not in data base

ENVIRONMENTAL CLEAN-UP STUDY

OF

21 DEW STATION SITES IN CANADA

FINAL REPORT: DRAFT
March 1991

VOLUME 3
BAR 1
Komakuk Beach, Yukon Territory

UMA Engineering Ltd.
Engineers, Planners & Surveyors

In association with

Hardy BBT Limited
CONSULTING ENGINEERING & ENVIRONMENTAL SERVICES

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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 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 (DOE 8505, July 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 - a risk assessment for each station and the development of decommissioning options.

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 Station Reports.
(4) Volume 24 - Quality Assurance and Quality Control.

This Volume (Volume 3) is a specific DEW Station report that presents all four phases pertaining to BAR-1, Komakuk Beach. 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 provide the findings of the field survey. In Section 5.0, the asbestos, paint and PCB findings are presented. In Section 6.0, the results of soil and water sampling are summarized for background conditions, landfills, POL areas, pallet lines, outfall areas, and building proximities.

The facility clean-up and decommissioning recommendations are provided in Section 7.0. References cited are listed in Volume 2.

1.2 FIELDWORK AND SAMPLING

Field work at BAR-1 took place between August 6, 1990 and August 9, 1990. A brief reconnaissance was completed initially. This was followed by sampling in selected areas.

Data showing the number of water, soil, paint, asbestos, and PCB oil samples taken at BAR-1 are provided in Table 1.1. Sample site descriptions are presented in Appendix B.

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

1.3 DATA ASSESSMENT CRITERIA

Indicator chemicals analyzed were screened using the Quebec Soil/Water Guidelines. If the concentration of metals was above the 50 percent Level A Quebec Soil/Water Guidelines, or organic compounds were detected, the results were defined as relevant and used in the baseline risk assessment. If the concentration exceeded the Quebec Level B or C Guideline, it was also noted. Typical laboratory contaminants, dicussed in Volume 2, were not considered in the risk assessment.

Table 1.1

Number of Samples Taken
Number of Samples Analyzed

SAMPLE TYPE	SAMPLES TAKEN*	SAMPLES ANALYZED*		SAMPLES NOT ANALYZED *
		FIRST ROUND	SECOND ROUND	
Soil	49	22	15	12
Water	12	12	0	0
Paint	5	5	0	0
Asbestos	5	5	0	0
Transformer Oil	2	2	0	0

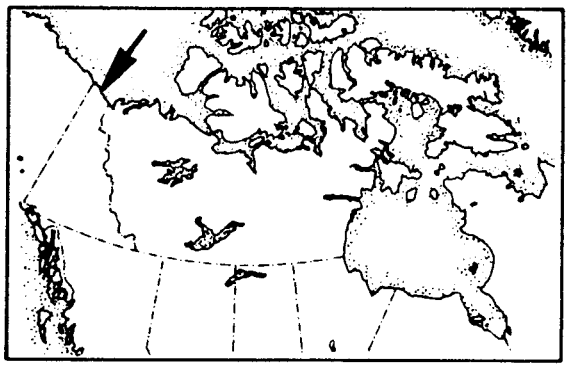
* Does not include duplicates or replicates

2.0 SITE OVERVIEW

BAR-1 Komakuk Beach is located on the coast of the Beaufort Sea approximately 32 km east of the Alaska border, at 69° 35' 53" north latitude and 140° 11' 00" west longitude. The site is still part of the DEW Station system but is a future NWS Short Range Radar site. The nearest community with an aircraft charter base and a full range of commercial and public services is Inuvik, 280 km to the east. Figure 2.1 shows the general location of the station in the area and provides some climate and access information.

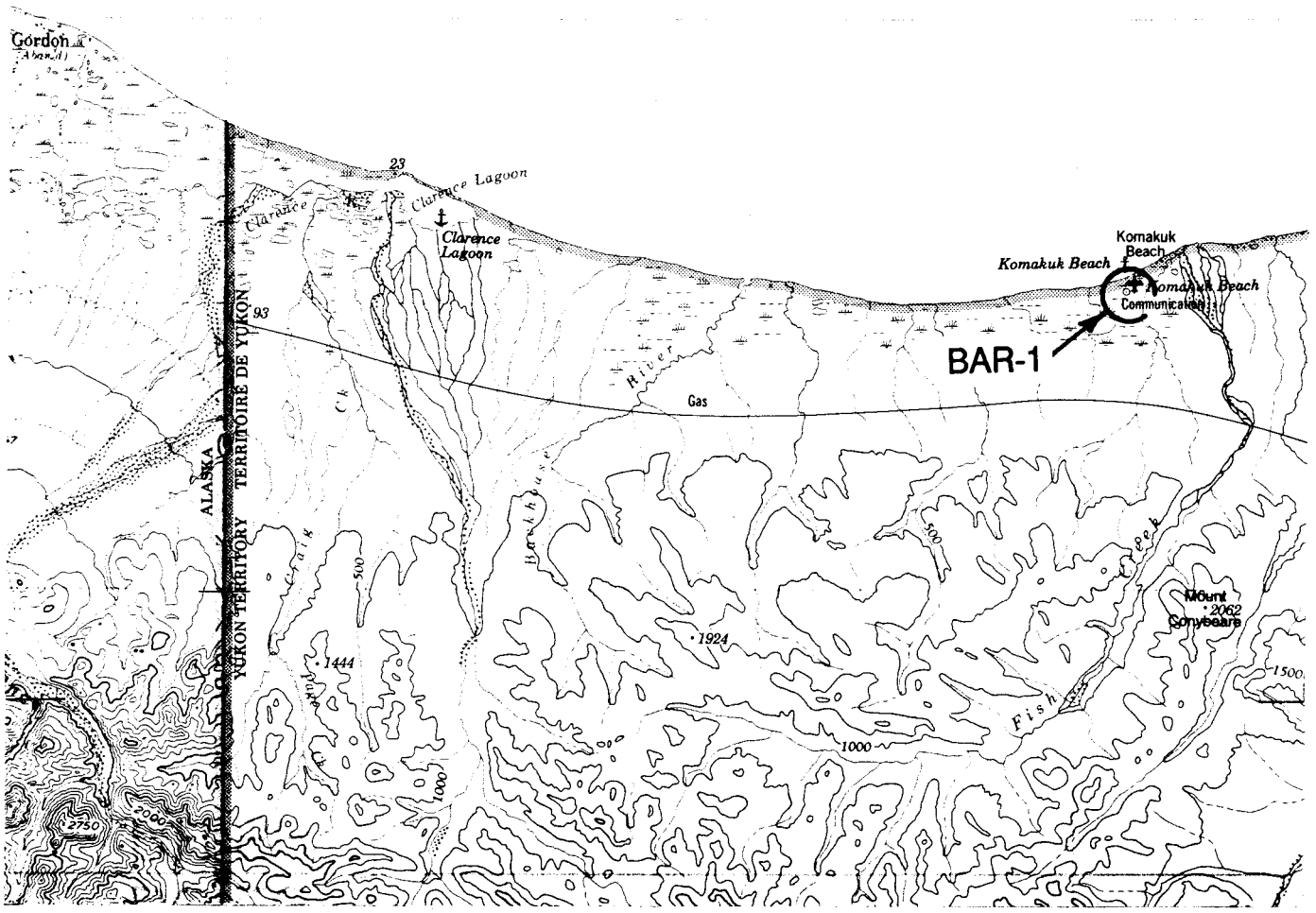
BAR-1 was an auxiliary station within the original DEW Station system. It will be decommissioned, but will have a remotely operated NWS Short Range Radar Station in its vicinity. The location of various buildings and activity areas on the station lands is provided in Section 3.0. Further site specific information about the facilities and the regional environment is provided in the Phase I Report of this study.

The DEW Station facilities not required for the NWS operation will be treated as abandoned and the area restored under the DND/DIAND 1989 Memorandum of Understanding for the Restoration of Distant Early Warning and North Warning System Sites; as discussed in Volume 2, Section 1.0.



KEY PLAN

BEAUFORT SEA



STATION DATA

LATITUDE: 69° 35' 53" N
LONGITUDE: 140° 11' 00" W
ELEVATION: 14 m
MEAN RAINFALL: 76 mm
MEAN SNOWFALL: 60 cm
ACCESS: AIR - CHARTER
WATER - BARGE SEA LIFT

BAR-1 KOMAKUK BEACH

LOCATION PLAN

SCALE: 1:250,000

FIGURE 2.1

3.0 DESCRIPTION OF BIOPHYSICAL ENVIRONMENT

3.1 CLIMATE

BAR-1 Komakuk Beach, the most western DEW Station site in Canada, is located in the Low Arctic Ecoclimatic region at approximately 14 m asl. Table 3.1 presents climatic normals for the site.

3.1.1 PRECIPITATION

Mean total annual precipitation is 135.9 mm; 75.8 mm of which falls as rain and 601 mm as snow. Approximately 46 d/yr have measurable precipitation and most of the moisture falls from June to October. The greatest amount of rain (44.5 mm) and snow (152 mm) received in 24 h occurred during July and August, respectively.

3.1.2 TEMPERATURE

Mean annual temperature is -11.4 °C, while the mean monthly maximum and minimums are 11.9 °C in July and -30.2 °C in January and March. Extreme temperatures of 30 °C can occur in July and minimums of -50 °C in January and February.

3.1.3 WIND AND FOG

Annual wind speeds average 20.8 km/h with extremes of 75 km/h. Winds are strongest in winter with high monthly means in November and January of 24 km/h. Prevailing winds tend to blow westward along the coast. Wind speeds exceed 20 km/h 40 percent of the year, 30 km/h 20 percent and 40 km/h 10 percent of the year.

Komakuk Beach receives approximately 1,044 h of fog annually and cloud cover is dependent on onshore/offshore winds. For approximately 10 percent of the year visibility is reduced due to blowing snow.

3.2 GEOLOGY

3.2.1 OVERVIEW

BAR-1 Komakuk Beach is located approximately 32 km east of the Alaska border immediately south of the Beaufort Sea shoreline (Figure 2.1). Regionally the site is situated on the coastal fringe of the Yukon Coastal Plain. It is bounded to the east by the western edge of a major braided floodplain which contains the deltas of Fish Creek, Malcolm and Firth Rivers. The western edge is a major lacustrine plain which stretches westward to the Clarence River delta (Rampton 1982).

The coastal fringe is underlain by thick unconsolidated deposits generally more than 60 m thick. The surface in this area is relatively flat. The only relief is due to incised stream valleys downcut 3 to 15 m below the surrounding surface.

Table 3.1

Climate Normals

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
Precipitation													
Mean Rainfall	0.1	0.0	0.0	0.0	0.9	12.4	26.4	27.3	7.9	0.4	0.4	0.0	75.8
Mean Snowfall	5.5	3.3	2.8	3.4	3.1	1.9	0.8	3.6	8.6	15.6	7.8	3.7	60.1
Mean Total	5.6	3.3	2.8	3.4	4.1	14.1	27.2	30.8	16.6	16.1	8.2	3.7	135.9
1 No. Days w/meas rain	0	0	0	0	0	3	6	7	3	0	0	0	19
No. Days w/meas snow	3	2	2	2	2	1	0	1	3	6	3	3	28
No. Days w/meas precip	3	2	2	2	2	3	6	8	6	6	3	3	46
Greatest rain in 24 hrs	1.3	0.0	0.0	T	3.8	28.7	44.5	44.5	10.4	4.3	6.9	T	44.5
Greatest snow in 24 hrs	10.2	7.0	5.0	12.4	7.6	6.9	15.2	15.2	8.5	12.0	11.5	10.2	15.2
Greatest precip in 24 hrs	10.2	7.0	5.0	12.4	7.6	28.7	44.5	44.5	10.4	12.0	11.5	10.2	44.5
Temperature (C)													
Mean Daily Max	-21.0	-23.4	-22.2	-13.8	-2.4	6.4	11.9	9.9	3.8	-6.1	-14.4	-19.7	-7.6
Mean Daily Min	-30.2	-31.9	-30.2	-22.5	-8.6	-0.1	3.0	2.1	-2.4	-12.4	-22.4	-28.0	-15.3
Mean Daily	-25.4	-27.5	-26.1	-18.2	-5.6	3.2	7.5	6.0	0.7	-9.3	-18.4	-23.7	-11.4
Extreme Max	8.3	6.5	2.8	13.3	17.2	25.6	30.0	28.5	23.3	13.3	10.0	8.9	30.0
Extreme Min	-50.0	-50.0	-47.8	-36.7	-26.7	-9.4	-5.6	-7.8	-17.8	-30.5	-38.9	-44.4	-50.0
Wind													
Mean Wind Speed (km/hr) and prevailing direction Mean Vector Speed (km/hr) and direction	Not applicable for this site												

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

Surficial sediments consist of organic silts overlying gravels that attain a collective thickness of 4 m.

The underlying bedrock is composed of Jurassic and Lower Cretaceous shale and quartzose sandstone.

3.2.2 TERRAIN UNITS

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

3.2.2.1 TERRAIN UNIT 1

Terrain Unit 1 is a lacustrine plain on which all the facilities of the main site, the runway and the water supply are located. These typical lacustrine deposits are composed of thinly bedded silty clays, silts and fine sands. This Unit is covered with a layer of peat to a depth of 150 to 200 mm. The area is relatively flat with very gentle slopes to the north. The area contains small ponds and is characterized by polygonal patterns, especially in low lying areas. The shore line is classified as an ice poor cliff at the western portion of the Unit, changing to low tundra near the western end of the runway.

3.2.2.2 TERRAIN UNIT 2

Terrain Unit 2 is composed of the broad alluvial fan of the Malcolm River. The western boundary of this alluvial fan is a north flowing stream at the eastern end of the runway. This unit is better drained than Unit 1 and is composed of coarser material. The Unit is also entirely vegetated.

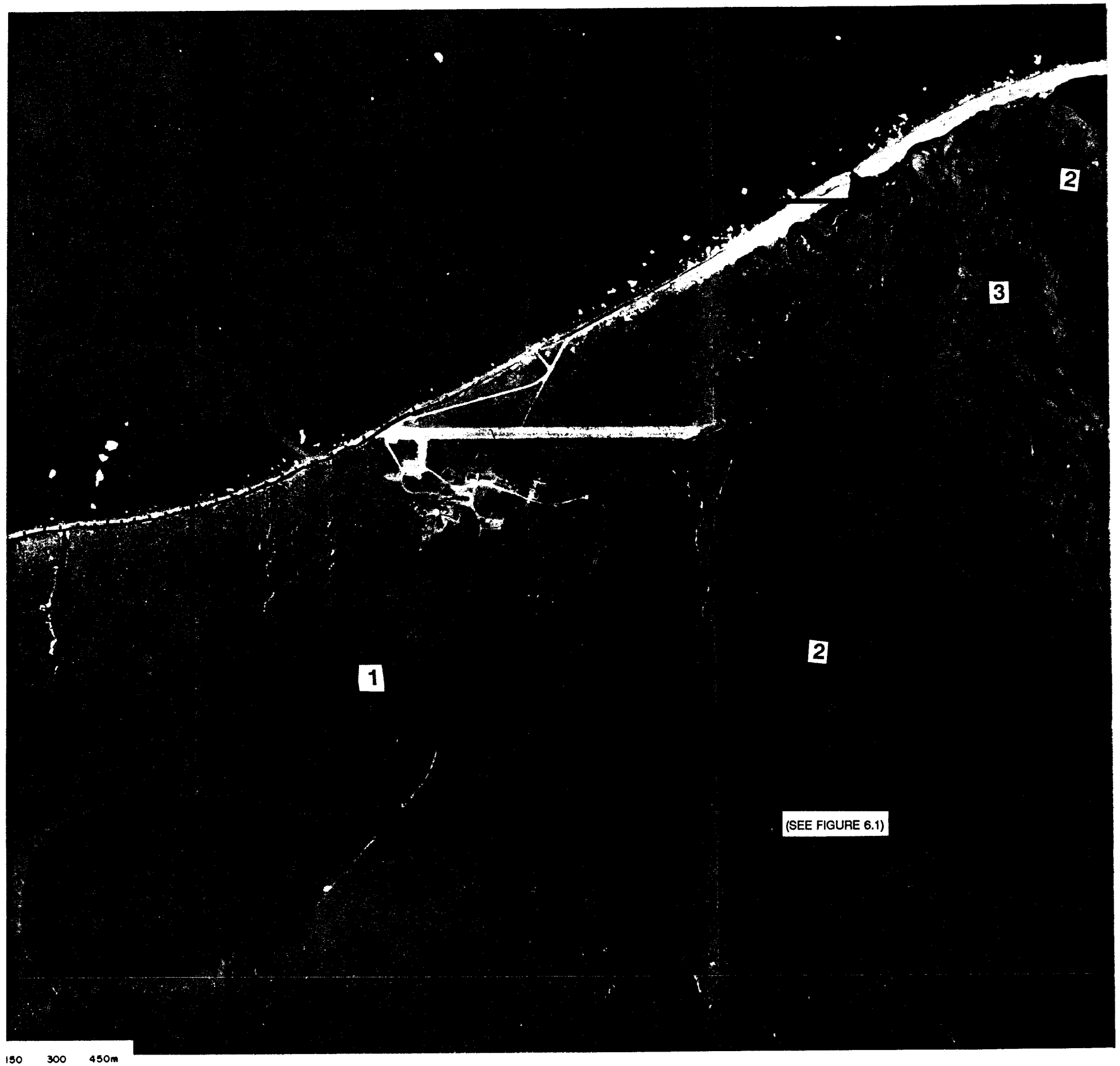
3.2.2.3 TERRAIN UNIT 3

Terrain Unit 3 is the modern delta plain of the Malcolm River. It is bounded on the north, east and west by Terrain Unit 2.

