Sample #	Conc. of PCBs (ppm or μg/g)	
	Field Test Kit	GC/ECD
D1	<1.0	
D2	<1.0	<1
D3	<1.0	<1
D4	<1.0	
D5	<1.0	
D6	<1.0	0.2
D7	2.0	
D8	<1.0	<1
D9	<1.0	
D10	2.0	
D11	<1.0	0.1
D12	<1.0	<1

Map III-4: Confirmatory Testing Sample Locations and PCB Concentrations (ppm) at AA108 and AA115, the Powerhouse South Stain



Photograph III-4: Delineation and demarcation of contaminated area at AA108 and AA115 the powerhouse south stain.

Photograph III-5: Excavated area at AA108 and AA115, the powerhouse south stain after removal of DCC-I contaminated soil.

C. Dump Site 3: Battery Stain

1. Previous Investigation

Dump site 3, located between two larger dump sites on the south side of the site, contained engine parts, an old vehicle and airstrip rollers in a small flat depression. Two large battery stains (west battery stain and east battery stain) were noted in this area of the site.

2. Delineation

Prior to performing any delineation sampling the visible battery fragments as well as the surface 3 cm of soil was removed from both battery stains and placed in barrels (Photograph III-6 and Photograph III-7).

a) West Battery Stain Delineation

Ten samples (E1 - E10), including one depth sample, were collected from in and around the area, defined by the scattered battery fragments, at random locations. All the samples were analyzed using the PFXRF at Aishihik. Four samples at the outer edge of the stained area (E6, E7, E7 and E9) had concentrations of lead that exceeded DCC-I. The concentrations of lead in the remaining samples ranged from 666 ppm to 50,080 ppm, all in excess of DCC-II. Sample locations are indicated on Map III-5 and the concentrations of copper, zinc and lead are shown in Table III-5 (Photograph III-8).

Table III-5: Concentrations of Metals in Soils Collected from West Battery Stain

Sample	Concentration (ppm or μg/g)		
	Copper	Zinc	Lead
E1	< 50	103	666
E2*	63	155	13,231
E3	< 50	167	48,450
E4	< 50	128	50,080
E5	< 50	82	2820
E6, 10cm	< 50	89	320
E7*	56	95	438
E8	77	88	2383
E9	74	103	226
E10*	< 50	147	872

*Analysis performed in duplicate.

b) East Battery Stain Delineation

Thirteen samples (F1 - F13), including one depth sample, were collected from in and around the area, defined by the scattered battery fragments, at random locations. All the samples were analyzed using the PFXRF at Aishihik. Three samples (F12, F12* and F13), located on the edge of the stained area, contained concentrations of lead below DCC-I. Six samples (F1, F6, F8, F8, F9 and F11) had concentrations of lead that exceeded DCC-I. The concentrations of lead in the remaining samples (F1, F2, F3, F4, F5, F7 and F10) ranged from 564 ppm to 68,810 ppm, all in excess of DCC-II. Sample locations are shown on (Map III-6) and the concentrations of copper, zinc and lead are displayed in Table III-6.

Table III-6: Concentration of Metals in Samples Collected to Delineate Contamination at East Battery Stain

Sample	Concentration (ppm or μg/g)		
	Copper	Zinc	Lead
F1	23	103	564
F2	< 50	140	68,810
F3*	62	120	1316
F4	< 50	358	27,170
F5	86	298	3267
F6, 10cm	< 50	69	201
F7	< 50	434	1125
F8*	54	128	237
F9	< 50	120	499
F10	58	561	601
F11	< 50	90	4739
F12*	54	112	156
F13	< 50	128	115

*Analysis performed in duplicate.

3. Excavation and Confirmatory Sampling

a) West Battery Stain

The high level DCC-II contaminated soils (1.2 m^3) were placed in barrels with the battery fragments. Contaminated soil was excavated using a front-end loader, from an area 6 m by 6 m to a depth of 0.6 m (22 m^3) and placed in a landfill on site. After excavation of the contaminated soil, six samples (G1 - G6) were taken from the perimeter and bottom of the excavated area and analyzed using the PFXRF. The results (Table III-7) indicated that the lead-contaminated soil in the West Battery Stain area had been successfully removed to below the detection limit (20 ppm). The confirmatory sample

locations and actual area of soil removed are shown in Map III-5 (Photograph III-10). All excavated areas were backfilled.

Table III-7: Concentration of Metals in Samples Collected from West Battery Stain After removal of Contaminated Soils

Sample	Concentration (ppm or $\mu g/g$)		
	Copper	Zinc	Lead
G1	<50	102	<20
G2	< 50	69	<20
G3	<50	68	<20
G4	<50	38	<20
G5	72	40	<20
G6	< 50	32	<20

b) East Battery Stain

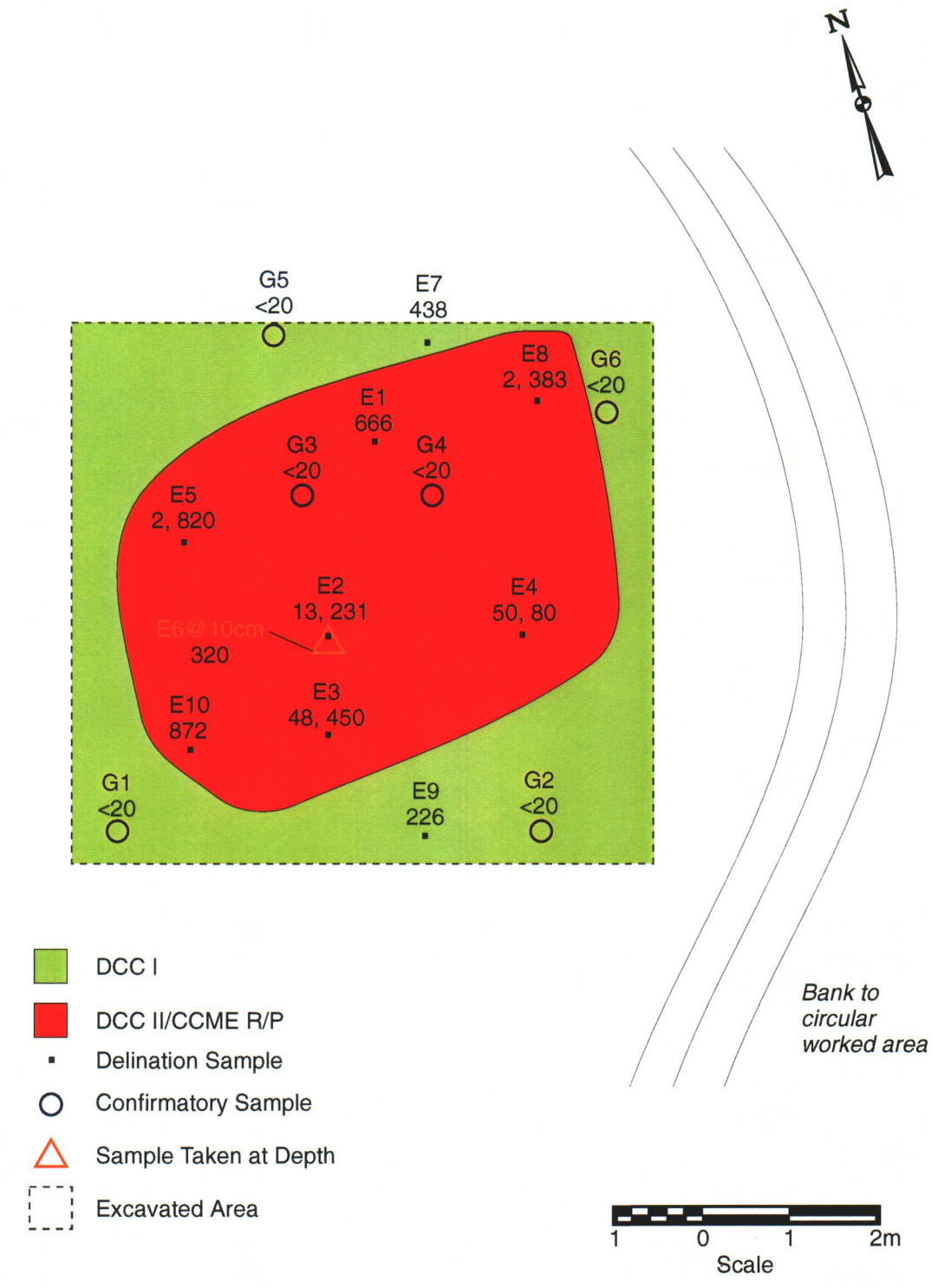
The surface layer of DCC-II contaminated soil (0.5 m^3) was placed in barrels with the battery fragments. Contaminated soil was excavated from an area 7 m by 6 m to a depth of 0.6 m (0.5 m^3), using a front-end loader, and placed in a landfill on site. After excavation of the contaminated soil, seven samples (H1 - H7) were taken from the perimeter and bottom of the excavated area and analyzed using the PFXRF. The results (Table III-8) indicated that the lead-contaminated soil in the East Battery Stain area had been successfully removed to below DCC-I in all cases and below the detection limit (20 ppm) in most cases. The confirmatory sample locations and actual area of soil removed are shown in Map III-6 (Photograph III-11). All excavated areas were backfilled.