3.3 HYDROLOGY

The area surrounding BAR-1 is predominantly low-lying organic terrain with an average slope of less than one percent generally toward the north (Figure 3.1). The site buildings are constructed on a natural ridge which has been augmented with granular fill material. The area on which the buildings are located has a maximum elevation of approximately 10 m asl. From the vicinity of the buildings the ridge extends for 2 km in a southerly direction to the east side of a large lake which once served as the winter water supply for the site. Access to the lake was by a road built along the crest of the ridge.

Regionally, drainage travels to the sea from the British Mountains, located approximately 20 km to the south. The ridge locally forms a watershed divide. The area west of the ridge is primarily organic terrain, and drains to a small stream which flows into the ocean within 200 m of the west end of the runway (Figure 3.1). Water movement through this organic terrain is primarily along the boundaries of the frost polygon features which are common in the area. This stream drains the southern and



LEGEND:

TERRAIN/GEOLOGICAL BOUNDARY

TERRAIN/GEOLOGICAL BOUNDARY (INFERRED)

SCARP (TICKED ON DOWN SLOPE SIDE)

0 150 300 450m

150

BAR-1 KOMAKUK BEACH

GEOLOGICAL OVERVIEW MAP

FIGURE 3.1

western sections of the compound and also receives water from the sewage outfalls. East of the ridge, drainage moves toward a north-south trending stream which skirts the east end of the runway. A dam across this stream at a location approximately 500 m west of the compound area creates a reservoir for the summer water supply. Part of the western section of the compound, including the area around the POL Tank Facility, drains to this stream.

There are two abandoned landfills and one active landfill at BAR-1. These landfills are located north of the runway and do not exhibit elevations significantly higher than that of the surrounding terrain. Drainage appears to travel northerly toward the shore. There is approximately a 1 percent slope associated with each of the landfill locations. Some slight depressions have been identified in the immediate vicinity of the landfills which contain ponded water.

The northern section of the compound drains toward a low lying area around the west end of the Airstrip (Figure 3.1). Standing water in much of this area appears to be landlocked by the raised shoreline to the north and the slightly higher terrain to the east, on which the road to the Beach Staging Area is built. Beyond the road, drainage is generally eastward across an expanse of organic terrain.

3.4 FLORA

This area is typical of low-arctic tundra and is characterized by a nearly continuous cover of vegetation, except in disturbed areas. The surrounding area is flat with organic terrain extending from the shore to the British Mountains, approximately 20 km inland. Vegetation is dominated by sedges (*Carex* spp.), with lesser amounts of *Sphagnum* spp. and grasses. On drier, more upland sites, such as isolated hummocks, the vegetation is dominated by grasses and willow (*Salix spp.*), with lesser amounts of *Sphagnum* spp., *Rubus chamaemorus*, *Vaccinium vitis-idaea*, *Betula spp.*, and *Ledum palustre*.

Disturbed areas in the vicinity of the site were characterized by grasses, *Epilobium latifolium*, and *Salix* spp., with incidental plants of *Gentiana propinqua*, *Papaver radicum*, *Pedicularis* spp., *Equisetum* spp., and *Aconitum delphinifolium* at some of these locations.

3.5 FAUNA

3.5.1 LARGE MAMMALS

Komakuk Beach lies outside management zones for muskox (*Ovibos moschatus*) as the species is known to occur only infrequently (Urquhart 1982). Animals in this region are probably from an introduction of muskox along Alaska's north coast in 1969 to 1970 (Wiken *et al.* 1981).

Caribou (*Rangifer tarandus granti*) in this region are part of the Porcupine Caribou herd which ranges in the Yukon and the Northwest Territories. The calving grounds for this herd overlap Komakuk Beach and caribou may occur here throughout the year (LeBlond 1979). These animals tend to concentrate here between May and August and station personnel reported that large groups pass through this area between the mountains and the shore. However, caribou were not observed during the field visit.

Polar bears (*Ursus maritimus*) in this area are within Management Zone H, which includes the Beaufort Sea and Amundsen Gulf (Schweinsburg *et al.* 1981). Demaster *et al.* (1980) estimated the total population of the zone in 1977 to 1978 at approximately 2,100 animals. Bears are known to inhabit the southern Beaufort during freeze-up and move northward with retreating ice floes during summer (Schweinsburg *et al.* 1981). Polar bears from eastern Alaska are known to migrate through the northwest coast in mid-April (Lentfer 1983). Most maternity denning in the Western Arctic occurs along the west and south coasts of Banks Island, and to a lesser degree on the western peninsulas of Victoria Island, with little denning on the mainland coast (Stirling *et al.* 1975). Records of polar bear encounters at this station were not available but personnel reported that they are occasionally sighted. Regardless, it appears that such incidents are rare particularly when compared to the eastern DEW Station sites (Stenhouse *et al.* 1988).

Grizzly bears (*Ursus arctos horribilis*) occur throughout the majority of mainland Northwest Territories (Britton and Graves 1985) and have been observed at this DEW Station. Station personnel reported that a grizzly bear had been frequently seen that summer. Black bears (*U. americanus*) are also known to occur in this region of the Northwest Territories (Banfield 1974) but there were no records of human-black bear interactions at this station.

3.5.2 OTHER TERRESTRIAL MAMMALS

There was no sign of arctic fox (*Alopex lagopus*) observed while visiting the site. A wolf (*Canis lupus*) was reported in the area during the site visit. This species occurs throughout the Northwest Territories and is commonly associated with the presence of caribou (Heard 1983). No sign of arctic ground squirrel (*Spermophilus parryii*) was observed at Komakuk Beach, which was felt to be due to the lack of burrowing habitat in the poorly-drained organic terrain. No arctic hare (*Lepus arcticus*) or other small mammals were observed.

3.5.3 MARINE MAMMALS

Beaufort Sea beluga whale (*Delphinapterus leucas*) populations are discrete from Eastern Canadian Arctic populations. The majority of sightings of belugas in the vicinity of Komakuk Beach would be expected to be of migrating animals, either eastward in early summer or westward in the fall. In the summer, beluga whales concentrate in the vicinity of the Mackenzie River Delta, primarily in the estuary, and are recognized as a discrete stock (Fraker and Fraker 1979; 1981; 1982). Certain specific coastal areas within the general summering areas are traditionally occupied during mid-summer, generally from late July or early August to late August (Sergeant 1973; Finley 1976; Fraker 1979).

Bowhead whales *(Balaena mysticetus)* winter in the Bering Sea and migrate eastward into the Beaufort Sea between late April and early June (Davis *et al.* 1980). Overall, the distribution of bowhead whales can show great inter-annual variation (McLaren and Davis 1985). In late August 1983, these authors observed a large concentration of bowheads between Shingle Point and Kay Point. The density of animals at the surface in this area (371 km^2) was extremely high (5.79/1,000 km^2). Bowheads have also been seen within a few kilometres of the shoreline in September (McLaren and Davis 1985).

The ringed seal (*Phoca hispida*) is the most widespread species of marine mammal in the Canadian Arctic and is usually a permanent resident in most of its range (Davis *et al* 1980). Ringed seals have been observed up to 70 km offshore of the Tuktoyaktuk Peninsula in early September (McLaren and Davis 1980).

3.5.4 RAPTORS

No raptors were reported or observed at Komakuk Beach although Snowy Owl (*Nyctea scandiaca*), Peregrine Falcon (*Falco peregrinus tundrius*), Gyrfalcon (*Falco rusticolus*), Golden Eagle (*Aquila chrysaetos*), and Rough-legged Hawk (*Buteo lagopus*) are known to occur in this region (Searing *et al.* 1975, Godfrey 1986).

3.5.5 WATERFOWL

Surface water in the vicinity of the site was restricted to small gullies which were generally unproductive for waterfowl. A lake located approximately 1 km southwest of the station was reported to contain waterfowl. All four species of loons are known to breed in the southeastern portion of the Beaufort Sea but only Pacific (*Gavia arctica*) and Red-throated Loons (*G. stellata*) are regarded as common (Searing *et al.* 1975), although none of these were observed. Fourteen Green-winged Teal (*Anas crecca*) were observed in small gullies, immediately south of the station. Other waterfowl sightings were limited to that of a small group of Common Eider (*Somateria mollissima*) consisting of three adults and 12 young near shore. This species has been observed in large concentrations in this region of the Beaufort Sea during aerial surveys (Searing *et al.* 1975).

3.5.6 OTHER AVIFAUNA

Thirty species of shorebirds are known to occur regularly along the Beaufort Sea coast (Searing *et al.* 1975), but only Baird's Sandpiper (*Calidris bairdii*) was observed near the facilities. Sign and observations of three Willow Ptarmigan (*Lagopus lagopus*) were recorded east of the site.

Glaucous Gulls (*Larus hyperboreus*) were commonly observed along the shore and near the active landfill. No Thayer's Gull (*Larus thayeri*) were observed during the site visit although they are known to exist in the region (Godfrey 1986). There were infrequent sightings of Parasitic Jaeger (*Stercorarius parasiticus*) but not Long-tailed Jaeger (*S. longicaudus*) or Pomarine Jaeger (*S. pomarinus*), although all three species likely occur in the region (Godfrey 1986).

3.6 HERITAGE RESOURCES

The camp, the beach terrace immediately above the present beach and in front of the station, the area of the runway, and the area of the water supply lake were inspected for archaeological remains (Figure 3.2). Disturbance at this station has been limited and has been restricted to the station. However, the beach terrace, which is the most likely area for archaeological remains, has been used as a landfill area and gravel source. Archaeological remains were not identified during the field reconnaissance. Recent historic remains have been reported in the area but appear to have been removed by natural erosion. There are no further archaeological or historical concerns associated with the decommissioning of this station.

A separate report documenting the heritage resources study on the site has been filed with the Yukon Heritage Branch, with copies to the USAF and DND (UMA 1991).

3.7 LAND USE

BAR-1 Komakuk Beach is located in the Firth River IBP site (Nettleship and Smith 1975), now included within the North Yukon National Park Reserve. Canadian Parks Service has expressed an interest in retaining the site as an interpretive centre. Some trapping by hunters living at the site occurs in the vicinity (Worbets 1979).

4.0 SITE INFRASTRUCTURE

4.1 BUILDINGS

Dwellings and structures on site are described in the Base Civil Engineering (BCE) data in Appendix I. Figure 4.1 shows site layout based on BCE data, as-built site plans and site inspection.

4.2 FUEL STORAGE AND DISTRIBUTION

The BAR-1 station had ten diesel tanks and two Mogas tanks. The complete details are described in Table 4.1.

Table 4.1
Fuel Storage Facilities

1.	Diesel Oil	
	a) Building Site Area	
	3 steel tanks (246 m^3 ea):	738 m^3
	7 steel tanks (37.9 m^3 ea):	265.3 m^3
2.	Mogas	
	a) Beach Area	
	1 steel tank:	22.7 m^3
	b) Site area	
	1 steel tank:	22.7 m^3

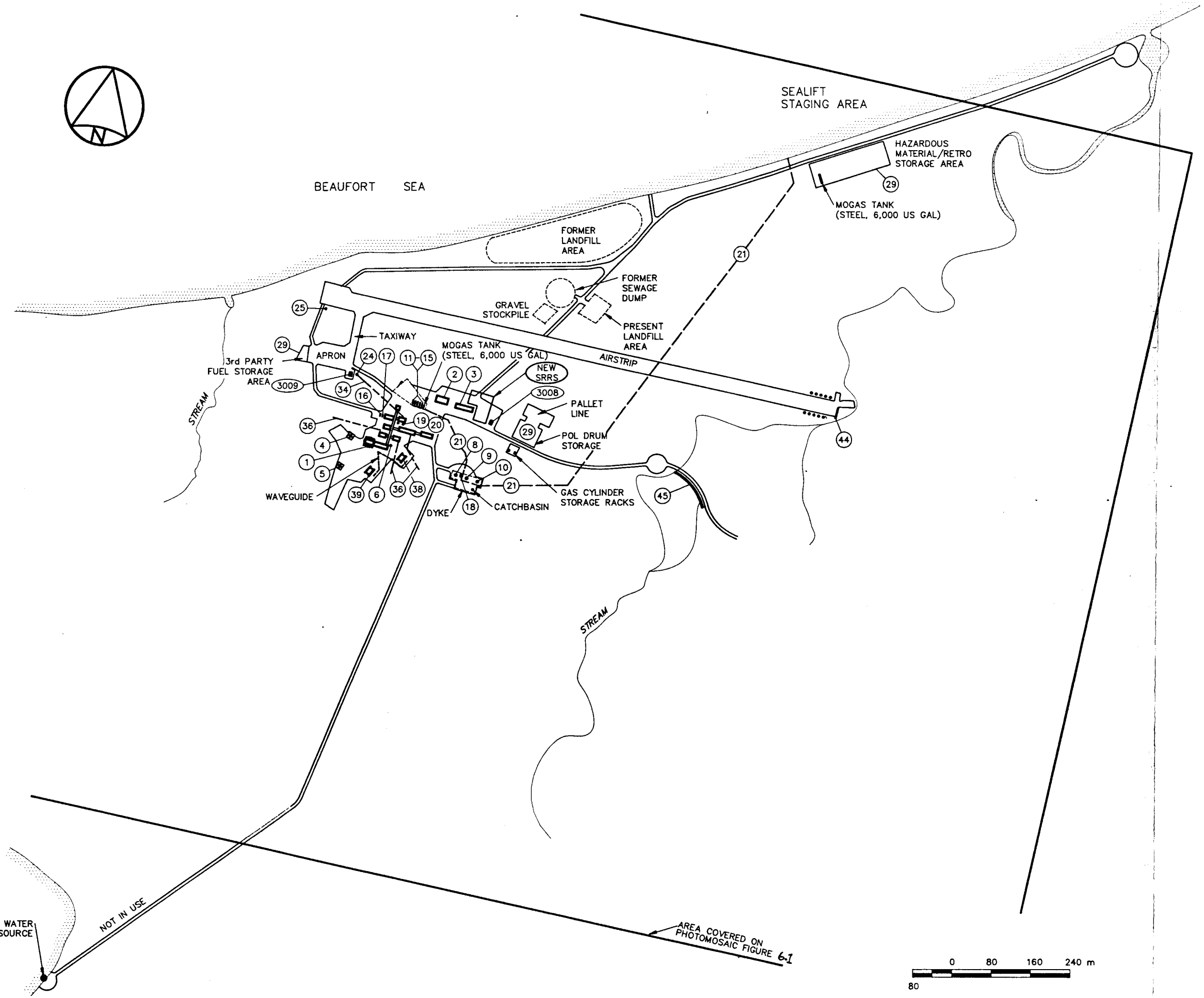
4.3 WASTE TREATMENT

Liquid sewage is accumulated in an internal storage tank in the module train building, which is the only one with toilet facilities, and is periodically pumped to the outfall areas.

4.4 HAZARDOUS MATERIAL STATUS

The following hazardous materials were included in the initial retrograde reports for sealift.

- Fifteen empty cylinders, which had contained Class 2 compressed gases including acetylene, mapp gas, nitrogen, and oxygen.
- Twenty-eight drums of waste petroleum products and 500 empty drums. Waste petroleum and the residue probably found in the empty drums are Class 3 flammable liquids.
- Two drums of asbestos-containing material.



FACILITIES INDEX:

- (1) MODULE TRAIN
- (2) GARAGE
- (3) WAREHOUSE
- (4) COMMUNICATION "DISH"
- (5) COMMUNICATION "DISH"
- (6) MASTER TV ANTENNA
- (8) DIESEL FUEL TANK (STEEL, 65,000 US GAL)
- (9) DIESEL FUEL TANK (STEEL, 65,000 US GAL)
- (10) DIESEL FUEL TANK (STEEL, 65,000 US GAL)
- (11) DIESEL FUEL TANK (STEEL, 10,000 US GAL)
- (12) DIESEL FUEL TANK (STEEL, 10,000 US GAL)
- (13) DIESEL FUEL TANK (STEEL, 10,000 US GAL)
- (14) DIESEL FUEL TANK (STEEL, 10,000 US GAL)
- (15) DIESEL FUEL TANK (STEEL, 10,000 US GAL)
- (16) DIESEL FUEL TANK (STEEL, 10,000 US GAL)
- (17) DIESEL FUEL TANK (STEEL, 10,000 US GAL)
- (18) POL PUMPHOUSE
- (19) WATER STORAGE TANK (STEEL, 20,000 US GAL)
- (20) WATER STORAGE TANK (STEEL, 20,000 US GAL)
- (21) POL LINE
- (24) BEACON LIGHT
- (25) WIND CONE
- (29) OPEN STORAGE AREAS
- (34) PRIMARY POWER CABLE (UG)
- (36) SEWER LINE
- (38) COMMUNICATION "BILLBOARD"
- (39) COMMUNICATION "BILLBOARD"
- (44) SEAWALL
- (45) WATER STORAGE DAM
- (3008) HAZARD STORAGE (POL)
- (3009) STORAGE SHED (ATB)

NOTE:

1. FOR OVERALL SITE PHOTOMOSAIC COVERAGE SEE FIGURE 3.1.
2. THE FACILITIES SHOWN ARE TAKEN FROM THE AVAILABLE AS-BUILT SITE DRAWINGS AND THE CURRENT BCE DATA (1990), AND AS VERIFIED ON SITE.
3. NUMBERED FACILITIES ARE AS GIVEN IN THE FACILITIES INDEX IN THE BCE DATA.