Table III-8: Concentration of Metals in Samples Collected from Battery Pile East After removal of Contaminated Soils

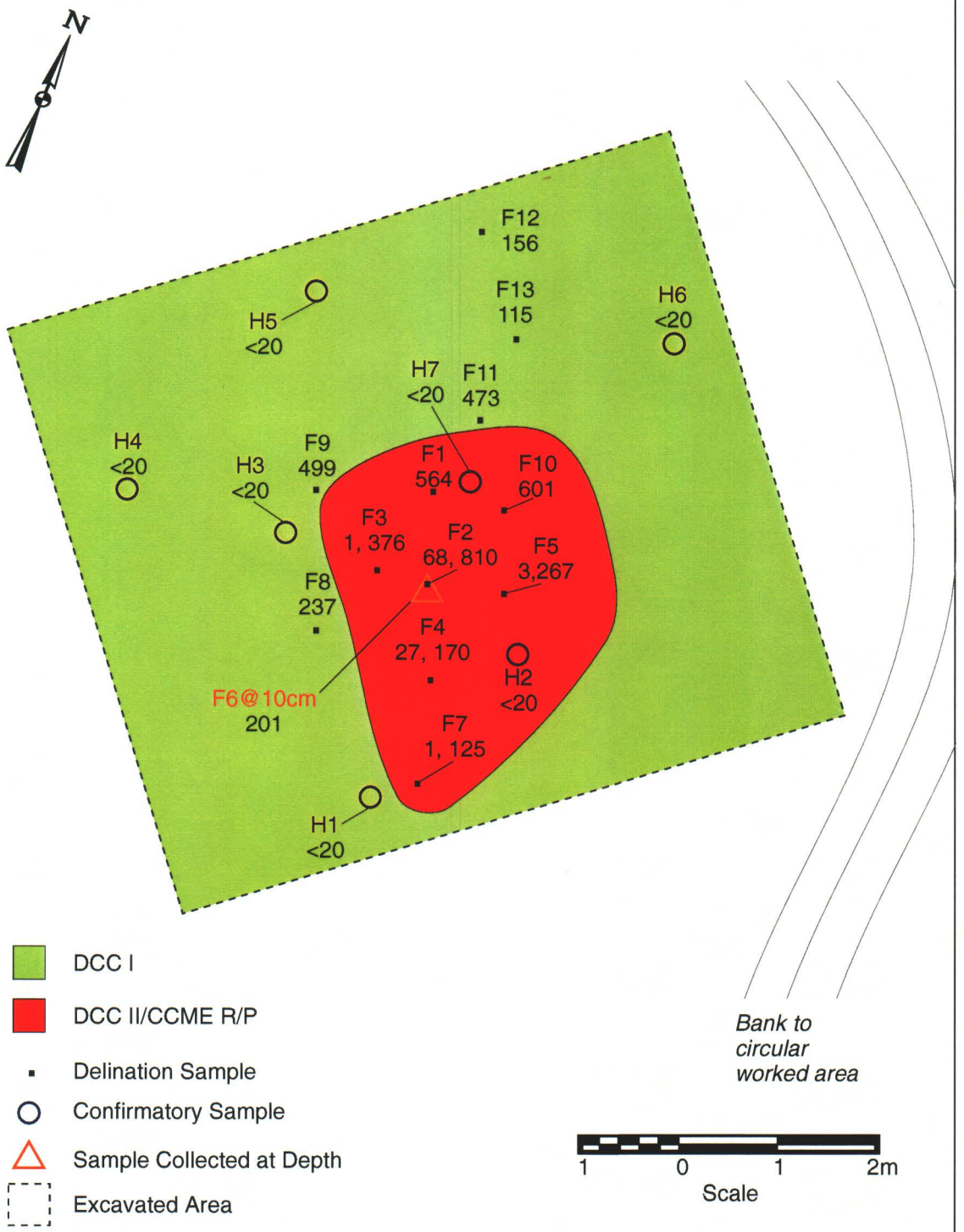
Sample	Concentration (ppm or μg/g)		
	Copper	Zinc	Lead
H1	<50	67	<20
H2	<50	58	<20
H3	<50	<30	<20
H4	<50	88	<20
H5	<50	56	<20
H6	<50	<30	<20
H7*	<50	41	<20

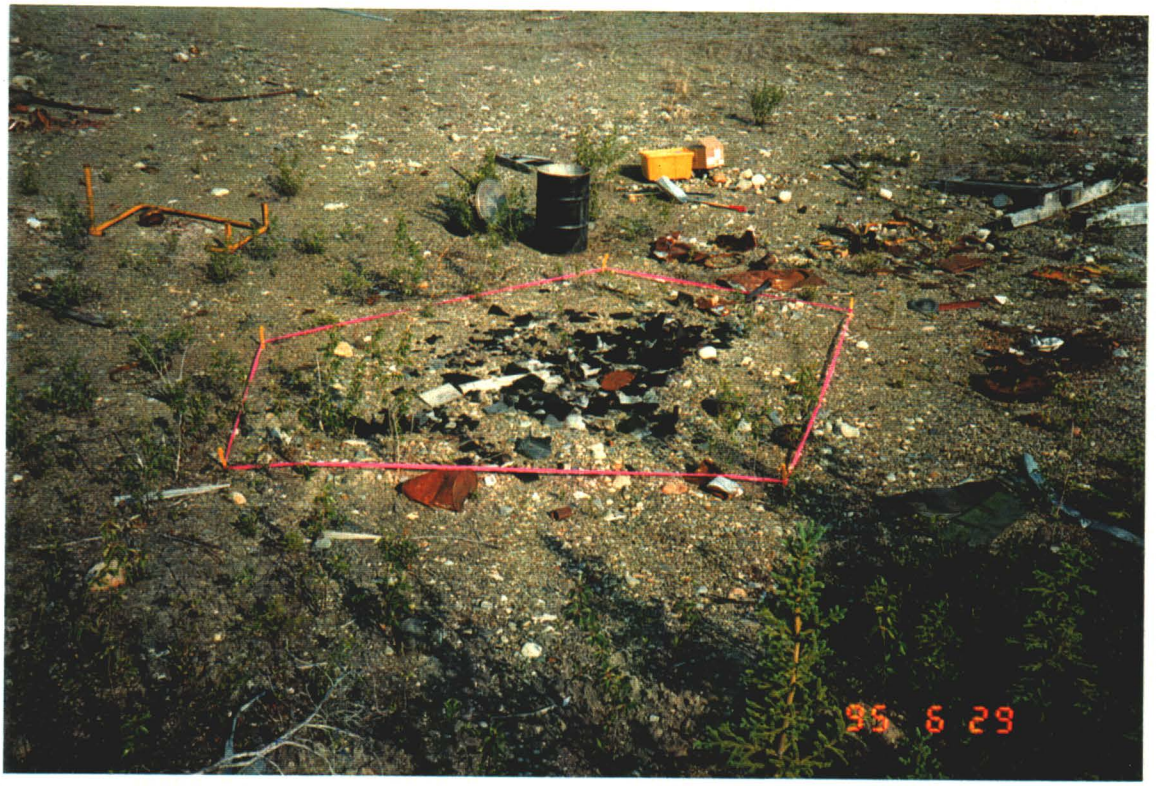
*Analysis performed in duplicate.