BAR-1 KOMAKUK BEACH

SITE PLAN

FIGURE 4.1

4.5 SPILL HISTORY

There were no fuel spills recorded in the DEW and NWS sites for BAR-1 Komakuk Beach.

5.0 ASBESTOS, PAINT AND PCB RESULTS

5.1 ASBESTOS

5.1.1 RECORD REVIEW

An asbestos survey was carried out on March 31, 1990. The location, type, and quantity of asbestos present at the site from this survey is presented in Table 5.1.

Table 5.1

Asbestos Survey

Location	Type	Quantity
Module Train	Pipe Sheet	66.0 m 62.9 m^2
Garage	Sheet	0.34 m^2
Warehouse	Sheet	98.7 m^2

5.1.2 FIELD SURVEY

Five samples of insulation from various areas of the station were collected during the August, 1990 site visit to test for the presence of asbestos.

Amosite forms of asbestos were found in seven of ten samples taken (Table 5.2). During decommissioning, asbestos materials will require special handling and disposal.

5.2 PAINT

5.2.1 FIELD SURVEY

Five paint samples were obtained from various interior surfaces at the BAR-1 facilities.

Table 5.2

Asbestos Analysis

SAMPLE	PRESENT	ASBESTOS	TYPE	BUILDING	LOCATION
B1-302	Yes	50-70%	Amosite	Module South	Furnace Room South
B1-304	Yes	20-40%	Amosite	Module South Powerhouse	Overhead Heat Exchangers
B1-306	Yes	20-40%	Amosite	Module J Room	Furnace Room
B1-308	Yes	10-30%	Amosite	Module North	Furnace Room
B1-310	Not Detected	-	-	Warehouse	Furnace Room

5.2.2 ANALYTICAL RESULTS

Results of analysis of paint samples for metals are presented in Table 5.3. The samples contain metal concentrations within typical ranges for industrial, oil-based-paints. The painted materials may require special handling as described in Volume 2.

5.3 PCB

5.3.1 RECORD REVIEW

The most recent PCB inventory is dated January 25, 1990.

The equipment suspected of containing PCB as of January 25, 1990 is summarized in Table 5.4.

Table 5.4

PCB Inventory

Area	Transformers Quantity	Capacitors Quantity	Total PCB (kg)
Module	1	1	274.7
Air Terminal	1		274.7
Receiver Room	1,062	38	131.6
Radar Room	418	574	94.1
Lat Com Room	12	24	36.6
Surveillance Room	33	68	12.0
Emergency Radio Room	2	1	2.5

5.3.2 FIELD SURVEY

Most of the equipment identified prior to the site visit could not be sampled because the individual units were sealed or were in use at the time. One sample of dielectric fluid suspected of containing PCB was collected from the Runway Light Regulator in the Air Terminal Building (Plate 1). The Runway Light Regulator located in the main office area of the station was also sampled.

Table 5.3

Paint Survey Data

INDICATOR CHEMICALS (mg/kg)	MDL	B1-301	B1-303	B1-305	B1-307	B1-309
Arsenic	0.1	25	5.1	8.8	33	2.8
Selenium	0.5	1.9	<	0.7	2.9	0.5
Mercury	0.05	19	1	6.8	24	0.22
Barium	1	770	790	500	830	530
Beryllium	0.5	<	<	<	<	<
Cadmium	1	38	27	59	15	2
Chromium	1	190	580	230	280	49
Lead	10	3800	5900	10000	4100	950
Nickel	5	18	33	26	22	<
Silver	5	<	<	<	<	<
LOCATION		Module South Dorm FAC 01	Module Powerhouse FAC 01	Module J-Room FAC 01	Module North Dorm FAC 01	Warehouse FAC 03
AREA		Furnace Room	Diesel Bed 1	Furnace Room	Furnace Room	Loading Dock Floor

5.3.2.1 ANALYTICAL RESULTS

Neither of the samples showed detectable levels of PCB.

6.0 SITE ASSESSMENT AND CLEAN-UP OPTIONS

Evaluation of the relevance of indicator chemical concentrations found at specific locations at this station is based on the site assessment strategy outlined in Volume 2. The strategy consisted of:

(1) Comparison of laboratory data to background soil and water indicator chemical concentrations.

(2) Comparison of laboratory data to Quebec Sil/Water Guidelines as per Section 1.3.

(3) Assessment of risk to human health and the environment from specific locations (landfills, sewage outfalls and others).

The following subsections address each location and stain area on the site and present options for clean-up. Results of soil and water analyses for the site are presented in Appendix C. Quality assurance and quality control of the analytical data appears in Appendix D. Risk assessment for the site is presented in detail in Appendix E.

6.1 SITE EVALUATION OF RISK ASSESSMENT AND ANALYTICAL RESULTS SUMMARY

Results from the BAR-1 site exposure assessment were integrated in order to characterize the site-specific risk. As described in Volume 2, Section 3.0, the methods for characterizing non-carcinogenic risk are different from those used for carcinogenic risk. The quantification of BAR-1 site risk has therefore been segregated according to these categories.

Results have been summarized in Appendix E and as may be seen the total carcinogenic risk was estimated at $\leq 6 \times 10^{-6}$. Based on the U.S. EPA site remediation goal of reducing cancer risks below 10^{-4}, the BAR-1 carcinogenic risk is considered very low. The principal contributor was arsenic intake from the dermal contact of soil pathway as shown in the distribution of risk given in Figure E-2.

The BAR-1 site worker non-carcinogenic hazard index results are summarized in Appendix E, Table E-7. The hazard index totals 9×10^{-3} which is 3 orders of magnitude less than the unity criteria. Non-carcinogenic risk are considered small.

The estimated contaminant intakes for caribou and grasses were compared to estimated safe values to characterize risk in a method similar to that used for human non-carcinogenic risk assessment. The sum of all hazard quotients in caribou was significantly smaller than the unity criterion and therefore caribou risks are considered small. Likewise, the hazard quotients for PCBs, arsenic, and nickel in grasses were less

than unity. The cadmium hazard quotient for grasses was above unity and therefore there may be potential risks to plant health in the locations identified in Subsection E-2.2. The estimated intakes for the remaining contaminants were small, however, toxicity information was not available and therefore risks could not be quantified.

6.1.1 SITE BACKGROUND CONDITIONS

6.1.2 VISUAL OBSERVATIONS AND SAMPLE LOCATIONS

The areal extent of activities and facilities was limited. Beyond the site itself, there were no apparent sources of which could introduce foreign indicator chemicals.

A background water sample (B1-K) was taken from a small pond 1.5 km south of the east end of the Airstrip (Appendix B). Drainage in the vicinity of the pond is toward the shoreline from the mountains to the south.

A background soil sample (B1-1106) was taken at a point 250 m south of the Airstrip and 15 m east of the water supply stream.

Sample site locations are presented in Figure 6.1.

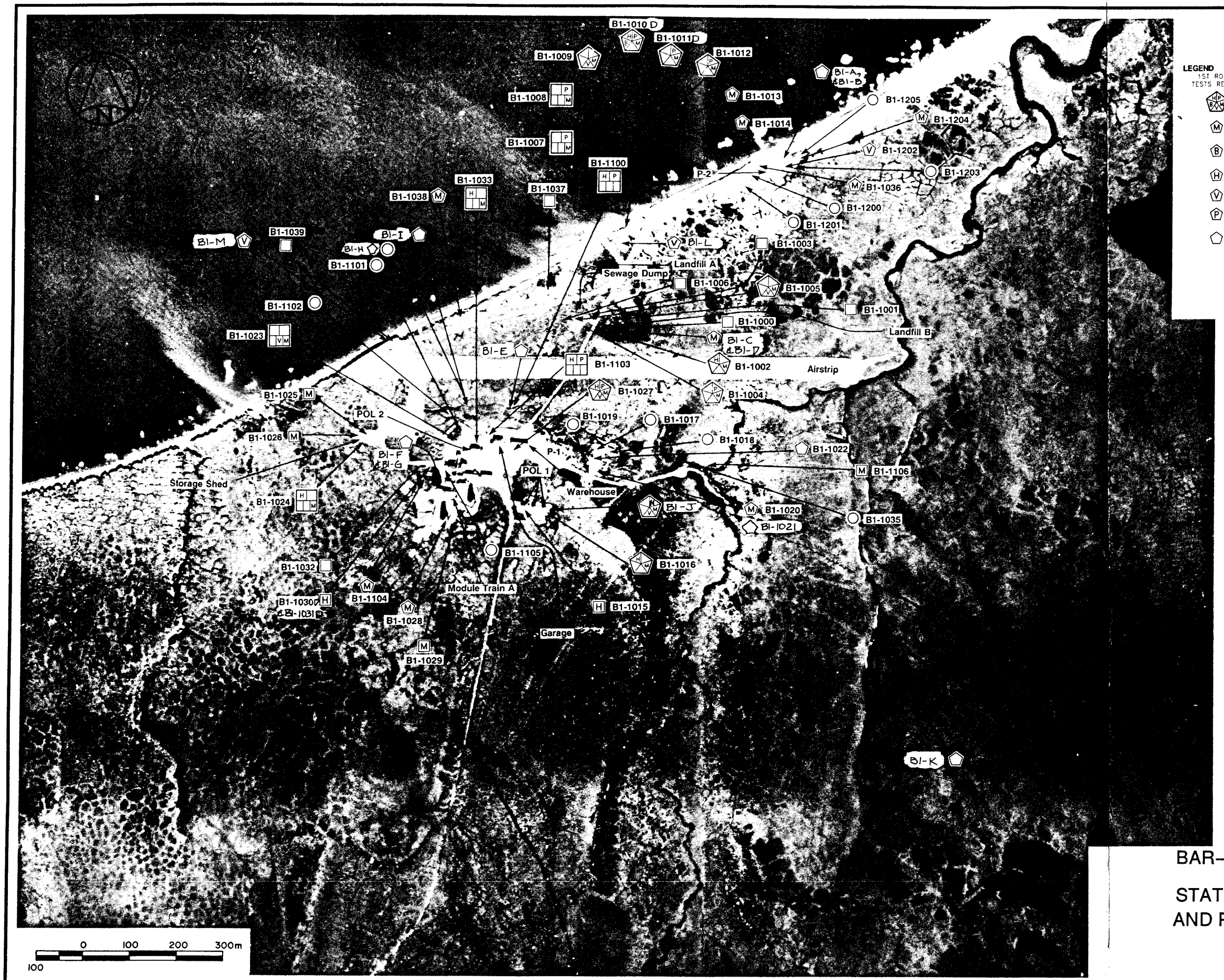
6.1.3 ANALYTICAL RESULTS

Analysis of the background water sample (B1-K) indicated no indicator chemicals were present.

Soil samples in which the concentration of indicator chemical exceeded the study criteria are presented in Table 6.1. Barium concentration (490 mg/kg) exceeded the study criterion. Arsenic, selenium, mercury, chromium and nickel concentrations (6.5, 0.8, 0.11, 38 and 39 mg/kg, respectively) were all in excess of the study criteria.

6.2 LANDFILLS

There are three landfills at the BAR-1 site and they are identified as Landfills A, B and C.



LEGEND

1ST ROUND TESTS RESULTS	2ND ROUND TESTS RESULTS	
HIP BNW	H P B V M	MULTIPLE PARAMETERS DETECTED
M	M	METALS DETECTED
B	B	BNA - BASE, NEUTRAL, ACID EXTRACTABLES DETECTED
H	H	HYDROCARBONS DETECTED
V	V	VOLATILES DETECTED
P	P	PCB DETECTED
⬠	□	SAMPLE TESTED AND NO PARAMETERS DETECTED
○		SAMPLE TAKEN BUT NOT ANALYZED
B1 - 1001		SOIL SAMPLE NUMBER
B1 - E		WATER SAMPLE NUMBER

BAR-1 KOMAKUK BEACH

STATION AREA SAMPLE SITES AND PARAMETERS IDENTIFIED

FIGURE 6.1

Table 6.1

Relevant Soil Results: Background

INDICATOR CHEMICALS (mg/kg)	LEVEL A	B1-1106	TYPICAL RANGES *
Arsenic	10	6.5	1.1-28.9
Selenium	1	0.8	0.1-1.32
Mercury	0.2	0.11	0.02-0.10
Barium	200	490	262-867
Beryllium	n/a	1	<1-2
Cadmium	1.5	<1	0.10-1.80
Chromium	75	38	2.6-34
Lead	50	<10	2.3-47.5
Nickel	50	39	1.3-34
Silver	2	<5	0.2-3.2
TPH	100	<1	n/a
PCB	0.1	<0.01	n/a

n/a = Not Available
TPH = Total Petroleum Hydrocarbon
PCB = Polychorinated Biphenyls
* Kabata - Pendias and Pendias (1984)

Table 6.2

Relevant Soil Results: Landfill A

INDICATOR CHEMICALS (mg/kg)	LEVEL A	BACKGROUND	B1-1007	B1-1008 B1-1008L*	B1-1009 B1-1009R*	B1-1010 B1-1011D
Mercury	0.2	.11	N.R.	0.2	0.16	0.21
Cadmium	1.5	N.R.	N.R.	2	N.R.	N.R.
Lead	50	N.R.	31	480	N.R.	76
TPH	100	<1	N.R.	N.R.	N.R.	3
PCB	0.1	<0.01	0.25	0.29	<0.01	0.16
Ethyl Benzene	0.1	N/A	N/A	N/A	0.183	N.R.
Phenathrene	0.1 **	<0.03	N.R.	N.R.	N.R.	0.11
Fluoranthene	0.1 **	<0.02	N.R.	N.R.	N.R.	0.1
Pyrene	0.1 **	<0.03	N.R.	N.R.	N.R.	0.09

INDICATOR CHEMICALS (mg/kg)	LEVEL A	BACKGROUND	B1-1012	B1-1013	B1-1014
Mercury	0.2	.11	0.06	0.15	0.15
Cadmium	1.5	N.R.	N.R.	N.R.	N.R.
Lead	50	N.R.	110	<10	11
TPH	100	<1	N.R.	N.R.	N.R.
PCB	0.1	<0.01	0.03	N.R.	N.R.
Ethyl Benzene	0.1	N/A	N.R.	N.R.	N.R.
Phenathrene	0.1 **	<0.03	N.R.	N.R.	N.R.
Fluoranthene	0.1 **	<0.02	N.R.	N.R.	N.R.
Pyrene	0.1 **	<0.03	N.R.	N.R.	N.R.

N.R. = Not Relevant
N/A = Not Analyzed
TPH = Total Petroleum Hydrocarbons
PCB = Polychlorinated Biphenyls
* Where replicates were available, the highest value was used.
** Total PAH

Table 6.3

Relevant Soil Results: Landfill B

INDICATOR CHEMICALS (mg/kg)	LEVEL A	BACKGROUND	B1-1002
Lead	50	<10	500
TPH	100	<1	9
Naphthalene	0.1	<0.03	0.09

TPH = Total Petroleum Hydrocarbons

6.2.3.2 ANALYTICAL RESULTS

Study criteria were not exceeded in the samples for the indicator chemicals.

6.2.3.3 EVALUATION OF RISK ASSESSMENT AND ANALYTICAL RESULTS

The results of the risk assessment show that carcinogenic and non-carcinogenic risks are below the levels established for this study, and no indicator chemicals were identified above the Quebec B guideline.

6.2.3.4 CLEAN-UP OPTIONS

There were many waste materials and debris scattered about the site. These materials should be removed and the site recontoured, covered with clean fill materials and vegetated, if necessary, to control erosion.

If reduction of risk is deemed desirable, soils can be removed, encapsulated, treated, or covered, as applicable.

6.3 POL AREAS

6.3.1 POL 1

6.3.1.1 VISUAL OBSERVATIONS AND SAMPLE LOCATIONS

Three 250 m^3 diesel tanks are located 150 m southeast of the module train. The tanks are on a rectangular gravel pad which is bounded by dykes approximately 0.45 m high. A catch basin is excavated outside the west and south sides of the bermed area. A spill was noted near the valve of diesel tank No. 9, and a drum was observed buried in the catch basin wall.

The POL distribution line extends eastward from the facility and is laid in a small pond adjacent to the east side of the bermed area. Vegetation on the east side of the pond was stressed over a 70 m^2 area along the POL distribution line. An odour of fuel was noticeable at this location.

The POL distribution line from the main facilities to the beach is in poor condition. It is not supported along its length and is laid directly on the ground surface. It is underwater at several locations. Visible corrosion was common along the length of the line.

One water sample (B1-J) was taken from the small pond adjacent to the east end of the POL facility (Figure 6.1).

of POL 2 and the latter was collected from standing water in the catch basin on the north side of the facility.

Soil samples were taken at three locations in the vicinity of POL 2 (Figure 6.1). B1-1023 was taken just outside the northwest corner of the berm around the POL and B1-1033 was collected in the approximate centre of the bermed area. B1-1101 was taken 75 m northwest of POL 2 from the bottom of a gulley that would receive surface runoff from the POL. Sample B1-1102 was collected at a point 150 m northwest of the POL. Only B1-1023 and B1-1033 were submitted for analysis.

6.3.2.2 ANALYTICAL RESULTS

Samples in which the concentration of indicator chemicals exceeded the study criteria are presented in Table 6.4.

In the three water samples (B1-E, B1-F and B1-G), the analyzed indicator parameters were not detected.

Lead was present in B1-1033 (93 mg/kg) at a greater value than the study criterion. B1-1033 contained 3,400 mg/kg of TPH which is in excess of the Level B criterion. B1-1023 showed concentrations of ethyl benzene (0.135 mg/kg) and toluene (0.824 mg/kg) greater than the study criterion.