Map III-5: Delineation and Confirmatory Testing Sample Locations and Lead Concentrations (ppm) for West Battery Stain

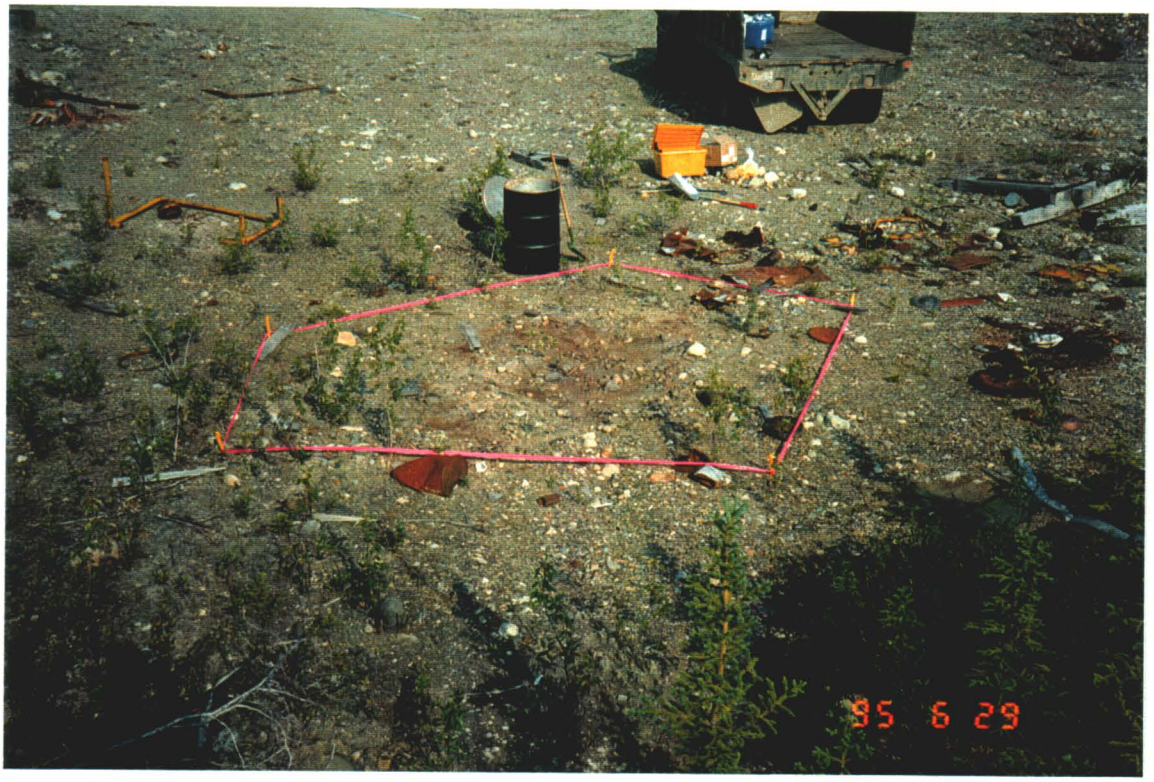


Map III-6: Delineation and Confirmatory Testing Sample Locations and Lead Concentrations (ppm) for East Battery Stain





Photograph III-6: West battery stain before containing battery fragments in barrels.



Photograph III-7: West battery stain after containing battery fragments in barrels.

Photograph III-8: Delineation sample locations for the west battery stain.

Photograph III-9: Delineation sample locations for east battery stain.

Photograph III-10: Confirmatory sampling at the west battery stain.

Photograph III-11: Confirmatory sampling at the east battery stain.

D. Location AA116

1. Previous Investigation

Sample AA116, collected 1.5 m northeast of a creosote-treated pole located 15 m west of the centre of the garage, contained lead (200 ppm) comparable to the DCC Tier I.

2. Delineation

One sample (I1) was collected from the original sample location and four more (I2 - I5) were collected 1 m from I1 in order to determine the extent of lead contamination. These samples were analyzed by using the FPXRF at Aishihik. The concentration of lead at I1 (208 ppm) was comparable to DCC-I; however, the remaining four samples contained lead at low levels. (Table III-9). This indicated that the lead contamination was restricted to a small isolated area, and therefore no further work was carried out at this location.

Table III-9: Concentration of Metals in Soils Collected near AA116

Sample	Concentration (ppm or μg/g)		
	Copper	Zinc	Lead
11*	<50	233	208
12	58	106	48
13	<50	126	<20
14*	<50	115	<20
15	<50	297	79

*Analysis performed in duplicate

IV. REMEDIATION OF CONTAMINATED POWERHOUSE

A. Previous Investigation

Samples taken from the powerhouse indicated that it was contaminated with PCBs. Highly elevated concentrations (1100 ppm) were found in one soil sample (AA100) taken from one of two generator sumps in the main room of the powerhouse. One paint sample obtained from the same area of the powerhouse also contained elevated levels (154 ppm), and a second, taken from a concrete bench in the southwest room of the powerhouse contained highly elevated levels (21,900 ppm) in violation of CEPA. A paint sample taken from the southeast room of the powerhouse contained PCB concentrations in excess of DCC-II (26 ppm) but less than CEPA. Swab samples taken from the three rooms had low levels (<100 ng/10 cm^2) indicating that the PCBs were "locked" in the paint.

Elevated levels of inorganic elements (lead, 620; zinc, 2020; and copper, 118 ppm) were also present in soil sample AA100 taken from the generator sump.

B. Remediation, Confirmatory Testing and Demolition

Due to the high levels of PCBs on the floor and in the paint on the walls of the building a decision was made to remove the building entirely. The waste generated with concentrations in excess of CEPA, and that generated by the paint stripping process, were segregated in labelled barrels, which were removed from the site for shipment to a waste disposal facility. The non-hazardous waste generated by the demolition of the powerhouse was buried in the landfill on site. The remediation of the powerhouse was conducted according to Health and Safety Plan prepared by Phoenix OHC, Inc., Kingston (Annex A).

Contaminated debris scattered on the floor of the powerhouse was consolidated and placed in labelled barrels (Photograph IV-1). The south section of the roof and the

entire ceiling of the powerhouse were removed to allow effective ventilation of the powerhouse during solvent washing and chemical paint stripping processes. Waste material generated was placed in the non-hazardous waste landfill.

1. Generator Sump

Soils containing PCBs in excess of CEPA and DCC-II were excavated from both generator sumps to a depth of 40 cm and placed in labelled barrels. A soil sample was taken and analyzed with test kits, and later analyzed by GC/ECD in the laboratory. The results obtained from the west and east sumps (2.5 ppm and 1.4 ppm respectively) were below DCC-II and indicated that sufficient soil had been removed to permit landfilling of the residual low level contaminated soil (Photograph IV-2).