The presence of indicator parameters in SA 2 and SA 3 was detected by the samples collected. B1-1100 and B1-1103 contained TPH (10,000 and 8 mg/kg, respectively) and PCB (0.09 and 0.05 mg/kg, respectively). B1-1100 exceeds the Level C criterion for TPH of 5000 mg/kg. Water samples B1-H and B1-I taken from SA 5 and SA 6, respectively, did not indicate the presence of any indicator chemicals.

6.3.2.3 EVALUATION OF RISK ASSESSMENT AND ANALYTICAL RESULTS

The results of the risk assessment show that carcinogenic and non-carcinogenic risks are below the levels established for this study, but that TPH was identified at above the Quebec B and Quebec C guidelines. Further sampling should be undertaken to determine the full extent of elevated TPH in soil at this location.

6.3.2.4 CLEAN-UP OPTIONS

After further sampling has achieved closure appropriate clean-up options, as discussed in Volume 2, can be implemented.

6.3.3 POL 3

6.3.3.1 VISUAL OBSERVATIONS AND SAMPLE LOCATIONS

This POL facility is located on the west side of the main compound pad, 25 m from the main module, and contains two 38,000 L diesel tanks. The tanks are on a gravel pad which slopes to a catch basin located 15 m to the west. The facility is surrounded by a berm which has been compromised along the northeast corner. Ponded water with a hydrocarbon sheen was noted within the catch basin and rust coloured staining was noted above the water line. A barrel was exposed on the side of the basin.

Two soil samples were taken in the vicinity of POL 3 (Figure 6.1). B1-1030 was taken from the east side of the catch basin. B1-1032 was taken from a location at the bottom of the berm, outside the west end of the facility. Water was observed seeping from the berm at this location. Both samples were submitted for TPH analysis.

6.3.3.2 ANALYTICAL RESULTS

B1-1030 contained TPH at a concentration of 4,200 mg/kg which is in excess of the Level B criterion of 1000 mg/kg.

6.3.3.3 EVALUATION OF RISK ASSESSMENT AND ANALYTICAL RESULTS

The results of the risk assessment show that carcinogenic and non-carcinogenic risks are below the levels established for this study, but that TPH was identified at above the Quebec B guideline. However, TPH data for the other sample collected at this location indicates the area of elevated TPH is relatively well-defined and does not extend beyond the bermed area.

6.3.3.4 CLEAN-UP OPTIONS

Tankage at the site should be removed and the site recontoured, covered with clean fill materials and vegetated, if necessary, to control erosion.

If reduction of risk is deemed desirable, soils can be removed, encapsulated, treated, or covered, as applicable.

6.3.4 POL 4

6.3.4.1 VISUAL OBSERVATIONS AND SAMPLE LOCATIONS

A 23,000 L Mogas tank is located 500 m north of the southeast end of the airstrip, and within 100 m of the beach. Ponded water was noted 5 m west of the catch basin berm and a hydrocarbon sheen was observed on the surface.

off the southeast corner. B1-1022 was sampled from the southwest corner of the pad. Only samples B1-1020 and B1-1022 were submitted for analysis.

6.4.1.2 ANALYTICAL RESULTS

Study criteria were not exceeded in the samples for the indicator chemicals. Ethyl benzene was detected in B1-1020 (0.004 mg/kg) and Cl4-ethylene was detected in B1-1022 (0.006 mg/kg). The study criterion for ethyl benzene is 0.1 mg/kg.

6.4.1.3 EVALUATION OF RISK ASSESSMENT AND ANALYTICAL RESULTS

The results of the risk assessment show that carcinogenic and non-carcinogenic risks are below the levels established for this study, and no indicator chemicals were identified above the Quebec B guideline.

6.4.1.4 CLEAN-UP OPTIONS

There were some waste materials and debris scattered about the site. These materials should be removed and the site recontoured, covered with clean fill materials and vegetated, if necessary, to control erosion.

If reduction of risk is deemed desirable, soils can be removed, encapsulated, treated, or covered, as applicable.

6.4.2 PALLET LINE 2

6.4.2.1 VISUAL OBSERVATIONS AND SAMPLE LOCATIONS

Pallet Line 2 is located just east of POL 4 within 100 m of the shoreline. The area is bounded by organic terrain to the south and the beach road to the north. Strong fuel odours and soil staining were noted in this area.

Four soil samples were taken in this area (Figure 6.1). B1-1202 was taken in the centre of a fuel-stained area of approximately 400 m^2, located 20 m east of POL 4, adjacent to the beach road. B1-1203 was located south of B1-1202, on the opposite side of the area near the adjacent organic terrain. B1-1204 was collected at a location 80 m east of POL 4, at the south side of the storage area near a pile of scrap metal. The location for B1-1205 was 35 m further east, 10 m beyond the scrap metal pile. B1-1202 and B1-1204 were submitted for analysis.

6.4.2.2 ANALYTICAL RESULTS

Study criteria were not exceeded in the samples for the indicator chemicals.

6.4.2.3 EVALUATION OF RISK ASSESSMENT AND ANALYTICAL RESULTS

6.4.3.4 CLEAN-UP OPTIONS

There were some waste materials and debris scattered about the site. These materials should be removed and the site recontoured, covered with clean fill materials and vegetated, if necessary, to control erosion.

If reduction of risk is deemed desirable, soils can be removed, encapsulated, treated, or covered, as applicable.

6.5 OUTFALL AREAS

6.5.1 SEWAGE OUTFALL A

6.5.1.1 VISUAL OBSERVATIONS AND SAMPLE LOCATION

Sewage Outfall A is located approximately 40 m east of the east dormitory (Figure 6.1). Wastewater from the kitchen area of the facility is discharged in this general area. B1-1027 was taken in a poorly drained area near the outfall.

6.5.1.2 ANALYTICAL RESULTS

Samples in which the concentration of indicator chemicals exceeded the study criteria are presented in Table 6.5.

Table 6.5

Relevant Soil Results: Sewage Outfall A

Indicator Chemicals (mg/kg)	Level A	Background	B1-1027
Arsenic	10	6.5	21
Mercury	0.2	0.11	0.17
TPH	100	<1	8

TPH = Total Petroleum Hydrocarbons

Arsenic, lead, cadmium and mercury concentrations in B1-1027 (21, 84, 1 and 0.17 mg/kg, respectively) were in excess of the study criteria. TPH and PCB were detected in B1-1027 at 8 and 0.07 mg/kg, respectively. The PCB concentration was in excess of the study criterion.

Table 6.6

Relevant Soil Results: Sewage Outfall B

INDICATOR CHEMICALS (mg/kg)	LEVEL A	BACKGROUND	B1-1028	B1-1029	B1-1104
Arsenic	10	6.5	7.5	N/A	5.6
Mercury	0.2	0.11	0.1	N/A	0.21
Cadmium	1.5	<1	N.R.	1	N.R.
Lead	50	<10	N.R.	N.R.	36

N.R. = Not Relevant
N/A = Not Analyzed

Table 6.7

Relevant Soil Results: Sewage Outfall D

Indicator Chemicals (mg/kg)	Level A	Background	B1-1004	B1-1005
Arsenic	10	6.5	5.5	N.R.
Mercury	0.2	0.11	0.13	0.12
PCB	0.1	<0.01	0.67	N.R.

N.R. = Not Relevant

B1-1004 contained arsenic at a concentration of 5.5 mg/kg which is in excess of the study criterion. The PCB concentration of 0.67 mg/kg is also in excess of the study criterion. B1-1005 contained mercury at a concentration of 0.12 mg/kg, which exceeds the study criterion. Benzene was detected in B1-1005 at 0.18 mg/kg.

6.5.4.3 EVALUATION OF RISK ASSESSMENT AND ANALYTICAL RESULTS

The results of the risk assessment show that carcinogenic and non-carcinogenic risks are below the levels established for this study, and no indicator chemicals were identified above the Quebec B guideline.

6.5.4.4 CLEAN-UP OPTIONS

No clean-up of this site is required.

If reduction of risk is deemed desirable, soils can be removed, encapsulated, treated, or covered, as applicable.

6.6 BUILDING PROXIMITIES

6.6.1 SITE NORTH OF WATER SUPPLY

6.6.1.1 VISUAL OBSERVATIONS AND SAMPLE LOCATIONS

Soil sample B1-1035 was located 30 m north of the summer water supply, near Stain Area 1 (SA 1),. Across the road from the water supply, the area appears to have been disturbed. (Figure 6.1)

6.6.3.4 CLEAN-UP OPTIONS

There were many waste materials and debris scattered about the site. These materials should be removed and the site recontoured, covered with clean fill materials and vegetated, if necessary, to control erosion.

If reduction of risk is deemed desirable, soils can be removed, encapsulated, treated, or covered, as applicable.

6.6.4 SITE NORTH OF SEWAGE OUTFALL B

6.6.4.1 VISUAL OBSERVATIONS AND SAMPLE LOCATION

Soil sample B1-1105 of SA 4 was taken 10 m west of the main building, near the west dormitory. The sample was submitted for analysis.

6.6.4.2 ANALYTICAL RESULTS

The analysis results for B1-1105 were not available.

6.6.5 SITE NORTH OF GARAGE

6.6.5.1 VISUAL OBSERVATIONS AND SAMPLE LOCATION

At SA 5, one water sample (B1-H) was collected from a small drainage channel at a point 100 m north of the northeast corner of the garage (Figure 6.1). B1-H was submitted for analysis of pesticides, volatile organic compounds and acid extractable organics.

6.6.5.2 ANALYTICAL RESULTS

Study criteria were not exceeded in the sample for the indicator chemicals.

B1-H did not contain any pesticides, volatile organic compounds or acid extractable organics.

6.6.6 SITE NORTHEAST CORNER OF GARAGE

6.6.6.1 VISUAL OBSERVATIONS AND SAMPLE LOCATION

At SA 6, another water sample (B1-I) was collected from a small drainage channel at a point 150 m north of the northeast corner of the garage. (Figure 6.1) B1-I was submitted for analysis of volatile organic compounds only.

7.0 FACILITY DECOMMISSIONING

7.1 OVERVIEW

The MOU provides for a site-specific decommissioning plan, to be updated regularly as additional facilities are abandoned. Volume 2 discusses the general requirements and approach to facility decommissioning as the basis for the site-specific decommissioning plans. These generic approaches can be applied to the BAR-1 site when the final disposition of the station facilities is known.

7.2 SITE CLEAN-UP OPTIONS AND MONITORING

The results of the baseline risk assessment indicate that contaminant levels are such that there is a low risk to human health for the two cases considered, the worker periodically visiting the site and the hunter using country foods in the vicinity and on the site.

However, four locations were identified as exceeding the Quebec Level B criteria and are identified in Table 7.1 For three of the locations, additional sampling is required to determine the full extent of contamination. At one location contamination is sufficiently delineated to proceed to clean-up work.

Site decommissioning procedures in Volume 2 for landfills, sewage outfalls, POL facilities, pallet lines and other site facilities outline procedures for restoring the site to ensure that contaminants are stabilized. During the decommissioning process, other zones of elevated levels may be found, especially when earthwork facilities, such as gravel pads and POL storage dykes are excavated and restored. A set of soil and water samples should be taken to confirm that contaminants have not been redistributed during the process. An environmental protection and continency plan for these potential releases should be developed as part of the site specific decommissioning plan.

It should be emphasized that this study was limited to a shallow subsurface investigation using hand tools at a specific time. As a result, there is no information about the contents of the waste disposal sites, particularly the landfill areas identified by visual observations. Leachate from the landfills does not appear at this time to be migrating and causing impacts. However, physical and chemical changes in the landfill could cause this to change in the future, and pollution from leachate migration could result.

It is recommended that a monitoring program be developed as part of the site specific decommissioning plan to address this potential. In particular, monitoring wells should be established at strategic locations on the site to take groundwater samples for analyses to determine if contaminants are being mobilized and moving in the groundwater. As well, a comprehensive surface water quality program should be included in the monitoring program to determine if surface water processes are picking up site contamination and redistributing it in the environment.

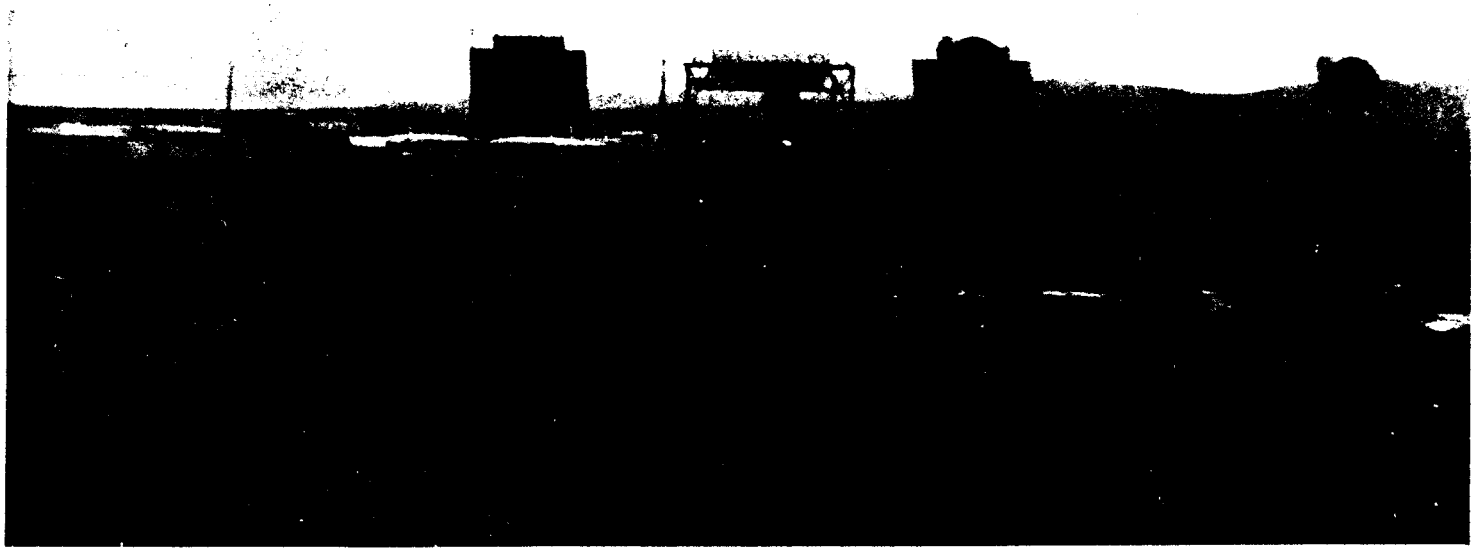


PLATE 1 – SEMI-AERIAL VIEW FROM NORTHWEST

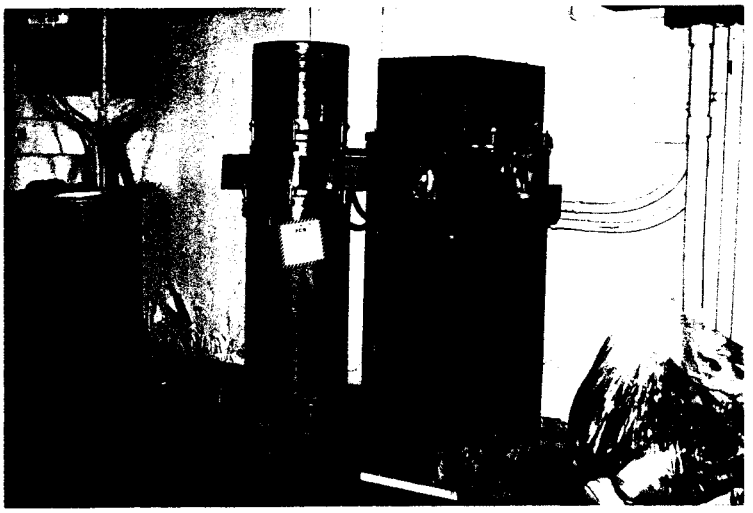


PLATE 2

RUNWAY LIGHT REGULATOR
ATB STORAGE SHED

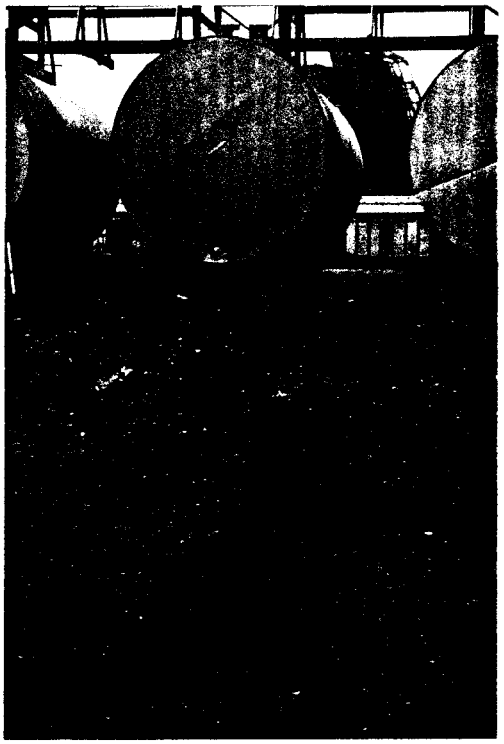
PLATE 3

WEST DORM SEWAGE OUTFALL AREA

PLATE 4

ACTIVE LANDFILL WATER SAMPLING

PLATE 5



BUILDING SITE DIESEL TANK FACILITIES SOIL STAINING IN CATCH BASIN

PLATE 6

ABANDONED LANDFILL NORTH SHORE

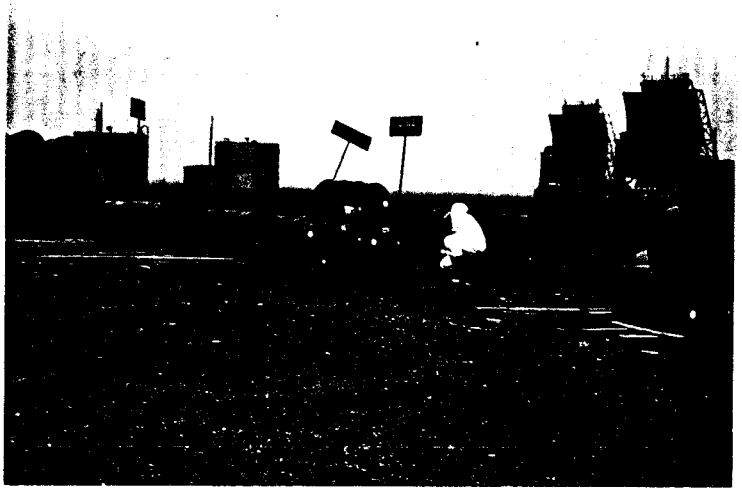


PLATE 7

POL DRUM STORAGE AREA SOIL STAINING

BAR-1 KOMAKUK BEACH

Appendix A Base Civil Engineering Data

BAR-1 AUXILIARY RADAR STATION BCE DATA

LOCATION AND TOPOGRAPHY

Location:	Komakuk Beach, Yukon, Canada on shores off the Beaufort Sea about 17 miles east of the Alaska border and approximately 85 miles east of Barter Island. (See arrow above).	
Terrain:	Low lying tundra (about 40' above SL).	
Topography:	Site structures and Mt. Coneybear, 2026 feet high south of station, are the most prominent features.	

CLIMATE

Precipitation:	Annual (including 24" snowfall).	6"
Temperature:	Absolute minimum and maximum (degrees Fahrenheit)	-55 & +86°F
GROUNDS	Total acres	924A
BUILDINGS	Refer to following Table of Particulars for details 1. Total number	6
AIRCRAFT FACILITIES	Total Aircraft Facility Surface (gravel)	70,266 SY
Runway:	1. Distance from Main Building Site	1800'
	2. Elevation (approximate mean feet above SL)	24'
	3. Surface: Gravel on 24" wearing course on non-frost acting base	110' X 3518' 43,000 SY
	4. Overruns:	1,110 SY
Shoulder:	Gravel	19,544 SY
Taxiway:	Gravel	2,877 SY
Apron:	Gravel	4,845 SY
Lighting:		
Runway:	1. Sides: White lights 10' from edge, 200' interval	33
	2. Threshold:	
	a. Green marker lights, 10' interval (10 on East end, 9 on West End)	19
	b. Strobeacon (2 each end 35' from sides)	4

AIRCRAFT FACILITIES (Continued)

Taxiway:	Outlining blue lights	8
Apron:	Outlining blue lights	6
Wind Cone:	White lights	4
Navaids:	NX 4000 Beacon	1
Aerovane:		1
Projector:	(ceiling) Property of Canadian Dept. of Atmospheric and Environmental Services (AES)	1
Wind Cone:	(lighted)	1

ROADS	1. Total road surface (gravel)	22,943 SY
	2. Paved surface	none
	3. 12-foot wide roadway (length)	14,800'
	4. 16-foot wide roadway (length)	1,800'
	5. Surface: Gravel on 6" wearing course on 3' non-frost acting base on existing ground.	

EXTERNAL SANITARY SEWER	3" sewer lines (3) to outfall areas from recreation and Kitchen Building (130'), from West Dorm (160'), and from East Dorm (150'), (Length)	440'

System: Only the module train is provided with running water, toilet, and drain facilities. Liquid sewage waste is accumulated at internal tanks for temporary storage. The waste from such tanks is periodically drained via sewer lines to outfall areas.

INTERNAL SEWAGE DISTRIBUTION: System is located in module train and consists of steel holding tanks, a grease trap, sump tanks and pumps, marine toilets, plumbing and latrine fixtures, piping, and valves.

Steel Tanks:	1. Holding, (3 each) (U.S. gallons)	1,900 GAL
	a. Recreation and Kitchen Bldg, 6' x 3'6" x 6'	800 GAL
	b. East and West Dorms, (1-550 Gal Each), 4' x 3'6" x 6'	1,100 GAL

STORM DRAIN SYSTEM

Note: There is no pipeline storm drain system.

System: Surface water is permitted to drain away by following natural run-off pattern of terrain, except where blocked by buildings, gravel pads, roadways, etc., at which point culverts are provided.

Culverts:	1. Approximate number	11'
	2. Approximate total length	560'

EXTERNAL WATER DISTRIBUTION

Note: There is no external, primary pipeline system.

System: External water distribution is accomplished by water haul from a dammed river in summer and from a spring in the river system in winter. Raw water is pumped through the filtering system located in the P.U. Mech Shop and then into the two 20,000 gal heated, raw water storage tanks located outside of the P.U. Mech Shop. Tanks are heated by a circulating hot water system from heat exchangers on three generator units in the powerhouse.

1. Summer haul	1300'
2. Winter haul	2.3 MI

3. Freeze-over emergency: Not required as spring in the river system is flowing and open all during winter season.

INTERNAL WATER DISTRIBUTION TREATMENT

System located in buildings serviced by plumbing consists of steel raw water receiving tanks (2), filter plant, hot water circulating pumps and heat exchangers, chlorinator, steel distribution potable water storage tanks (3), electric domestic hot water heaters, assorted pumps, hot and cold water lines, valves, and pneumatic tank and pump units.

Steel Tanks:	1. Receiving - 2 ea 20,000 gal exterior, heated, raw water storage tanks (steel and insulated)	40,000 GAL
	2. Treated Water Distribution Tanks: (3) (U.S. gal)	1,900 GAL
	a. Recreation & Kitchen Building, 6' x 3'6" x 6'	800 GAL
	b. East & West dormitories (1-550 gal each), 4' x 3'6" x 6'	1,100 GAL
ELECTRIC POWER	Power is generated at station (total capacity)	380 KW
Powerplant:	Diesel-Electric Units: Primary Units: Six, 60KW, 1200 rpm, 120/208v, 3 ph, 60 Hz at 80% pf, located in Powerhouse Building, GMC Model 6-71.	360 KW
	Survival Unit: One Caterpillar Model D-311, 20 KW, 1200 RPM, 120/208v, 3 ph, 60 Hz at 80% pf, located in garage	20 KW
Distribution:		
Internal:	System consists of switchboard, single bus system (servicing both Technical and Utility loads), and assorted branch circuits throughout the corridor-connected Main Building Complex, with single bus service provided in buildings and areas requiring only Utility service.	
External:	System consists of ground supported cable runs, in general (with short buried runs under man-made obstructions), servicing buildings and areas requiring electric power, and such transformers associated therewith.	
	1. Number of primary power transformers	2
	a. Power House (one, 2400/120/208v)	30 KVA
	b. Airstrip Hut (one, 2400/120/208v)	30 KVA

ELECTRIC POWER (Continued)

Demand & Consumption:	1. Peak Demand	126 KW
	2. Average Power Consumption	
	a. Monthly	69,363 KWH
	b. Annual	832,359 KWH
	3. Fuel Oil Consumption, Power Production	
	a. Monthly average (U.S. Gallons)	5,978 GAL
POL STORAGE, DISTRIBUTION	Total Storage Capacity, external tanks (U.S. Gallons)	277,000 GAL
Storage:	1. Diesel Oil: Total Capacity	265,000 GAL
	a. Total number of tanks (steel)	10
	b. Building Site Area (only location)	
	(1) 3 Steel tanks (65,000 ea)	195,000 GAL
	(2) 7 Steel tanks (10,000 ea)	70,000 GAL
	2. Mogas: Total Capacity	12,000 GAL
	a. Total number of tanks (steel)	2
	b. Beach Area: 1 tank steel	6,000 GAL
	c. Site Area: 1 tank steel	6,000 GAL
Pipelines:	Total length (including building feeder lines)	4,150'
	a. 2" pipe	1,000'
	b. 6" pipe	3,150'
Pumphouses:	Total number	1
	a. Module Train Tank Area	1

System: Product delivered by sealift is pumped via 6" pipeline to 3 each 65M gal storage tanks, at building Site Area, for distribution via pumphouse to secondary tanks and various fill stands and building day tanks. Drum stocks are transferred via portable pump units.

Permanent Buildings: 1. All buildings except C&E Operations Building: Fan driven, ducted, oil fired, hot air furnaces (1 each building).
2. C&E Operations Building: Heat recovered from Electronic Equipment is distributed and recirculated via fans and ductwork.

BAR-1 AUXILIARY RADAR STATION BCE DATA

HEATING

Temporary Buildings: Unheated.

Furnace Capacity:

Total rated output for station	1,676,000 BTU/hr
a. 1 furnace (4000 cfm) Garage	350,000 BTU/hr
b. 1 furnace (3650 cfm) Kitchen	184,000 BTU/hr
c. 1 furnace (3800 cfm) Warehouse	350,000 BTU/hr
d. 2 furnaces (1540 cfm/141,000 BTU/hr each) East & West Dorm	282,000 BTU/hr
e. 2 furnaces (1250 cfm/114,000 BTU/hr each) North Dorm & P.U. Mech Shop	228,000 BTU/hr
f. 2 furnaces (1540 cmf/141,000 BTU/hr each) South Dorm & Receiving Building	282,000 BTU/hr

FIRE PROTECTION

Fire Alarm:

1. Automatic heat and smoke detectors are installed throughout all building areas, which are divided into Fire Alarm Zones. A zoned circuit alarm system centralizes all calls at the Annunciator Panel, near the Control Console, to facilitate further announcements over the Public Address System. Alarm horns in all enclosed areas and an outdoor siren sounds, strobe lights are energized, and magnetic door holders are de-energized (allowing fire doors to close) whenever the heat and smoke detectors, CO_2 systems, or manually operated pull boxes are actuated.
2. Smoke Detector System in sleeping quarters, East and West Dorms. Both smoke and heat detectors are installed in North and South dorms and all other areas with acoustic drop ceilings.
3. A custom 6500 master alarm panel is located in building R-1, C & E Workshop. 1526 single zone alarm panels are located in the garage and warehouse.

FIRE PROTECTION (Continued)

Fire Fighting Systems:

Permanent Buildings:

1. Deluge System consisting of fixed CO_2 tanks equipped for manual and automatic discharge.
   a. System automatically operated in all buildings Mechanical Rooms.
   b. System manually operated in C&E Operations Building fire barrier module and in Powerhouse Building.

Note: Actuation of CO_2 system automatically turns in fire alarm, deactivates associated heating and ventilating fans, and releases associated normally open fire doors to confine fire.

2. Fire Extinguishers: Halon, dry chemical, and loaded-stream water hand extinguishers are placed at strategic locations throughout the Train.
3. Fire hose system consisting of a manual start gas engine water pump and four (4) hose racks in corridor of the module train.

Other Buildings:

Fire fighting equipment in other buildings is limited to the hand extinguishers listed above plus CO_2 extinguishers, except as follows:

1. Garage: Automatic CO_2 deluge system in furnace room.
2. Warehouse: Same as garage furnace room.

ANTENNAS

(See Plot Plan for location and type)

REFUSE DISPOSAL

Collection:

Refuse is collected periodically and hauled to the landfill.

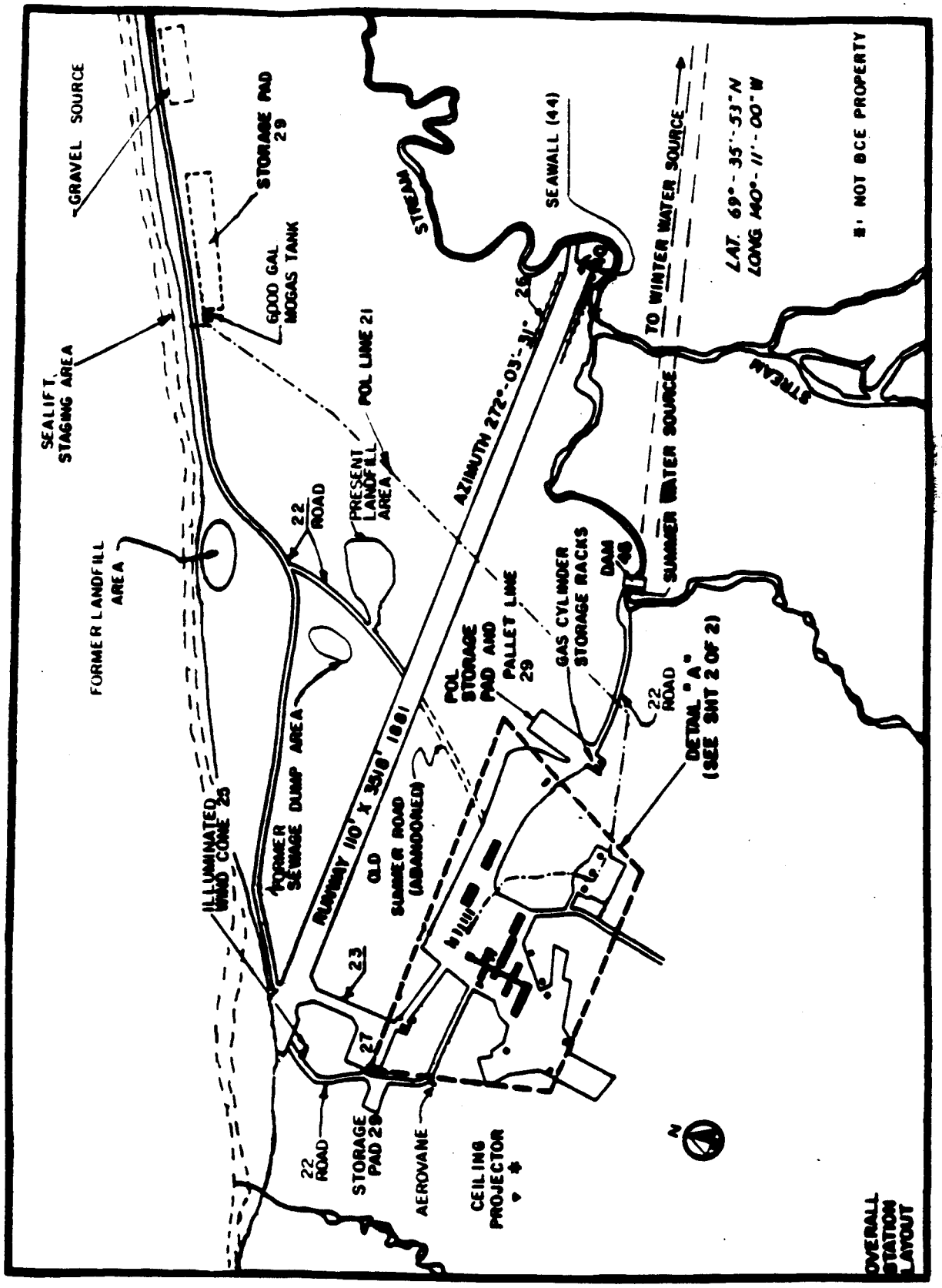
REFUSE DISPOSAL (Continued)

Disposal:	NOTE: Refuse dumped at landbound disposal areas is periodically buried under material (gravel, etc.) stockpiled in the area for this purpose.	
	1. Refuse haul (distance):	3564'

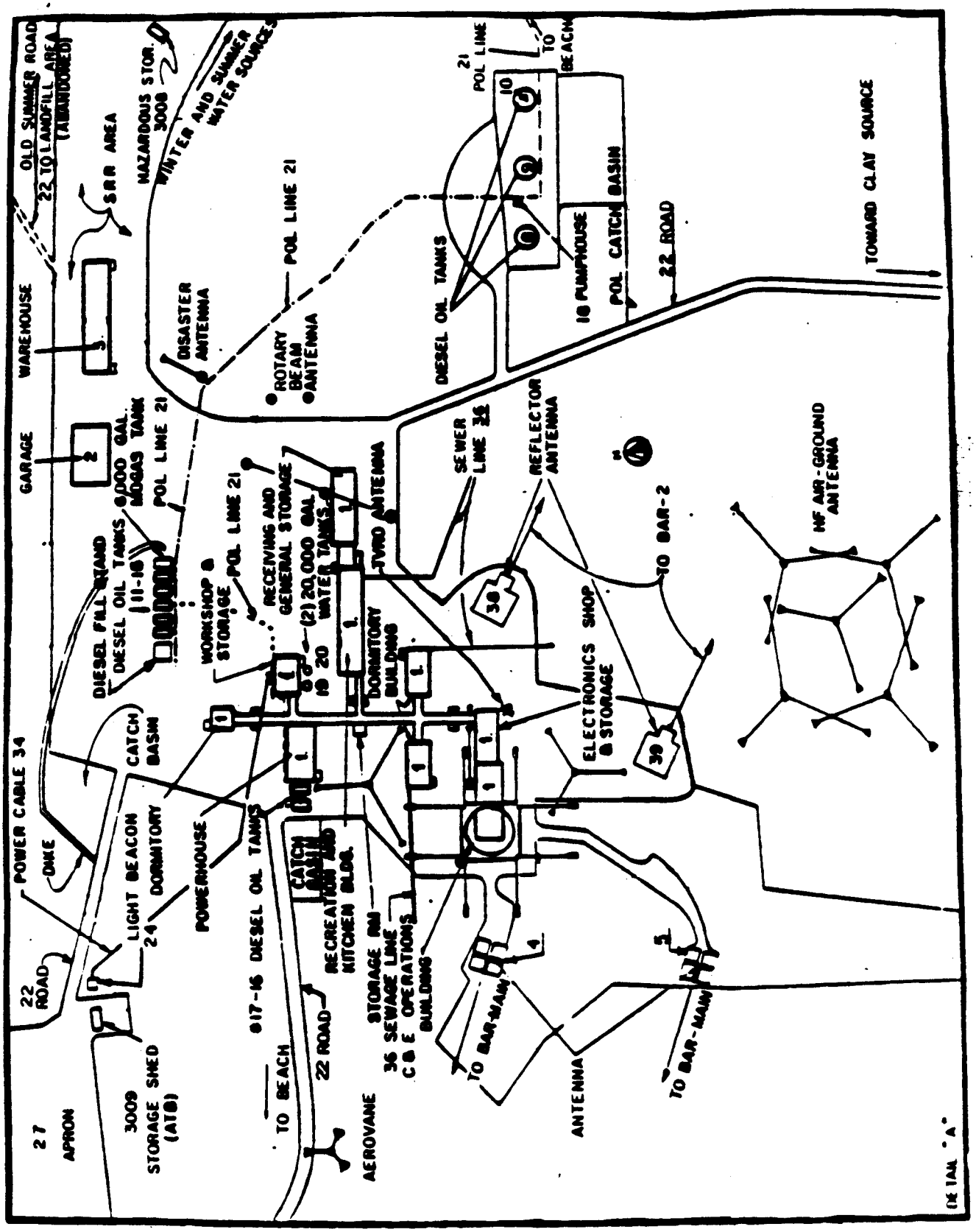
FACILITIES INVENTORY VALUE

Total	$7,316,000

BAR-1 PLOT PLAN (SHEET 1 OF 2)