2. Powerhouse Walls and Concrete Floor and Bench

The powerhouse floor, concrete bench in the southwest room and two radiators in the powerhouse main room, were washed three times using Varsol and the washings absorbed with oil absorbant material (Oclansob). Four floor paint samples were taken, two from the main room and one each from the southwest and southeast rooms. Laboratory analysis for PCBs by GC/ECD indicated that the paint still contained elevated levels of PCBs ranging from 6,140 ppm to 11,860 ppm. Paint was dry scraped from all walls and concrete surfaces where possible. Painted areas on the floor and wooden shelving and edging which resisted the physical stripping process were treated with a commercial methylene chloride base paint stripper. The waste generated by these processes was removed and placed in appropriately labelled barrels (Photograph IV-3 and Photograph IV-4).

The two radiators were removed from the building and placed in the landfill. The building was demolished and the debris placed in the landfill. Two concrete floor samples were taken from the main room of the powerhouse, obtained as fine powders by drilling

the surface of the concrete floor with a masonry drill bit, and analyzed in the laboratory for PCBs. The concentrations of PCBs (6.5 ppm and 36 ppm) in these two samples were found to be below CEPA and no further treatment of the concrete surfaces was performed (Photograph IV-5). The concrete bench from the southwest room was removed to the landfill.

The buried diesel fuel tank was removed from the west side of the powerhouse and taken to the landfill. A stain at the bottom of the tank pit was sampled and analyzed for benzene, toluene, ethylbenzene and xylene (BTEX), pesticides and PCBs. Low levels of xylene (p,m-xylene (0.34 ppm) and o-xylene (1.8 ppm)) was detected. None of the other BETX compounds were detected. Pesticide and PCB levels were below the detection limits. These results indicate that the levels and nature of the contamination are not deleterious to the environment. Further, the depth of contamination suggested that back-filling the tank pit with gravel provided a suitable remediation solution (Photograph IV-6 and Photograph IV-7).

A 3 m wide and 0.5 m deep trench of soil was removed from the west and south sides of the building (Photograph IV-8) using a front-end loader and placed in the landfill, in order to ensure that any near surface contamination, which may not have been detected in previous investigations, was removed. All excavated areas around the powerhouse were backfilled with soil and gravel from a local source. Soil was banked around and over the concrete pad to a depth of 0.5 m to ensure encapsulation and isolation of the pad from any environmental influence (Photograph IV-8 and Photograph IV-9).

Photograph IV-1: Scattered debris from powerhouse floor containment in barrels.

Photograph IV-2: Powerhouse generator sump soil excavation and containment in barrels.

Photograph IV-3: Powerhouse walls after physical paint stripping.

Photograph IV-4: Powerhouse wooden plank during chemical paint stripping.

Photograph IV-5: Concrete sample removed from the powerhouse generator foundations.

Photograph IV-6: Pit and tank after removal of the powerhouse diesel tank.

Photograph IV-7: Sample location at the base of the powerhouse diesel tank pit.

Photograph IV-8: Graded trench after removal of soil from around the powerhouse concrete pad.

Photograph IV-9: Barrels awaiting shipment off site, temporarily stored on powerhouse concrete pad.

V. QUALITY ASSURANCE / QUALITY CONTROL (QA/QC)

A. Inorganic Elements

For field measurements, the operation of the FPXRF was monitored with pure metal and Teflon standards in accordance with the manufacturer's instructions; analyses were only carried out after obtaining Mn and Co intensities of <0.003 as recommended by the manufacturer. Precision and reproducibility of the data were checked by analyzing a selected number of samples (20 %) in duplicate. Good agreement was obtained between replicate analyses (Table V-1: Concentration). The average relative standard deviation or coefficient of variation (standard deviation divided by the mean) expressed as a percentage for all replicate soil samples was 8.0 % for copper, 11 % for zinc and 10 % for lead.

The concentrations of copper, zinc and lead in soil samples analyzed by FPXRF in the field are compared to those obtained by laboratory AAS in Table V-2. A good correlation between the FPXRF and AAS results was obtained for confirmatory samples (G1, G4, G6, H1, H4 and H7); copper, lead and zinc levels were comparable and well below the DCC.

Table V-1: Concentration of Metals in Duplicate Analyses of Aishihik Airstrip Soil Samples by FPXRF

Sample	Concentration (ppm or μg/g)		
	Copper	Zinc	Lead
E2	75	205	14460
E2 dup	44	104	12003
Std. Dev.	16	50	2457
Rel Std. Dev. (%)	13	34	19
E7	62	100	437
E7 dup	< 50	90	438
Std. Dev.	6	5.0	0.5
Rel Std. Dev. (%)	11	5.3	.11
E10	<50	155	895
E10 dup	<50	139	849
Std. Dev.	-	8	23
Rel Std. Dev. (%)	-	5	3
F8	57	112	251
F8 dup	<50	144	223
Std. Dev.	4	16	14
Rel Std. Dev. (%)	7	12.5	6
F12	57	121	145
F12 dup	<50	103	166
Std. Dev.	4	9	10
Rel Std. Dev. (%)	7	8	6

Table V-1: Continued

Sample	Concentration (ppm or μg/g)		
	Copper	Zinc	Lead
H7	<50	51	<20
H7 dup	<50	<30	<20
Std. Dev.	-	10	-
Rel Std. Dev. (%)	-	26	-
I1	<50	233	208
I1 dup	<50	223	207
Std. Dev.	-	5	0.5
Rel Std. Dev. (%)	-	2	0.2
I4	<50	115	<20
I4 dup	<50	111	23
Std. Dev.	-	2	2
Rel Std. Dev. (%)	-	2	7
Average Rel. Std. Dev	**8.0**	**11**	**10**

Table V-2: Concentration of Copper, Zinc and Lead in Soils by using FPXRF and AAS

Sample	Concentration (μg/g or ppm)					
	Copper		Zinc		Lead	
	XRF	AAS	XRF	AAS	XRF	AAS
G1	<50	37.2	67	57	<20	13
G4	<50	19.7	88	102	<20	<10
G6	<50	16.9	102	115	<20	<10
H1	<50	23.9	51	56	<20	<10
H4	<50	16.4	38	37	<20	<10
H7	<50	6.7	32	26	<20	<10

B. PCBs Analysis

Precision/reproducibility of the immunoassay test kits was monitored by analyzing four samples in duplicate. Good agreement was obtained between replicate analyses (Table V-3); the maximum relative standard deviation obtained was 8.3%.

Table V-3: Concentration of PCBs in Duplicate Analyses of Aishihik Airstrip Soil Samples

Sample	Concentration of PCBs (ppm or μg/g)
B9	39
B9 dup	35
Std. Dev.	2
Rel Std. Dev. (%)	5.4
B16	65
B16 dup	55
Std. Dev.	5
Rel Std. Dev. (%)	8.3
B22	35
B22 dup	33
Std. Dev.	1
Rel Std. Dev. (%)	2.9
B16, 15	1.7
B16, 15 dup	1.7
Std. Dev.	0
Rel Std. Dev. (%)	0
Average Rel. Std. Dev	**4.2**

The concentrations of PCBs in nine confirmatory samples determined by laboratory GC/ECD and immunoassay field test kits are shown in Table V-4. Good agreement was obtained between the field results and the laboratory data.

Table V-4: Concentration of PCBs in Soils by Using by Gas Chromatography/ Electron Capture Detection (GC/ECD) and Immunoassay Test Kit

Sample	Concentration of PCBs (μg/g or ppm)	
	GC/ECD	Test kit
C2	<1.0	<1.0
C3	<1.0	<1.0
C6	0.08	<1.0
C7	0.04	<1.0
C9	0.6	<1.0
C11	0.1	<1.0
C12	0.07	<1.0

Annex A: The following pages contain the Phoenix OHC Health and Safety Plan submitted to the DIAND representative at Aishihik during the site cleanup.

Phoenix OHC, Inc.

Consultants in Occupational and Environmental Health
Formerly Occupational Health Centre at Queen's University

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HEALTH CONSIDERATIONS AND PROCEDURES RELATING TO THE REMOVAL OF PCB AND LEAD CONTAINING PAINT

AISHIHIK POWERHOUSE, YUKON

PREPARED BY: Tom Beardall, MHSc, CIH, ROH
ON: 1995.06.15
AS REQUESTED BY: Dr. Ken Reimer
REFERENCE NO.: 4577

1. SCOPE OF WORK

1.1 This project involves a clean-up of the floor, removal of the roof, removal of paint from the interior surfaces of the ceiling and walls, and PCB decontamination (with Varsol) of all interior surfaces of the Aishihik powerhouse. Paint will be removed with chemical paint stripper and by manual scraping of the treated material. After the waste has been removed to appropriately labelled collection barrels, surfaces will be washed with Varsol, and the washings contained and collected by means of hydrocarbon absorbent material.

1.2 The powerhouse is described as a small wooden building with a concrete floor. Doors and windows are no longer present in the existing frames. Although this could provide for a considerable degree of natural ventilation, it may not adequately reduce methylene chloride vapour levels during indoor paint stripping. Exposure to methylene chloride and methanol (the two components of the paint stripper) are not adequately controlled by air purifying respirators due to rapid breakthrough of charcoal and poor warning properties. Therefore, to maximize the level of natural ventilation, the roof of the powerhouse will be removed before any paint stripping is conducted.

1.3 Paint and floor debris samples have been determined analytically to contain up to 2.2% PCB and up to 2.0% lead (in addition to varying concentrations of other inorganic elements; results appended).

This document was prepared based on information about the site and intended work procedures provided by the Royal Roads Military College and information regarding the paint stripper, decontamination solvent and absorption agents that were scheduled to be used at the site, provided by Action on Waste, Arctic Environmental Strategy, Indian and Northern Affairs.

2. DEFINITIONS

2.1 CEPA: Canadian Environmental Protection Act

2.2 CSA: Canadian Standards Association

2.3 Chemical Paint Remover: Paint and Varnish Remover, manufactured by Recochem Inc. (MSDS appended)

2.4 Detector tubes: Glass tubes containing colorimetric reagents adsorbed on silica gel. A piston or bellows pumps is used to draw a precise volume of air through the tube. The reagents react quantitatively to specific gases or vapours to provide a length-of-stain indication of airborne concentrations. Manufacturers include Gastec Corporation and Drager Ltd.

2.5 Hydrocarbon absorbent material: Oclansorb™ or equivalent (MSDS appended)

2.6 MSDS: Material Safety Data Sheet

2.7 NIOSH: National Institute for Occupational Safety and Health (in the U.S.A.)

2.8 PCB: Polychlorinated Biphenyls

2.9 Transition Zone: The zone between the contaminated work area and the outdoor environment, (see section 5.4)

2.10 Waste load-out area: A staging area for waste filled containers to allow for the decontamination of their outer surfaces (if necessary) prior to transport (see section 5.5)

2.11 Wet methods: Manual disturbance of materials (e.g. with scrapers, brushes etc.) only after the materials have been "wetted" to near saturation, with liquid.

2.12 Work Area: The area delineated by the exterior walls of the powerhouse once the project set-up is completed (see section 5) and until the final clean-up is completed

3. GENERAL REQUIREMENTS

3.1 All work is to be conducted in strict compliance with the applicable legal requirements of the jurisdiction(s).

3.2 Prior to the start of work, all workers are to be informed of the hazards of the work and work area, and are to be trained in the proper care, use and limitations of their personal protective equipment.

4. HYGIENE AND PERSONAL PROTECTIVE EQUIPMENT

4.1 Anyone entering the work area must be wearing the personal protective equipment assigned for the particular phase of remediation (see sections 6, 7, 8 and 9)

4.2 There will be no eating, drinking or smoking inside the work area and workers will wash-up prior to eating, drinking or smoking away from the work area.

4.3 Prior to leaving the work area, personnel will remove visible contamination from their protective clothing and equipment (e.g. by wet wiping with a water soaked rag).

4.4 The work area will be exited into a transition zone (a 6 mil polyethylene drop sheet on the ground outside the door). The exiting sequence will consist of the following:

- contaminated coveralls, boot covers, respirator cartridges and gloves will be removed and disposed in waste barrels,
- non-contaminated protective clothing intended for reuse will be stored,
- goggles and respirators will be cleaned and stored in sealed containers,
- personnel will wash their hands and face, and if contaminated, any other skin surface.

4.5 If at any time during the project the protective equipment or clothing is damaged (e.g. torn) or penetration by the stripper or solvent is suspected, then the worker must exit the work area into the transition zone and remove, dispose and replace the affected item. Saranex coveralls and boot coverings may be penetrated by chemical stripper shortly after being contaminated with this liquid, and therefore, must be replaced immediately after such contamination.

5. PROJECT SET-UP

5.1 The project set-up reflects the fact that this is fundamentally an environmental abatement project, and is intended to provide a workable approach to the protection of workers and protection of the environment (through containment) but with worker protection being of paramount importance. Wet removal methods will minimize airborne PCB/lead dust levels, but may result in high airborne solvent levels. Therefore a high degree of natural ventilation is desirable; doors and windows must not be sealed off. Depending on the degree of natural cross-drafting available, portable fan(s) may also be useful or necessary for diluting airborne solvent levels. However, it is imperative that solvent vapour explosivity be precluded (e.g. by use of a solvent such as Varsol with a flash point well above ambient temperature) and ensuring that no source of ignition (e.g. fan motor) is present where there is any significant accumulation of solvent vapour.

After the floor is cleaned with Varsol and before any paint removal is conducted, the roof of the powerhouse will be removed, thereby maximizing the degree of natural ventilation present during paint stripping activities.

5.2 Warning signs (e.g. "Health Hazard, Keep Out") will be posted at the approaches to the work areas,

5.3 Polyethylene drop sheets will be secured to the ground outside the exterior doors and windows to provide for the clean-up of any debris falling through these openings during the remediation

5.4 A transition zone between the contaminated work area and the outdoor environment will be created. It will consist of a 6 mil polyethylene drop sheet secured to the ground at the entrance to the building (tent-like enclosure, optional) and having a waste receptacle for disposal of contaminated clothing, wash-up facilities, storage containers for respirators and goggles, a portable eye-wash and a first aid kit.

5.5 A waste load-out area will be created. It will consist of a 6 mil polyethylene drop sheet secured to the ground at a separate access point to the powerhouse. It must be of sufficient size to permit cleaning of waste collection barrels, if necessary, prior to transport.

5.5.1 All waste will be removed from the work area via the waste load-out area. The waste containers will be cleaned of all surface contamination and/or be inserted into second (clean) containers at this point. The waste load-out area is never to be used for entering or exiting the work area. That is to occur only through the transition zone.

6. FLOOR DECONTAMINATION

6.1 The cleanup of loose debris and sediment from the floor, washing of the floor with Varsol, absorbing of washings with hydrocarbon absorbent material and disposal of debris and contaminated materials in designated containers will be conducted with the following stipulations:

6.1.2 The following **personal protective equipment**, intended to minimize exposures to lead/PCB dust and Varsol vapour and splashes, must be worn:

- a half-face respirator with organic vapour cartridges and dust/mist prefilter (NIOSH approved),
- disposable full body Saranex® (or equivalent) coveralls with a hood,
- nitrile or Silvershield® gloves (disposable "surgical-type" glove coverings over the Silver Shields, used to improve dexterity, is optional)
- safety boots (CSA approved) with disposable Saranex® (or equivalent) boot covers,
- chemical-splash resistant goggles.