BAR-1 PLOT PLAN (SHEET 2 OF 2)



FACILITIES INDEX BAR-1

1. Module Train
2. Garage
3. Warehouse
4. Communication "DISH"
5. Communication "DISH"
6. Master TV Antenna
8. Diesel Fuel Tank (Steel)
9. Diesel Fuel Tank (Steel)
10. Diesel Fuel Tank (Steel)
11. Diesel Fuel Tank (Steel)
12. Diesel Fuel Tank (Steel)
13. Diesel Fuel Tank (Steel)
14. Diesel Fuel Tank (Steel)
15. Diesel Fuel Tank (Steel)
16. Diesel Fuel Tank (Steel)
17. Diesel Fuel Tank (Steel)
18. POL Pumphouse
19. Water Storage Tank
20. Water Storage Tank
21. POL Line
22. Road
23. Taxiway
24. Beacon Light
25. Wind Cone
26. Runway Lights
27. Airstrip Apron
*28. Runway Shoulder
29. Open Storage Areas
34. Primary Power Cable (UG)
36. Sewer Line
38. Communication Billboard
39. Communication "BILLBOARD"
40. Runway Overrun
* 41. Light Strobeacon
* 42. Light Approach
* 43. Light Taxiway
44. Seawall
45. Water Storage Dam
1881. Runway
3008. Hazard Storage (POL)
3009. Storage Shed (ATB)

* Not Shown on Plot Plan

NOTE: Ceiling Projector on Sheet 1 of Plot Plan is property of Canadian Department of AES.

TABLE OF PARTICULARS -- BAR-1 BUILDINGS -- REAL PROPERTY

BUILDING DESCRIPTION	CONSTRUCTION DATA FOUNDATION	BUILDING	FACILITIES AND/OR PURPOSE	UTILITY DATA ELECTRIC	HEAT	WATER	SEWAGE	VENTILATION	COMMENTS
C&E Operations Building (28' x 82') FAC No. 00001	Timber piles	Prefab-unit, modular type approx 16' x 28' per unit) a. Occupied Units (4) Wd frame with insulated plywd panels, with exterior metal sheathing on roof b. Unoccupied Fire Barrier Unit (1) Unheated stl box type with heated cross corridor	C&E Mission Equip	a. Single bus system (1 bus for tech and utility loads) b. Emergency lights (btry powered with auto lighting & charging controls.)	Ducted forced air utilizing C&E equipment heat recovery system	No System	No System	a. Supply: Ducted forced air system equipped with Modultrol dmpr for auto control of fresh & recirc air mixture b. Exhaust: Ducted, forced air system	Surveillance radar antenna housed in rigid, unheated radome located on independent platform straddling Module Train, interconnected with Electronic Shop Building
Electronic Shop & Storage Building (26' x 56') FAC No. 00001	Post/timber sill	Prefab-units wd frame with insulated metal panels, with exterior metal sheathing on roof	a. Station offices b. C&E Repair Shop c. Parts Storage d. S.S. Bedroom	a. Ext supply via station plant utiltiy bus b. Emergency lights (btry powered with auto lighting & charging controls.)	Ducted forced air system from oil fired furnace	No System	No System	No Mechanical System	Serviced by Building Complex Corridor System
Dormitory Building (2) (26' x 48' EA) FAC No. 00001	Post/timber sill	Prefab-units wood frame with insulated metal panels, with exterior metal sheathing on roof	Bedrooms and bath	a. Ext supply via stn plant utility bus b. Emergency lights (btry powered with auto lighting & charging controls)	Ducted forced air system from oil fired furnace	Plumbing system supplied with potable water pumped from int steel storage tanks	Int plumbing system terminating at int storage tank serviced by outfall sewer pipe	No Mechanical System	Serviced by Building Complex Corridor System. (East & West dorms)
Dormitory Building (24' x 26') FAC No. 00001	Post/timber sill	Prefab-units wood frame with insulated metal panels, with exterior metal sheathing on roof	Bedrooms	a. Ext supply via stn plant utility bus b. Emergency lights (btry powered with auto lighting & charging controls)	Ducted forced air system from oil fired furnace	No System	No System	No Mechanical System	Serviced by Building Complex Corridor System. (North dorm)

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TABLE OF PARTICULARS -- BAR-1 BUILDINGS -- REAL PROPERTY

BUILDING DESCRIPTION	CONSTRUCTION DATA FOUNDATION	CONSTRUCTION DATA BUILDING	FACILITIES AND/OR PURPOSE	ELECTRIC	HEAT	UTILITY DATA WATER	SEWAGE	VENTILATION	COMMENTS
Recreation & Kitchen Building (26' x 124') FAC No. 00001	Post/timber sill	Prefab-units wood frame with insulated metal panels, with exterior metal sheathing on roof	a. Dining & Recreation b. Kitchen & dry food storage c. Laundry d. Library e. PX, hobby shop, & darkroom f. Mechanical room	a. Ext supply via stn plant utility bus b. Emergency lights (btry powered with auto lighting & charging controls)	Ducted forced air system from oil fired furnace	Plumbing system supplied with potable water pumped from int steel storage tanks	Int plumbing system terminating at int storage tank serviced by outfall sewer pipe	No Mechanical System	Serviced by Building Complex Corridor System
Powerhouse (31' x 61') FAC No. 00001	Post/timber sill	Prefab-units wood frame with insulated plywood panels, with exterior metal sheathing on walls and roof	Site Powerplant	a. Ext supply via stn plant utility bus b. Emergency lights (btry powered with auto lighting & charging controls)	Engine heat via exhaust piping	No System	No System	No Mechanical System	Serviced by Building Complex Corridor System
Work shop and Storage (26' x 40') FAC No. 00001	Post/timber sill	Prefab-units wood frame with insulated metal panels, with exterior metal sheathing on roof	J-Mech Shop and water treatment plant	a. Ext supply via stn plant utility bus b. Emergency lights (btry powered with auto lighting & charging controls)	Ducted forced air system from oil fired furnace	No System	No System	No Mechanical System	Serviced by Building Complex Corridor System
Receiving and Storage (26' x 80') FAC No. 00001	Post/timber sill	Prefab-units wood frame with insulated metal panels, with exterior metal sheathing on roof	a. Recreation b. Storage c. Receiving d. Emergency Radio System e. Walk-in refrig storage f. GYM	a. Ext supply via stn plant utility bus b. Emergency lights (btry powered with auto lighting & charging controls)	Ducted forced air system from oil fired furnace	No System	No System	No Mechanical System	Serviced by Building Complex Corridor System
Dormitory and Storage (17' x 27') FAC No. 00001	Post/timber sill	Timber frame with plywood exterior (Insulated with exterior metal sheathing on roof	a. General storage b. Transient dormitory	Ext supply via station plant utility bus	Oil burning space heater	No System	No System	No Mechanical System	Serviced by Building Complex Corridor System

TABLE OF PARTICULARS -- BAR-1 BUILDINGS -- REAL PROPERTY

BUILDING DESCRIPTION	CONSTRUCTION DATA FOUNDATION	BUILDING	FACILITIES AND/OR PURPOSE	UTILITY DATA ELECTRIC	HEAT	WATER	SEWAGE	VENTILATION	COMMENTS
Garage (41'-9" x 62'-10") FAC No. 00002	Concrete footings on fill	Stl frame with insulated metal panels	a. Vehicle M&R b. Survival electric generator unit c. Emerg/Disaster Radio System	a. Ext supply via stn plant utility bus b. Emergency lights (btry powered with auto lighting & charging controls)	Ducted forced air system from oil fired furnace	No System	No System	No Mechanical System	
Warehouse (28' x 120') FAC No. 00003	Timber piles	Timber frame with metal and wood exterior (Insulated)	a. General storage b. Receiving dock c. Office d. Security crib	a. Ext supply via stn plant utility bus b. Emergency lights (btry powered with auto lighting & charging controls)	Ducted forced air system from oil fired furnace	No System	No System	No Mechanical System	
POL Pumphouse (8' x 8') FAC No. 00018	Concrete slab on fill	Steel frame with metal exterior (uninsulated)	POL Pumps	Ext supply via station plant utility bus	No System	No System	No System	No Mechanical System	
Hazard Storage (17' x 27') FAC No. 03008	Timber sills	Atwell tent	a. General storage	No System	No System	No System	No System	No Mechanical System	POL Hazardous Storage
Storage Shed (14' x 28') FAC No. 03009	Post/timber sill	Timber frame with plywood exterior (insulated)	a. General storage (unheated) b. Airstrip lighting controls	Ext supply via station plant utility bus	No System	No System	No System	No Mechanical System	ATB

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Appendix B Sample Location Description

APPENDIX B

BAR-1 KOMAKUK BEACH

Sample No.	Surface Run-Off	Soil Drainage Class	Soil Perviousness Class	Surface Stoniness	Soil Sample Depth	Topography	Slope Position	Slope Exposure	Soil Description	Soil Colour	Remarks (Location, Adjacent Areas, Comments)
B1-1002	N/A	poor	N/A	N/A	N/A	slight gradient < 5% to the N & NW	middle	north	saturated, gravelly sand	grey	-landfill B 100m N of runway in disturbed area next to landfill -roads on 2 sides, restricting drainage -scrap metal, general domestic refuse in vicinity -vegetation cover sparse (Equisetum spp., sedges)
B1-1009	N/A	poor	N/A	N/A	N/A	slope to NW, slight gradient < 5%	N/A	N/A	organic, high water content	dark brown	-landfill A 300m N of runway between road and ocean -80m S of beach in disturbed area with pools of water -contains drums, domestic refuse, possibly electrical equipment -vegetation cover 25% (sedges, Salix spp., Epilobium spp., grasses)
B1-1010D & B1-1011D	N/A	poor	N/A	N/A	N/A	slope to NW, slight gradient < 5%	N/A	N/A	organic, gravelly sand	dark brown	-landfill A 300m N of runway between road and ocean -75m S of beach in disturbed area with pools of water -contains drums, domestic refuse, possibly electrical equipment -vegetation cover 25% (sedges, Salix spp., Epilobium spp., grasses)
B1-1012	N/A	poor	N/A	N/A	N/A	slope to NW, slight gradient < 5%	N/A	N/A	granular sand	grey	-landfill A 300m N of runway between road and ocean -25m S of beach in disturbed area -contains drums, domestic refuse, possibly electrical equipment -vegetation cover (clumps of grass)
B1-1013	N/A	moderate	N/A	N/A	N/A	slope to NW, slight gradient < 5%	middle	northwest	silty sand	grey	-landfill A 300m N of runway between road and ocean -100m S of beach in local drainage channel -contains drums, domestic refuse, possibly electrical equipment -vegetation cover (grasses, sedges, Salix spp.)
B1-1014	N/A	moderate	N/A	N/A	N/A	slope to NW, slight gradient < 5%	middle	northwest	silty sand	grey	-landfill A 300m N of runway between road and ocean -130m S of beach in local drainage channel -contains drums, domestic refuse, possibly electrical equipment -vegetation cover (grasses, sedges, Salix spp.)
B1-1038	N/A	good	N/A	N/A	N/A	approx. 75% along foundering bank	middle	north	clay	dark grey to brown	-bank of clay 2m high within 100m of runway, opening onto landfill C -sample taken adjacent to discoloured seepage of groundwater -vegetation cover (none)
B1-1004	N/A	poor	N/A	N/A	N/A	slight gradient < 5% to the NW	N/A	N/A	saturated, sandy gravel	grey to brown	-275m S of ocean, 100m N of sewage outfall D -30m by 100m in slight depression, roads on SE and N -drainage flow to NW, pools of water -adjacent to road, 5m N of gravel stockpile -vegetation cover (sedges, Senecio sp.)
B1-1005	N/A	fair to poor	N/A	N/A	N/A	slight gradient < 5% to the NW	N/A	N/A	peat overlying clay, medium plasticity	dark brown	-275m S of ocean, 100m N of sewage outfall D -30m by 100m in slight depression, roads on SE and N -drainage flow to NW, pools of water -landfill B area 20m E of outfall area -vegetation cover (Senecio sp., sedges, grasses)

APPENDIX B

BAR-1 KOMAKUK BEACH

Sample No.	Surface Run-Off	Soil Drainage Class	Soil Perviousness Class	Surface Stoniness	Soil Sample Depth	Topography	Slope Position	Slope Exposure	Soil Description	Soil Colour	Remarks (Location, Adjacent Areas, Comments)
B1-1027	N/A	poor	N/A	N/A	N/A	slight gradient < 5% to the SE	N/A	N/A	silty sand	grey	-sewage outfall A 40m SE of main module train -poorly drained, roads on 3 sides, gravel pads -vegetation cover 100% (Senecio sp., Rumex sp., sedges, grasses)
B1-1104	N/A	poor	N/A	N/A	N/A	< 1% to the W	N/A	N/A	gravelly sand	grey	-sewage outfall B 60m SE of module train -poorly drained, roads on 3 sides, gravel pads -vegetation cover 100% (Senecio sp., Rumex sp., sedges, grasses)
B1-1016	N/A	poor	N/A	N/A	N/A	< 1%	N/A	N/A	fine gravel	grey to brown	-POL 1 area 150m SE of main module train -3m E of catch basin, 1.5m S of POL line, smell of fuel evident, sheen noted on adjacent pool of water -vegetation cover 100% (grasses, sedges), fen species in surrounding area (sedges, Sphagnum spp., Vaccinium spp., Salix spp.)
B1-1020D & B1-1021D	N/A	moderate to poor	N/A	N/A	N/A	slight gradient < 5% to the E	N/A	N/A	sandy gravel	grey to brown	-pallet line 1 area 300m E of main module train -1m E of gravel pad, in undisturbed area -vegetation cover 100% (grasses, sedges, Salix spp., Epilobium spp., Empetrum sp.)
B1-1202	N/A	good	N/A	N/A	N/A	slight gradient to the N	middle	north	sandy gravel	grey to brown	-pallet line 2 500m N of SE corner of runway, within 100m of landfill C -20m by 30m contaminated with fuel -vegetation cover (none)
B1-1204	N/A	good	N/A	N/A	N/A	slight gradient to the N	middle	north	gravelly sand	grey to brown	-pallet line 2 500m N of SE corner of runway, within 100m of landfill C -located S of storage area, stores piping/scrap metal -vegetation cover 30% (sedges)
B1-1036	N/A	good	N/A	N/A	N/A	slope is N drainage flows E	middle	north	clay	grey	-pallet line 2 500m N of SE corner of runway, within 20m of landfill C -50m N of Mogas storage tank -vegetation cover (none)
B1-1039	N/A	good	N/A	N/A	N/A	45% down eroding bank 1% to 5% along beach	bottom	north	sandy clay	brown	-landfill C 400m N of main module, within 25m of shoreline -water in stream slightly discoloured -vegetation cover 30% (Salix spp., Senecio spp., grasses)
B1-1037	N/A	good	N/A	N/A	N/A	45% down eroding bank 1% to 5% along beach	bottom	north	sand & clay	grey to light brown	-landfill C 400m N of main module, within 25m of shoreline -rust coloured staining noted in area -vegetation cover (isolated grasses)
B1-1001	N/A	poor	N/A	N/A	N/A	slight gradient to the NE	middle	northeast	saturated, some clay, organic peat	brown	-landfill B 100m N of runway on NW corner of landfill -adjacent to beach access road, landfill is same grade as surrounding area -drainage impeded by beach access road, landfill -scrap metal, domestic refuse in vicinity

APPENDIX B

BAR-1 KOMAKUK BEACH

Sample No.	Surface Run-Off	Soil Drainage Class	Soil Perviousness Class	Surface Stoniness	Soil Sample Depth	Topography	Slope Position	Slope Exposure	Soil Description	Soil Colour	Remarks (Location, Adjacent Areas, Comments)
											-vegetation cover (sedges, Salix spp., Equisetum spp.)
B1-1000	N/A	poor	N/A	N/A	N/A	slight gradient to the NE	middle	northeast	organic peat	brown	-landfill B 100m N of runway on SW corner of landfill -landfill is same grade as surrounding area -drainage impeded by beach access road, landfill -pools of standing water on S and W sides of landfill -scrap metal, domestic refuse in vicinity -vegetation cover (sedges, Salix spp., Equisetum spp.)
B1-1006	N/A	poor	N/A	N/A	N/A	slight gradient to the NW	middle	northwest	peat overlying clay	grey	-sewage outfall D 275m S of ocean, 100m N of runway -30m by 100m in slight depression, roads on SE and N -drainage flow to NW, pools of water -35m W of outfall in shallow peatland from clay -vegetation cover 100% (sedges, grasses)
B1-1003	N/A	poor	N/A	N/A	N/A	slight gradient to the NW & N	top	northwest	saturated sandy gravel	grey	-sewage outfall D 275m S of ocean, 100m N of runway -30m by 100m in slight depression, roads on SE and N -drainage flow to NW, pools of water -NE edge of outfall, adjacent to beach access road -vegetation cover (Senecio spp., grasses, sedges)
B1-1008	N/A	moderate to poor	N/A	N/A	N/A	slope to NW, slight gradient < 5%	middle	northeast	sandy organic	brown	-landfill A 300m N of runway, between access road and ocean -contains drums, domestic refuse, electrical equipment -drainage impeded, standing pools of water -vegetation cover (no information)
B1-1007	N/A	moderate	N/A	N/A	N/A	slope to NW, slight gradient < 5%	near bottom	northwest	gravelly sand	N/A	-landfill A 300m N of runway, between access road and ocean -contains drums, domestic refuse, electrical equipment -drainage impeded, standing pools of water -vegetation cover (no information)
B1-1015	N/A	N/A	N/A	N/A	N/A	no significant slope	N/A	N/A	gravel fill	grey	-POL 1 area 150m SE of main module train -dyked area, 15m W of Tank 8 -vegetation cover (none)
B1-1030D & B1-1031D	N/A	moderate to poor	N/A	N/A	N/A	gradient approx 5% to the NW	top	northwest	silty gravel	grey with rust	-POL 3 facility adjacent to W side of main module -catch basin midway down wall of E berm -basin partially filled with water, rust coloured staining noted around perimeter -corner of basin dug away to permit drainage of water -vegetation cover (grasses, Equisetum spp., Artemisia spp.)
B1-1032	N/A	moderate to poor	N/A	N/A	N/A	gradient approx 5% to the NW	top	northwest	N/A	N/A	-sewage outfall C 50m W of main module at base of catch basin -sewage outflow passes along the S edge of catch basin -vegetation cover 60% (grasses, sedges, Artemisia spp.)
B1-1023	N/A	good	N/A	N/A	N/A	5% to 10% to the NW	top	northwest	sandy gravel	grey	-Pol 2 area 20m N of main module, in dyked area -two 1m x 5m stained areas noted

APPENDIX B

BAR-1 KOMAKUK BEACH

Sample No.	Surface Run-Off	Soil Drainage Class	Soil Perviousness Class	Surface Stoniness	Soil Sample Depth	Topography	Slope Position	Slope Exposure	Soil Description	Soil Colour	Remarks (Location, Adjacent Areas, Comments)
											-fuel percolating through pools of water -vegetation cover (none)
B1-1033	N/A	moderate to good	N/A	N/A	N/A	5% to 10% to the NW	top	northwest	sandy gravel	grey	-pol 2 area 20m N of main module, in dyked area -two 1m x 5m stained areas noted -fuel percolating through pools of water -vegetation cover (none)
B1-1024	N/A	moderate to poor	N/A	N/A	N/A	1% to the NW	top	northwest	10cm peat overlying gravel	brown and grey	-pallet line 1 125m NW of main module, crushed drums protruding -pad poorly compacted, other drums had leaked -fuel noted on pad, around perimeter -sample taken from peatland, 1m from NW corner of pad -vegetation cover (grasses, sedges)
B1-1025	N/A	moderate to poor	N/A	N/A	N/A	1% to the NW	top	northwest	silty gravel	grey	-pallet line 1 125m NW of main module, crushed drums protruding -pad poorly compacted, other drums had leaked -fuel noted on pad, around perimeter -sample taken from NW corner on surface of pad -vegetation cover (none)
B1-1026	N/A	poor	N/A	N/A	N/A	1% to the NW	near top	northwest	20 cm peat overlying clay	grey	-pallet line 1 125m NW of main module, crushed drums protruding -pad poorly compacted, other drums had leaked -fuel noted on pad, around perimeter -sample taken 30m NW of corner of storage pad -vegetation cover 100% (sedges)
B1-1029	N/A	poor	N/A	N/A	N/A	slight gradient < 5% to the W	top	west	organic, granular fill	dark brown	-sewage outfall B 60m S of main module, borders S edge of main compound -sewage lagoons approx. 10m E of sample location -vegetation cover (no information)
B1-1028	N/A	moderate to poor	N/A	N/A	N/A	slight gradient < 5% to the W	top	west	silty gravel, some organic	brown	-sewage outfall B 60m S of main module, borders S edge of main compound -sewage drains onto peatland, has ponded into "lagoons" -sample taken at edge of sewage lagoon -vegetation cover 30% (Epilobium spp., grasses, Salix spp.)
B1-1100	N/A	moderate	N/A	N/A	N/A	5% to the N	top	north	sand and gravel	N/A	-stain area 2, 75m N of garage, near main compound pad -oil soaked gravel noted, small pools of water -stained soil approx. 20m downslope -vegetation cover (none)
B1-1103	N/A	good	N/A	N/A	N/A	2% to the N	top	north	sand and silty gravel	grey	-stain area 3, 10m W of garage on main compound pad -vegetation cover (none)
B1-1106	N/A	moderate to poor	N/A	N/A	N/A	1% to the SW	middle	southwest	peat overlying clay	brown and grey	-250m S of E end of airstrip -15m E of water supply in peatland -vegetation cover 100% (sedges, Salix spp., mosses, Vaccinium vitis-idaea, Lupinus sp.)

APPENDIX B

BAR-1 KOMAKUK BEACH

Sample No.	Surface Run-Off	Soil Drainage Class	Soil Perviousness Class	Surface Stoniness	Soil Sample Depth	Topography	Slope Position	Slope Exposure	Soil Description	Soil Colour	Remarks (Location, Adjacent Areas, Comments)
B1-A	N/A	N/A	N/A	N/A	N/A	5% to the N	N/A	N/A	N/A	N/A	-pol 4 area, MOGAS storage tanks 1200m N of E end of runway -within 100m of shoreline, small pond 5m W of MOGAS tank -volatile organic compound only -vegetation cover (none towards beach - 100% S of site)
B1-B	N/A	N/A	N/A	N/A	N/A	5% to the N	N/A	N/A	N/A	N/A	-pol 4 area, MOGAS storage tanks 1200m N of E end of runway -50m E of site, between MOGAS tank and drum storage -volatile organic compound only -vegetation cover (none towards beach - 100% S of site)
B1-C(D) & B1-D(D)	N/A	N/A	N/A	N/A	N/A	1% to the N	N/A	N/A	N/A	N/A	-landfill B 100m N of runway -water slightly turbid -metal/mercury samples unfiltered, unpreserved -vegetation cover 40% (sedges)
B1-E	N/A	N/A	N/A	N/A	N/A	5% to the N	N/A	N/A	N/A	N/A	-pol 2 area, pond 150m N of main module, between main pad and runway -check possible spill from POL storage upslope -vegetation cover 80% (grasses, sedges)
B1-F	N/A	N/A	N/A	N/A	N/A	5% to the NW	N/A	N/A	N/A	N/A	-pol 2 area, 50m downslope of NW corner of POL storage tanks -volatile organic compound only -vegetation cover (clumps of sedge)
B1-G	N/A	N/A	N/A	N/A	N/A	5% to the N	N/A	N/A	N/A	N/A	-pol 2 area, catch basin for fuel storage tanks, 50m N of main module -hydrocarbon expelled from bottom of pool, sheen on surface of water, staining throughout catch basin -volatile organic compound only -vegetation cover (none)
B1-H	N/A	N/A	N/A	N/A	N/A	2% to the N	N/A	N/A	N/A	N/A	-stain area 5, 100m N of garage between main compound and runway -hydrocarbon contamination upslope, along toe of compound -volatile organic compound only -vegetation cover (none along channel - 100% beyond)
B1-I	N/A	N/A	N/A	N/A	N/A	2% to the N	N/A	N/A	N/A	N/A	-stain area 6, 150m downslope of B1-108, between main compound and runwa -traces of viscous hydrocarbon on water surface -volatile organic compound only -vegetation cover 100% (sedges, Salix spp.)
B1-J	N/A	N/A	N/A	N/A	N/A	1% to the W	N/A	N/A	N/A	N/A	-150m E of main module, outside POL 1 tank catch basin -drainage impeded by catch basin, forms small pond -stained soil noted along edge of pond, dead vegetation also -vegetation cover 100% (sedges) around pond
B1-K	N/A	N/A	N/A	N/A	N/A	1% to the N	N/A	N/A	N/A	N/A	-1500m S of E end of airstrip -sample taken from small pond in peatland area -vegetation cover 100% (sedges)

APPENDIX B

BAR-1 KOMAKUK BEACH

Sample No.	Surface Run-Off	Soil Drainage Class	Soil Perviousness Class	Surface Stoniness	Soil Sample Depth	Topography	Slope Position	Slope Exposure	Soil Description	Soil Colour	Remarks (Location, Adjacent Areas, Comments)
B1-L	N/A	N/A	N/A	N/A	N/A	1% to the N	N/A	N/A	N/A	N/A	-landfill A 300m N of runway, between access road and ocean -50m S of beach in disturbed area, pools of water -vegetation cover 20% (sedges, grasses)
B1-M	N/A	N/A	N/A	N/A	N/A	towards ocean, to the N	N/A	N/A	N/A	N/A	-landfill C, 10m N of W end of air strip, on cliff -satellite dish buried in cliff, 30m W of sample site -seepage originating from cliff due to permafrost melt -volatile organic compound only, vegetation cover (none) -sheen, discolouration noted on surface of water

Appendix C Soil/Water Data

Appendix 表 C

BAR-1 Komakuk Beach
Water Sampling Field Information

Sample No.	Location #	pH Meter Readings		Conductivity Meter Readings		Comments
		pH	Temp °C	Conductivity u mhos	Temp °C	
B1-A	007	na	na	na	na	VOC sample only; taken from small pond 5 m west of POL 4
B1-B	003	na	na	na	na	VOC sample only; taken from pond 50 m east of POL 4
B1-C(D)	018	8.07	11.7	650	12.9	Taken from pond that partically encircles the Landfill B
B1-D(D)	018	8.07	11.7	650	12.9	Field replicate of B1-C
B1-E	026	7.90	12.2	700	13.0	Taken from small pond 100 m north (downgradient) of POL 2
B1-F	006	na	na	na	na	VOC sample only; taken from small pond 50 m northwest of POL 2
B1-G	008	na	na	na	na	VOC sample only; taken from standing water at the northeast corner of the POL 2
B1-H	104	na	na	na	na	VOC sample only; taken from a small stream draining the are north of the garage; site is 100 m north of the northeast corner of the garage
B1-I	019	na	na	na	na	VOC sample only; 150 m downstream (north) of B1-H
B1-J	025	7.66	13.4	290	13.0	Taken from pond adjacent to the east end of the southeast POL 1
B1-K	319	8.34	12.7	130	13.5	Background sample taken from pond 1.5 km south of the east end of the airstrip
B1-L	318	8.42	13.9	950	14	Taken from small pond in landfill A area; pond is 50 m south of shoreline and 50 m west of road to POL 4
B1-M	347	na	na	na	na	VOC sample only

Sample #	Location #	Location Description	1st Round Analysis							2nd Round Analysis						
			1	2	3	4	5	6	7	1	2	3	4	5	6	7
B1-1000	382	Landfill B									*					
B1-1001	383	Landfill B									*					
B1-1002	384	Landfill B	*	*	*	*	*	*	*							
B1-1003	389	Sewage Outfall D										*				
B1-1003(R)	389	Sewage Outfall D														
B1-1004	387	Sewage Outfall D	*	*	*	*	*	*	*							
B1-1005	386	Sewage Outfall D	*	*	*	*	*	*	*							
B1-1005(R)	386	Sewage Outfall D	*	*	*	*	*	*	*							
B1-1006	390	Sewage Outfall D			*							*				
B1-1007	312	Landfill A								*	*	*	*		*	*
B1-1008	313	Landfill A								*	*	*	*		*	*
B1-1009	385	Landfill A	*	*	*	*	*	*	*							
B1-1009(R)	385	Landfill A	*	*	*	*	*	*	*							
B1-1010(D)	381	Landfill A	*	*	*	*	*	*	*							
B1-1011(D)	381	Landfill A	*	*	*	*	*	*	*							
B1-1012	320	Landfill A	*	*	*	*	*	*	*							
B1-1013	314	Landfill A	*	*	*	*	*	*	*							
B1-1014	388	Landfill A	*	*	*	*	*	*	*							
B1-1015	311	POL 1									*					
B1-1016	316	POL 1	*	*	*	*	*	*	*							
B1-1016(R)	316	POL 1	*	*	*	*	*	*	*							
B1-1017	307	Pallet Line 1														
B1-1018	304	Pallet Line 1														
B1-1019	309	Pallet Line 1														
B1-1020(D)	306	Pallet Line 1	*	*	*	*	*	*	*							
B1-1021(D)	306	Pallet Line 1		*	*	*	*	*	*							
B1-1022	303	Pallet Line 1					*									
B1-1023	302	POL 2		*	*		*			*	*	*				
B1-1023(R)	302	POL 2														
B1-1024	308	Pallet line 3								*	*					
B1-1025	341	Pallet line 3			*					*	*					
B1-1026	346	Pallet line 3								*	*					
B1-1027	344	Sewage Outfall A	*	*	*	*	*	*	*							
B1-1028	345	Sewage Outfall B	*	*	*											
B1-1028(R)	345	Sewage Outfall B	*	*	*											
B1-1029	343	Sewage Outfall B								*	*	*				
B1-1030(D)	349	POL 3									*					
B1-1031(D)	349	POL 3									*					
B1-1032	350	Sewage Outfall C									*					
B1-1033	305	POL 2								*	*					
B1-1035	357	Stain Area 1														
B1-1036	360	POL 4	*	*	*	*	*	*	*							
B1-1037	358	Landfill C									*	*				
B1-1037(R)	358	Landfill C														
B1-1038	359	Landfill C	*	*	*		*	*	*							
B1-1039	365	Landfill C									*	*				
B1-1100	339	Stain Area 2									*	*				
B1-1101	331	POL 2														
B1-1102	301	POL 2														
B1-1103	310	Stain Area 3									*	*				
B1-1104	333	Sewage Outfall B	*	*	*		*	*	*							
B1-1105	335	Stain Area 4														
B1-1106	332	Background	*	*	*	*		*	*							
B1-1106(R)	332	Background								*	*	*	*		*	*
B1-1200	351	POL 4														
B1-1201	352	POL 4														
B1-1202	353	Pallet Line 2					*									
B1-1203	354	Pallet Line 2														
B1-1204	356	Pallet Line 2	*	*	*	*	*	*	*							
B1-1205	355	Pallet Line 2														

1-metals
2-TPH
3-PCB
4-Pesticides
5-Volatile Organics (EPA 8240)
6-Acid Extractable Organics (EPA 8270)
7-Base/Neutral Extractable Organics (EPA 8270)

*-Requested and Reported

-Reported Results Were Higher Than Assessment Criteria Per Volume 2

-Incomplete Data Set

Water Analysis Summary for Bar-1

Sample #	Location #	Location Description	1st Round Analysis							
			1	2	3	4	5	6	7	8
B1-A	007	POL 4					*			
B1-B	003	POL 4					*			
B1-C(D)	018	Landfill B	*	*		*	*	*	*	*
B1-D(D)	018	Landfill B	*	*		*	*	*	*	*
B1-E	026	POL 2	*	*		*	*	*	*	*
B1-F	006	POL 2					*			
B1-G	008	POL 2					*			
B1-H	104	Stain Area 5				*		*	*	
B1-I	019	Stain Area 6					*			
B1-J	025	POL 1	*	*		*	*	*	*	*
B1-K	319	Background	*	*		*	*	*	*	*
B1-L	318	Landfill A	*	*		*	*	*	*	*
T.Blank	-					*	*	*	*	
F.Blank	-		*							
B1-M	347	Landfill C					*			

1-metals
2-TPH
3-PCB
4-Pesticides
5-Volatile Organics (EPA 8240)
6-Acid Extractable Organics (EPA 8270)
7-Base/Neutral Extractable Organics (EPA 8270)
8-Hg

*-Requested and Reported

-Significant Values Reported

Dewline B1 Sites (Soils)