6.1.2 Remove any litter that is not associated with PCB and/or paint contamination from the work area, prior to the clean-up/decontamination activities.

6.1.3 Test the floor and floor debris for levels of contamination (as well as wall and ceiling surfaces and materials when appropriate)

6.1.4 Remove the PCB-contaminated sediment (previously found to exceed CEPA criteria) from depression in floor by wet methods (i.e. thoroughly wet the sediment with Varsol and wipe, scrape or sweep) and dispose in DCC-II waste receptacle

6.1.5 Remove any other debris from the floor by similar wet methods and dispose in the appropriate waste receptacle (DCC-I or DCC-II).

6.1.6 Wash the floor with Varsol

6.1.7 Absorb the washings with hydrocarbon absorbent material and dispose in appropriate waste receptacle

6.1.8 Allow the floor to dry

6.1.9 Completely cover the floor with 6 mil polyethylene drop sheet(s) secured with duct tape or glue (intended to facilitate an easier final clean-up). *Significant contact with methylene chloride (paint stripper) may well dissolve some of the plastic; however, the degree to which this may become problematic will need to be determined based on site conditions.*

7. ROOF REMOVAL

7.1 The roof will be removed according to methods prescribed by the site supervisor, with the following stipulations:

7.1.1 The following **personal protective equipment**, intended to minimize head, foot and eye injury during destruction activities as well as exposures to lead/PCB dust, must be worn:

- hard hat (CSA approved),
- safety boots (CSA approved),
- safety glasses or impact resistant goggles (CSA approved)
- disposable full body coveralls with hood,

and if there is likely to be significant paint dust generation then a NIOSH approved dust/mist respirator.

7.1.2 Internal ceiling surfaces requiring paint removal and/or decontamination with Varsol will be kept inside the building until completion of the next phase of remediation (section 8).

8. PAINT REMOVAL

8.1 Once the roof has been removed, the removal of paint from the walls and the disassembled ceiling, by means of chemical paint stripper and manual scraping, will be conducted with the following stipulations:

8.1.1 In addition to the requirements of section 3.2, the workers will be advised of the acute effects of methylene chloride on the eye, and be shown how to flush out the eyes in case of accidental contact.

8.1.2 The following **personal protective equipment**, intended to minimize skin and eye contact with chemical paint stripper and exposures to lead/PCB dust, must be worn:

- disposable full body Saranex® (or equivalent) coveralls with a hood,
- Silvershield® gloves,
- safety boots (CSA approved) with disposable Saranex® (or equivalent) boot covers,
- chemical-splash resistant goggles,

and if there is likely to be significant paint dust or mist generation (e.g. if flakes dry/crumble to a powder or if wire brushing becomes necessary such as in cracks and crevices) then a NIOSH approved dust/mist filtering respirator

NOTE: Air purifying respirators (e.g. with organic vapour cartridges) will not adequately protect against the vapours of the paint stripper and are therefore not recommended. Exposures are to be controlled with natural dilution ventilation, confirmed to be effective by means of a direct reading monitoring device for methylene chloride (see clause 8.1.3).

8.1.3 **Air monitoring** with detector tubes will be conducted by the site supervisor to confirm that methylene chloride levels are within the following acceptable limits:

- At no time may exposures to methylene chloride exceed 250 ppm,
- Short term exposures (30 minutes average levels) to methylene chloride shall not exceed 150 ppm,
- 8 hour average levels shall not exceed 50 ppm

If exposures inside the work area are likely to exceed these limits, then the area should be vacated until such time that airborne methylene chloride concentrations are within acceptable levels.

The detector tube system will provide "grab sample" type results not directly comparable to 30 minute and 8 hour averages. Therefore, interpretation of the results will be dependent on the user's judgement. Ideally, methylene chloride levels during worst-case periods (e.g. during and shortly after application of the stripper) would be well below the 30 minute limit and levels at the start of scraping (i.e. after the waiting period required for the stripper to take effect) would be below the 8 hour limit.

8.1.4 Follow the manufacturer's recommended procedure for paint removal. Multiple layers of paint may require multiple applications of the paint stripper.

8.1.5 While still damp, place the stripped paint in the appropriate waste collection barrel. Clean up waste materials at frequent intervals, at the end of the day and prior to any inclement weather.

9. WALL AND CEILING DECONTAMINATION / FINAL CLEAN-UP

9.1 The washing of the walls and ceiling with Varsol, absorbing of washings with hydrocarbon absorbent material, disposal of absorbed materials in designated containers, and final clean-up will be conducted with the following stipulations:

9.1.2 The following **personal protective equipment**, intended to minimize exposures to lead/PCB dust and Varsol vapour and splashes, must be worn:

- a half-face respirator with organic vapour cartridges and dust/mist prefilter (NIOSH approved),
- disposable full body Saranex® (or equivalent) coveralls with a hood,
- nitrile or Silvershield® gloves (and disposable "surgical-type" glove coverings over the Silver Shields, used to improve dexterity, is optional)
- safety boots (CSA approved) with disposable Saranex® (or equivalent) boot covers,
- chemical-splash resistant goggles.

9.1.3 Wash the walls and ceiling with Varsol

9.1.4 Absorb the washings with hydrocarbon absorbent material and dispose in appropriate waste receptacle

9.1.5 Fold up the plastic drop sheet (from the floor) in a manner that contains any residual material left on its surface and dispose in the appropriate waste receptacle

9.1.6 If necessary, based on any observed contamination and/or test methods, re-clean and/or wash the floor, absorb the washings and dispose of materials as described previously.

9.1.7 Fold up drop sheets from outside the windows and doors in a manner that contains any waste material and dispose in the appropriate receptacle.

9.1.8 Clean-up and disassemble the waste load out area and transition zone and dispose of any contaminated materials and drop sheets in the appropriate receptacle(s).

9.1.9 Generally accepted practice would require that workers remove any contaminated work clothes (i.e. that were worn under the disposable coveralls) for laundering, and then shower and change into clean "street clothes" before leaving the site. As this will not be possible, care must be taken not to contaminate living quarters (or other occupied areas). Upon returning to the home, workers should bag their work clothes (preferably "at the door"), set them aside for laundering, and then shower.

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removal.pcb

APPENDIX

G. Inorganic Element and PCB Results for Paint Samples

	Co ug/g	Cd ug/g	Cr ug/g	Cu ug/g	Zn %	Pb %	As ug/g	Ni ug/g	PCBs ug/g
ASPC1	107	3.4	208	58	1.46	0.28	0.45	<0.5	21915
ASPC2	66	3.1	1090	35	1.58	0.58	0.6	7.6	26
ASPC3	159	9.8	144	147	4.83	1.98	1.47	<0.5	154

RECOCHEM INC.
CONSUMER DIV. COMPLIANCE DEPT.
131 EAST DRIVE BRAMPTON, ONTARIO L6T 1B5
(905)791-1788

PRODUCT : PAINT AND VARNISH REMOVER

SECTION 01 : CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

MANUFACTURER.....RECOCHEM INC.
850, MONTEE DE LIESSE
MONTREAL, QUEBEC
514-341-3550
PRODUCT NAME.....PAINT AND VARNISH REMOVER.
SYNONYMS.....NOT APPLICABLE.
CHEMICAL FAMILY.....NOT APPLICABLE.
CHEMICAL FORMULA.....NOT APPLICABLE.
PRODUCT USES.....PAINT STRIPPING.

SECTION 02 : COMPOSITION/INFORMATION ON INGREDIENTS

%	C.A.S. / T.L.V.	LD/50, ROUTE, SPECIES	LC/50, ROUTE, SPECIES
METHYLENE CHLORIDE			
60 - 100	75-09-2 50 ppm	1500-2500mg/kg/RAT/ ORAL	NOT AVAILABLE
METHANOL			
7 - 13	67-56-1 200 ppm	13000mg/kg RAT/ORAL 20000mg/kg RABBIT/ DERMAL	64,000ppm RAT/ INHALATION

SECTION 03 : HAZARDS IDENTIFICATION

EFFECTS OF ACUTE EXPOSURE.....
SKIN CONTACT.....CAN CAUSE IRRITATION OR DERMATITIS.
SKIN ABSORPTION.....MAY BE ABSORBED, BUT TOXICITY IS LOW.
INHALATION.....CAUSES NARCOSIS, NAUSEA, DIZZINESS, HEADACHES AND UNCONSCIOUSNESS.
INGESTION.....CAUSES ABDOMINAL PAIN. METABOLIZES IN BODY TO FORM CARBON MONOXIDE WHICH REDUCES OXYGEN CARRYING CAPACITY OF BLOOD.
EYE CONTACT.....CAUSES PAIN AND MODERATE IRRITATION, POSSIBLE TRANSIENT CORNEAL INJURY.
EFFECTS OF CHRONIC EXPOSURE.....CAUSES NARCOSIS AND NAUSEA; ANESTHESIA SIGNS OVER 900 PPM.

SECTION 04 : FIRST AID MEASURES

SKIN CONTACT.....WASH WITH SOAP AND WATER.
INHALATION.....REMOVE PATIENT TO FRESH AIR. GET MEDICAL ATTENTION.
INGESTION.....DO NOT INDUCE VOMITING. OBTAIN MEDICAL ATTENTION IMMEDIATELY.
EYE CONTACT.....FLUSH WITH COPIOUS AMOUNTS OF WATER. CALL A DOCTOR IMMEDIATELY.

SECTION 05 : FIRE FIGHTING MEASURES

FLASH POINT. (deg) METHOD.....NOT FLAMMABLE.
AUTO IGNITION TEMP. (deg).....605 C
UPPER FLAMMABLE LIMIT (% VOL)....22% @ 25 C
LOWER FLAMMABLE LIMIT (% VOL)....14.0% @ 25 C
EXTINGUISHING MEDIA.....WATER FOG.
HAZARDOUS COMBUSTION PRODUCTS....OPEN FLAME AND WELDING ARCS CAN CAUSE THERMAL DEGRADATION WITH THE EVOLUTION OF HYDROGEN CHLORIDE AND VERY SMALL AMOUNTS OF PHOSGENE AND CHLORINE.
SENSITIVITY TO MECHANICAL IMPACT.....NONE.
SENSITIVITY TO STATIC DISCHARGE.....NONE.

SECTION 06 : ACCIDENTAL RELEASE MEASURES

LEAK/SPILL.....WIPE UP SPILLS OR CLEAN UP USING ABSORBENT MATERIAL. USE RESPIRATORY, SKIN AND EYE PROTECTION.

SECTION 07 : HANDLING AND STORAGE

HANDLING PROCEDURES.....HANDLE WITH CARE.
STORAGE NEEDS.....STORE IN A COOL WELL VENTILATED AREA. KEEP AWAY FROM CHILDREN. KEEP CONTAINER CLOSED WHEN NOT IN USE.

SECTION 08 : EXPOSURE CONTROLS / PERSONAL PROTECTION

PROTECTIVE EQUIPMENT.....FOR NORMAL USE CONDITIONS.
EYE/TYPE.....NOT APPLICABLE.
RESPIRATORY/TYPE.....NOT APPLICABLE.
GLOVES/ TYPE.....WEAR RUBBER GLOVES.
CLOTHING/TYPE.....NOT APPLICABLE.
FOOTWEAR/TYPE.....NOT APPLICABLE.
OTHER/TYPE.....NOT APPLICABLE.
VENTILATION REQUIREMENTS.....LOCAL EXHAUST - MECHANICAL.

SECTION 09 : PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE.....CLEAR COLOURLESS.
PHYSICAL STATE.....VISCOUS LIQUID.

SECTION 09 : PHYSICAL AND CHEMICAL PROPERTIES

ODOUR.....CHARACTERISTIC ODOUR OF METHYLENE CHLORIDE.
ODOUR THRESHOLD (ppm).....25-50
SPECIFIC GRAVITY (H20=1).....1.285
VAPOUR PRESSURE (mmHg @ deg).....349 mm Hg @ 20 C
VAPOUR DENSITY (AIR=1)(mg/m3).....2.93
EVAPORATION RATE (nBuAc).....> 1
BOILING POINT (deg).....40.2 C
pH.....NOT APPLICABLE.
SOLUBILITY IN WATER (% W/W).....3%
COEFFICIENT OF WATER\OIL.....NOT AVAILABLE.
DISTRIBUTION
FREEZING POINT (deg).....NOT AVAILABLE.
MELTING POINT (deg).....NOT AVAILABLE.

SECTION 10 : STABILITY AND REACTIVITY

HAZARDOUS POLYMERIZATION.....WILL NOT OCCUR.
STABILITY.....STABLE UNDER NORMAL CONDITIONS.
INCOMPATIBILITY.....ALKALI, OXYDANT MATERIAL.
CONDITIONS OF REACTIVITY.....AVOID HIGH TEMPERATURES. THIS MATERIAL HAS A LOW BOILING POINT.
HAZARDOUS PRODUCTS OF DECOMPOSITION.....OPEN FLAME AND WELDING ARCS CAN CAUSE THERMAL DEGRADATION WITH THE EVOLUTION OF HYDROGEN CHLORIDE AND VERY SMALL AMOUNTS OF PHOSGENE AND CHLORINE.

SECTION 11 : TOXICOLOGICAL INFORMATION

IRRITANCY OF MATERIAL.....EYE AND SKIN IRRITANT.
SENSITIZING CAPABILITY OF MATERIAL.....NOT DETERMINED.
CARCINOGENICITY OF MATERIAL.....INCLUDED IN IARC LIST OF CARCINOGENIC SUBSTANCES.
TERATOGENICITY.....NO KNOWN EFFECTS.
MUTAGENICITY.....NO KNOWN EFFECTS.
REPRODUCTIVE EFFECTS.....NO KNOWN EFFECTS.
SYNERGISTIC MATERIALS.....NOT AVAILABLE.

SECTION 12 : ECOLOGICAL INFORMATION

ENVIRONMENTAL.....FOLLOW ALL FEDERAL, PROVINCIAL AND MUNICIPAL REGULATIONS.
BIODEGRADABILITY.....NOT AVAILABLE.

SECTION 13 : DISPOSAL CONSIDERATIONS

WASTE DISPOSAL.....DISPOSE OF IN ACCORDANCE WITH LOCAL MUNICIPAL REGULATIONS.

SECTION 14 : TRANSPORT INFORMATION

SHIPPING NAME.....DICHLOROMETHANE SOLUTION.
CLASSIFICATION.....6.1

SECTION 14 : TRANSPORT INFORMATION

P.I.N.....UN 1593
PACKING GROUP.....III
LABELS REQUIRED.....POISON AND ORIENTATION ARROWS UP.

SECTION 15 : REGULATORY INFORMATION

WHMIS CLASSIFICATION.....D1B MATERIALS CAUSING SERIOUS AND IMMEDIATE TOXIC EFFECT. TOXIC MATERIAL. D2A MATERIAL CAUSING OTHER TOXIC EFFECTS. VERY TOXIC MATERIAL. D2B MATERIAL CAUSING OTHER TOXIC EFFECTS. TOXIC MATERIAL.
CPR COMPLIANCE.....THIS PRODUCT HAS BEEN CLASSIFIED IN ACCORDANCE WITH THE HAZARD CRITERIA OF THE CPR AND THE MSDS CONTAINS ALL OF THE INFORMATION REQUIRED BY THE CPR.

SECTION 16 : OTHER INFORMATION

PREPARED BY.....MR. R.A. HILL
PREPARATION DATE.....SEP 28/93

CANUTEC EMERGENCY (613) 996-6666

OCLANSORB™

MATERIAL SAFETY DATA SHEET

Product Name:	Chemical Synonyms and Family:	Material Use:
OCLANSORB	PEAT, SPHAGNUM	ABSORBENT FOR OIL AND OIL-BASED CHEMICAL SPILLS

Manufacturer's Name:	Address:
HI-POINT INDUSTRIES LTD.	P.O. Box 779, Sunset Drive Bishop's Falls, Nfld. Canada A0H 1C0

Telephone Number:	Emergency Telephone Number:	U.N. Number:	T.D.G. Classification
(709) 258-6274	(709) 258-5456	NONE	NOT CLASSIFIED

I. INGREDIENTS OF PRODUCT

Components	Exposure Limits	% Wt. / Wt
PEAT	ACGIH TLV	> 95%
SOIL	NONE ESTABLISHED (REGARDED AS A NUISANCE PARTICULATE) 10 mg/m³	< 5%

II. PHYSICAL DATA FOR PRODUCT

Boiling Point °C, 760 mm Hg	Melting Point °C	Vapour Pressure (mm Hg)
SOLID, NOT APPLICABLE	NOT APPLICABLE	NEGLIGIBLE
Vapour Density (Air = 1)	**Solubility in H_2O % by Wt.**	**Appearance, Odour**
SOLID, NOT APPLICABLE	NOT SOLUBLE, WILL REPEL H_2O	BROWN, ODOURLESS POWDER MIXTURE
pH	**Percent Volatile by Wt**	**Evaporation Rate**
APPROXIMATELY 5	NOT APPLICABLE	(NOT APPLICABLE =1)

III. FIRE AND EXPLOSION DATA FOR PRODUCT

Flash Point (Test Method): NOT APPLICABLE

Auto Ignition Temp.	Lower Flammable Limits in Air % by Volume	Upper Flammable Limits in Air % by Volume
265 - 289 °C	UNKNOWN	UNKNOWN

Fire Extinguishing Substances

[X] WATER FOG [X] FOAM [X] CO_2 [X] DRY CHEMICAL [ ] OTHER (SPECIFY)

OCLANSORB CAN BE EXTINGUISHED BY ANY FIRE EXTINGUISHING AGENT

Unusual Fire and Explosion Hazards

IN THE EVENT OF A FIRE WHILE OCLANSORB IS BEING USED AS AN ABSORBENT THE RECOMMENDED FIRE EXTINGUISHING MEDIA FOR THE SPILLED OIL OR OIL-BASED CHEMICAL SHOULD BE USED.

IV REACTIVITY DATA FOR PRODUCT

Incompatibility

[ ] WATER [X] OXIDIZING MATERIAL [ ] ACID [ ] BASE [ ] OTHER

If Other (Please Specify)	Materials to Avoid	Hazardous Decomposition Products
NOT APPLICABLE	NONE	NOT APPLICABLE

Stability	Can Hazardous Polymerization Occur?	Storage Precautions
STABLE	NO	STORE IN A DRY PLACE

V HEALTH HAZARD INFORMATION FOR PRODUCT

Effects of Over Exposure (Both Chronic and Acute) (Inhalation, Ingestion, Eyes, Skin)

INHALATION: MAY BE SLIGHTLY IRRITATING AT VERY HIGH CONCENTRATIONS.
INGESTION: NO KNOWN HEALTH HAZARD
EYES: DUST PARTICLES MAY CAUSE EYE IRRITATION.
SKIN: NO KNOWN HEALTH HAZARD

N.B. The above information is intended for unused OCLANSORB. Consult with chemical manufacturer for health hazard information for oil and oil-based chemical

8574

VI. TOXICITY DATA LD_{50} LC_{50} AND SPECIES FOR PRODUCT OR INGREDIENTS

A STATIC LT50 TOXICITY TEST WAS PERFORMED BY ENVIRONMENTAL PROTECTION SERVICES, ATLANTIC REGION, ENVIRONMENT CANADA (84.02.22)(FILE 4490-3). THE STATIC LT50 TOXICITY TEST EXPOSED FISH TO 1,000 AND 5,000 mg/l OF SEAWATER FOR A 96 HR. PERIOD. ALL FISH SURVIVED WITH NO OBSERVABLE ILL EFFECTS. THEREFORE AN LC50 TEST WAS NOT REQUIRED.

Emergency and First Aid Procedures (Inhalation, Ingestion, Eyes, Skin)

INHALATION: REMOVE TO FRESH AIR IF IRRITATION OCCURS. IMPLEMENT APPROPRIATE CONTROLS TO PREVENT FURTHER EXPOSURE.
INGESTION: NORMALLY NOT NECESSARY TO INDUCE VOMITING. CONSULT A PHYSICIAN IF PAIN OR DISCOMFORT OCCURS.
EYES: IF DUST ENTERS EYE, FLUSH EYES WITH RUNNING WATER TO REMOVE PARTICLES.
SKIN: WASH AFFECTED AREAS WITH SOAP AND RUNNING WATER TO REMOVE PARTICLES.

N.B. This information is intended for unused OCLANSORB. Consult with manufacturer of spilled oil or oil-based chemical absorbed onto OCLANSORB for emergency and first aid information

VII SPILL OR LEAK PROCEDURES

Steps to be Taken Upon Release or Spillage (Including Neutralizing Chemicals)

SHOVEL OR SWEEP UP UNUSED OCLANSORB

Waste Disposal Methods

UNUSED OCLANSORB IS NOT A HAZARDOUS WASTE.
CONSULT QUALIFIED PERSONNEL FOR DISPOSAL TREATMENT OF HYDROCARBON SATURATED OCLANSORB.
SINCE DISPOSAL OF HAZARDOUS WASTE IS CONTROLLED BY MUNICIPAL, PROVINCIAL, STATE AND FEDERAL LAWS, CONTACT THESE AUTHORITIES FOR GUIDANCE.

VIII. SPECIAL PROTECTION INFORMATION FOR PRODUCT

Ventilation Requirements (Local or General - Specify)

LOCAL, GENERAL AND/OR NATURAL VENTILATION MUST KEEP DUST CONCENTRATIONS BELOW RECOMMENDED EXPOSURE LIMIT FOR NUISANCE DUSTS

Respiratory Protection (Specify)

NIOSH APPROVED DUST RESPIRATOR SHOULD BE USED IF CONCENTRATIONS EXCEED THE RECOMMENDED EXPOSURE LIMITS OR IF ANY RESPIRATORY IRRITATION OCCURS

Eye Protection

SAFETY GLASSES WITH SIDE SHIELDS

Protective Gloves, Clothing

PROTECTIVE GLOVES OR CLOTHING ARE NOT REQUIRED FOR OCLANSORB BUT MAY BE NECESSARY TO HANDLE ABSORBED MATERIAL

Other Protection, Special Precautions, Comments

NOT APPLICABLE

References Used to Complete M.S.D.S

ALBERTA OCCUPATIONAL HEALTH AND SAFETY ACT CHEMICAL HAZARD REGULATIONS;
ACGIH DOCUMENTATION OF TLVs;
DANGEROUS PROPERTIES OF INDUSTRIAL MATERIALS, 6TH EDITION, N. IRVING SAX.

Approval	Approval
Wayne Champion	
Approval	Approval

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