Parameter	MDL (mg/kg)	B1-1000	B1-1001	B1-1002	B1-1003	B1-1004
METALS						
Arsenic	0.1			5.5		5.5
Selenium	0.5			1		0.8
Mercury	0.05			0.12		0.13
Barium	1			330		130
Beryllium	0.5			<		<
Cadmium	1			<		<
Chromium	1			42		24
Lead	10			500		<
Nickel	5			<		24
Silver	5					<
TPH	1	<	<	9		<
PCB	0.01			<	<	0.67
PESTICIDES						
Aldrin	1.3			<		<
a-BHC	1.3			<		<
b-BHC	1.3			<		<
g-BHC (Lindane)	1.3			<		<
d-BHC	1.3			<		<
Chlorodane	1.3					
p,p'-DDD	1.3			<		<
p,p'-DDE	1.3			<		<
p,p'-DDT	1.3			<		<
Dieldrin	1.3			<		<
a-Endosulfan	1.3			<		<
b-Endosulfan	1.3			<		<
Endosulfan Sulfate	1.3			<		<
Endrin	1.3					
Endrin Aldehyde	1.3					
Heptachlor	1.3			<		<
Heptachlor Epoxide	1.3			<		<
Toxaphene	1.3					
VOLATILES						
Cl-Methane	0.011			<		<
Vinyl Chloride	0.015			<		<
Br-Methane	0.012			<		<
Cl-Ethane	0.012			<		<
Cl3F3-Methane	0.002			<		<
1,1-Cl2-Ethylene	0.002			<		<
Methylene Chloride	0.002			0.15		0.036
trans 1,2-Cl2-Ethylene	0.002			<		<
1,1 Cl2-Ethane	0.003			<		<
Chloroform	0.002			<		<
1,1,1-Cl3-Ethane	0.003			<		<
1,2 C12-Ethane	0.002			<		<
Carbon Tetrachloride	0.002			<		<
Benzene	0.001			<		<
1,2-Cl2-Propane	0.003			<		<

Dewline B1 Sites (Soils)

Parameter	MDL	B1-1000	B1-1001	B1-1002	B1-1003	B1-1004
	(mg/kg)					
Cl3-Ethylene	0.002			<		<
BrCl2-Methane	0.002			<		<
2-Cl-Ethylvinyl ether	0.014			<		<
cis-1,2-Cl2-Propylene	0.003			<		<
Toluene	0.002			<		<
trans-1,2-Cl2-Propylene	0.006			<		<
1,1,2-Cl3-Ethane	0.003			<		<
ClBr2-Methane	0.002			<		<
C14-Ethylene	0.001			<		<
Cl-Benzene	0.003			<		<
Ethyl Benzene	0.002			<		<
Bromoform	0.002			<		<
1,1,2,2-Cl4-ethane	0.002			<		<
d4-1,2-Dichloroethane	%			99		90
d8-Toluene	%			90		88
Bromofluorobenzene	%			98		94
ACID EXT						
*N-Nitrosodimethylamine				<		<
phenol	0.11			<		<
Bis(2-chloroethyl)ether	0.18			<		<
2-Chlorophenol	0.27			<		<
1,3-Dichlorobenzene	0.20			<		<
1,4-Dichlorobenzene	0.20			<		<
1,2-Dichlorobenzene	0.20			<		<
Bis(2-chloroisopropyl)ether	0.15			<		<
Hexachloroethane	0.20			<		<
N-Nitroso-N-Propylamine	0.21			<		<
Nitrobenzene	0.20			<		<
Isophrone	0.40			<		<
2-Nitrophenol	0.14			<		<
2,4-Dimethylphenol	0.17			<		<
Bis(2-chloroethoxy)methane	0.13			<		<
2,4-Dichlorophenol	0.12			<		<
1,2,4-Trichlorobenzene	0.20			<		<
Naphthalene	0.03			0.09		<
Hexachlorobutadiene	0.20			<		<
4-Chloro-3-Methylphenol	0.14			<		<
Hexachlorocyclopentadiene	0.20			<		<
2,4,6-Trichlorophenol	0.12			<		<
BASE/NEUTRAL						
2-Chloronaphthalene	0.09			<		<
Acenaphthylene	0.04			<		<
Dimethyl phthalate	0.11			<		<
2,6-Dinitrotoluene	0.06			<		<
Acenaphthene	0.07			<		<
2,4-Dinitrophenol	0.48			<		<
2,4-Dinitrotolulene	0.05			<		<
4-Nitrophenol	0.14			<		<

Dewline B1 Sites (Soils)

Parameter	MDL	B1-1000	B1-1001	B1-1002	B1-1003	B1-1004
	(mg/kg)					
Fluorene	0.03			<		<
4-Chlorophenylphenylether	0.09			<		<
Diethyl phthalate	0.11			<		<
4,6-Dinitro-2-methylphenol	0.15			<		<
N-Nitrosodiphenylamine	0.19			<		<
4-Bromophenylphenylether	0.03			<		<
Hexachlorobenzene	0.20			<		<
Pentachlorophenol	0.11			<		<
Phenanthrene	0.03			<		<
Anthracene	0.02			<		<
Di-n-butyl phthalate	0.11			0.59		<
*Benzidine	0.40			<		<
Fluoranthene	0.02			<		<
Pyrene	0.03			<		<
Benzyl butyl phthalate	0.06			0.07		<
*3,3'-Dichlorobenzidine	0.20			<		<
Benzo(a)Anthracene	0.02			<		<
Chrysene	0.03			<		<
Bis(2-ethylhexyl)phthalate	0.14			0.31		<
Di-n-octyl phthalate	0.11			0.21		<
Benzo(b)fluoranthene	0.04			<		<
Benzo(k)fluroanthene	0.04			<		<
Benzo(a)pyrene	0.05			<		<
Ideno(1,2,3-cd)pyrene	0.06			<		<
Dibenzo(a,h)anthracene	0.04			<		<
Benzo(ghi)perylene	0.04			<		<
d5-Phenol	%			55		84
d5-Nitrobenzene	%			45		77
2-Fluorobiphenyl	%			64		81
2,4,6-Tribromophenol	%			42		87
d-14-p-Terphenyl	%			110		89

Dewline B1 Sites (Soils)

Parameter	MDL (mg/kg)	B1-1005	B1-1006	B1-1007	B1-1008	B1-1008L
METALS						
Arsenic	0.1	1.8		7.8	8	
Selenium	0.5	<		0.6	0.3	
Mercury	0.05	0.12		<	0.2	
Barium	1	230		170	170	
Beryllium	0.5	<		0.8	0.8	
Cadmium	1	<		<	2	
Chromium	1	26		24	31	
Lead	10	22		31	480	
Nickel	5	17		30	32	
Silver	5	<		<	<	
TPH	1	<		<	<	
PCB	0.01	<	<	0.25	0.29	
PESTICIDES						
Aldrin	1.3	<		<	<	<
a-BHC	1.3	<		<	<	<
b-BHC	1.3	<		<	<	<
g-BHC (Lindane)	1.3	<		<	<	<
d-BHC	1.3	<		<	<	<
Chlorodane	1.3					
p,p'-DDD	1.3	<		<	<	<
p,p'-DDE	1.3	<		<	<	<
p,p'-DDT	1.3	<		<	<	<
Dieldrin	1.3	<		<	<	<
a-Endosulfan	1.3	<		<	<	<
b-Endosulfan	1.3	<		<	<	<
Endosulfan Sulfate	1.3	<		<	<	<
Endrin	1.3					
Endrin Aldehyde	1.3					
Heptachlor	1.3	<		<	<	<
Heptachlor Epoxide	1.3	<		<	<	<
Toxaphene	1.3					
VOLATILES						
Cl-Methane	0.011	<				
Vinyl Chloride	0.015	<				
Br-Methane	0.012	<				
Cl-Ethane	0.012	<				
Cl3F3-Methane	0.002	<				
1,1-Cl2-Ethylene	0.002	<				
Methylene Chloride	0.002	<				
trans 1,2-Cl2-Ethylene	0.002	<				
1,1 Cl2-Ethane	0.003	<				
Chloroform	0.002	<				
1,1,1-Cl3-Ethane	0.003	<				
1,2 C12-Ethane	0.002	<				
Carbon Tetrachloride	0.002	<				
Benzene	0.001	0.018				
1,2-Cl2-Propane	0.003	<				

Dewline B1 Sites (Soils)

Parameter	MDL	B1-1005	B1-1006	B1-1007	B1-1008	B1-1008L
	(mg/kg)					
Cl3-Ethylene	0.002	<				
BrCl2-Methane	0.002	<				
2-Cl-Ethylvinyl ether	0.014	<				
cis-1,2-Cl2-Propylene	0.003	<				
Toluene	0.002	<				
trans-1,2-Cl2-Propylene	0.006	<				
1,1,2-Cl3-Ethane	0.003	<				
ClBr2-Methane	0.002	<				
C14-Ethylene	0.001	<				
Cl-Benzene	0.003	<				
Ethyl Benzene	0.002	<				
Bromoform	0.002	<				
1,1,2,2-Cl4-ethane	0.002	<				
d4-1,2-Dichloroethane	%	107				
d8-Toluene	%	109				
Bromofluorobenzene	%	98				
ACID EXT						
*N-Nitrosodimethylamine		<		<	<	<
phenol	0.11	<		<	<	<
Bis(2-chloroethyl)ether	0.18	<		<	<	<
2-Chlorophenol	0.27	<		<	<	<
1,3-Dichlorobenzene	0.20	<		<	<	<
1,4-Dichlorobenzene	0.20	<		<	<	<
1,2-Dichlorobenzene	0.20	<		<	<	<
Bis(2-chloroisopropyl)ether	0.15	<		<	<	<
Hexachloroethane	0.20	<		<	<	<
N-Nitroso-N-Propylamine	0.21	<		<	<	<
Nitrobenzene	0.20	<		<	<	<
Isophrone	0.40	<		<	<	<
2-Nitrophenol	0.14	<		<	<	<
2,4-Dimethylphenol	0.17	<		<	<	<
Bis(2-chloroethoxy)methane	0.13	<		<	<	<
2,4-Dichlorophenol	0.12	<		<	<	<
1,2,4-Trichlorobenzene	0.20	<		<	<	<
Naphthalene	0.03	<		<	<	<
Hexachlorobutadiene	0.20	<		<	<	<
4-Chloro-3-Methylphenol	0.14	<		<	<	<
Hexachlorocyclopentadiene	0.20	<		<	<	<
2,4,6-Trichlorophenol	0.12	<		<	<	<
BASE/NEUTRAL						
2-Chloronaphthalene	0.09	<		<	<	<
Acenaphthylene	0.04	<		<	<	<
Dimethyl phthalate	0.11	<		<	<	<
2,6-Dinitrotoluene	0.06	<		<	<	<
Acenaphthene	0.07	<		<	<	<
2,4-Dinitrophenol	0.48	<		<	<	<
2,4-Dinitrotolulene	0.05	<		<	<	<
4-Nitrophenol	0.14	<		<	<	<

Dewline B1 Sites (Soils)

Parameter	MDL	B1-1005	B1-1006	B1-1007	B1-1008	B1-1008L
	(mg/kg)					
Fluorene	0.03	<		<	<	<
4-Chlorophenylphenylether	0.09	<		<	<	<
Diethyl phthalate	0.11	<		<	<	<
4,6-Dinitro-2-methylphenol	0.15	<		<	<	<
N-Nitrosodiphenylamine	0.19	<		<	<	<
4-Bromophenylphenylether	0.03	<		<	<	<
Hexachlorobenzene	0.20	<		<	<	<
Pentachlorophenol	0.11	<		<	<	<
Phenanthrene	0.03	<		<	<	<
Anthracene	0.02	<		<	<	<
Di-n-butyl phthalate	0.11	0.44		<	<	<
*Benzidine	0.40	<		<	<	<
Fluoranthene	0.02	<		<	<	<
Pyrene	0.03	<		<	<	<
Benzyl butyl phthalate	0.06	0.35		<	<	<
*3,3'-Dichlorobenzidine	0.20	<		<	<	<
Benzo(a)Anthracene	0.02	<		<	<	<
Chrysene	0.03	<		<	<	<
Bis(2-ethylhexyl)phthalate	0.14	<		<	<	<
Di-n-octyl phthalate	0.11	0.46		<	<	<
Benzo(b)fluoranthene	0.04	<		<	<	<
Benzo(k)fluroanthene	0.04	<		<	<	<
Benzo(a)pyrene	0.05	<		<	<	<
Ideno(1,2,3-cd)pyrene	0.06	<		<	<	<
Dibenzo(a,h)anthracene	0.04	<		<	<	<
Benzo(ghi)perylene	0.04	<		<	<	<
d5-Phenol	%	87		28	71	80
d5-Nitrobenzene	%	72		17	59	69
2-Fluorobiphenyl	%	87		37	85	87
2,4,6-Tribromophenol	%	110		67	110	100
d-14-p-Terphenyl	%	Interfe		99	130	110

Dewline B1 Sites (Soils)

Parameter	MDL (mg/kg)	B1-1009	B1-1009R	B1-1010D	B1-1011D	B1-1011SK
METALS						
Arsenic	0.1	8.5		9.4	9.3	
Selenium	0.5	0.8		0.9	<	
Mercury	0.05	0.16		0.21	0.11	
Barium	1	210		180	200	
Beryllium	0.5	<1		<	<	
Cadmium	1	<		<	<	
Chromium	1	14		27	26	
Lead	10	<		76	69	
Nickel	5	17		28	31	
Silver	5	<		<	<	
TPH	1	<		3	<	
PCB	0.01	<		0.16	0.04	
PESTICIDES						
Aldrin	1.3	<		<	<	4
a-BHC	1.3	<		<	<	4.2
b-BHC	1.3	<		<	<	3.6
g-BHC (Lindane)	1.3	<		<	<	4.2
d-BHC	1.3	<		<	<	3.5
Chlorodane	1.3					
p,p'-DDD	1.3	<		<	<	5.2
p,p'-DDE	1.3	<		<	<	4.8
p,p'-DDT	1.3	<		<	<	<
Dieldrin	1.3	<		<	<	4.4
a-Endosulfan	1.3	<		<	<	4.5
b-Endosulfan	1.3	<		<	<	4.5
Endosulfan Sulfate	1.3	<		<	<	5.1
Endrin	1.3					
Endrin Aldehyde	1.3					
Heptachlor	1.3	<		<	<	<
Heptachlor Epoxide	1.3	<		<	<	4.3
Toxaphene	1.3					
VOLATILES						
Cl-Methane	0.011	<		<	<	
Vinyl Chloride	0.015	<		<	<	
Br-Methane	0.012	<		<	<	
Cl-Ethane	0.012	<		<	<	
Cl3F3-Methane	0.002	<		<	<	
1,1-Cl2-Ethylene	0.002	<		<	<	
Methylene Chloride	0.002	0.16		0.041	0.12	
trans 1,2-Cl2-Ethylene	0.002	<		<	<	
1,1 Cl2-Ethane	0.003	<		<	<	
Chloroform	0.002	<		<	<	
1,1,1-Cl3-Ethane	0.003	<		<	<	
1,2 C12-Ethane	0.002	<		<	<	
Carbon Tetrachloride	0.002	<		<	<	
Benzene	0.001	0.082		<	<	
1,2-Cl2-Propane	0.003	<		<	<	

Dewline B1 Sites (Soils)

Parameter	MDL	B1-1009	B1-1009R	B1-1010D	B1-1011D	B1-1011SK
	(mg/kg)					
Cl3-Ethylene	0.002	<		<	<	
BrCl2-Methane	0.002	<		<	<	
2-Cl-Ethylvinyl ether	0.014	<		<	<	
cis-1,2-Cl2-Propylene	0.003	<		<	<	
Toluene	0.002	0.312		<	<	
trans-1,2-Cl2-Propylene	0.006	<		<	<	
1,1,2-Cl3-Ethane	0.003	<		<	<	
ClBr2-Methane	0.002	<		0.002	<	
C14-Ethylene	0.001	<		<	<	
Cl-Benzene	0.003	<		<	<	
Ethyl Benzene	0.002	0.183		<	<	
Bromoform	0.002	<		<	<	
1,1,2,2-Cl4-ethane	0.002	0.011		<	<	
d4-1,2-Dichloroethane	%	81		95	100	
d8-Toluene	%	67		100	110	
Bromofluorobenzene	%	84		95	95	
ACID EXT						
*N-Nitrosodimethylamine		<		<	<	<
phenol	0.11	<		<	<	3.2
Bis(2-chloroethyl)ether	0.18	<		<	<	3.1
2-Chlorophenol	0.27	<		<	<	3.3
1,3-Dichlorobenzene	0.20	<		<	<	3
1,4-Dichlorobenzene	0.20	<		<	<	3
1,2-Dichlorobenzene	0.20	<		<	<	3.2
Bis(2-chloroisopropyl)ether	0.15	<		<	<	3.2
Hexachloroethane	0.20	<		<	<	1.7
N-Nitroso-N-Propylamine	0.21	<		<	<	3.3
Nitrobenzene	0.20	<		<	<	3.3
Isophrone	0.40	<		<	<	3.4
2-Nitrophenol	0.14	<		<	<	3.3
2,4-Dimethylphenol	0.17	<		<	<	1.8
Bis(2-chloroethoxy)methane	0.13	<		<	<	3.5
2,4-Dichlorophenol	0.12	<		<	<	4
1,2,4-Trichlorobenzene	0.20	<		<	<	3.7
Naphthalene	0.03	<		<	<	3.9
Hexachlorobutadiene	0.20	<		<	<	3.8
4-Chloro-3-Methylphenol	0.14	<		<	<	3.8
Hexachlorocyclopentadiene	0.20	<		<	<	<
2,4,6-Trichlorophenol	0.12	<		<	<	5.3
BASE/NEUTRAL						
2-Chloronaphthalene	0.09	<		<	<	4.3
Acenaphthylene	0.04	<		<	<	3.7
Dimethyl phthalate	0.11	<		<	<	4.5
2,6-Dinitrotoluene	0.06	<		<	<	4.1
Acenaphthene	0.07	<		<	<	3.9
2,4-Dinitrophenol	0.48	<		<	<	1.4
2,4-Dinitrotolulene	0.05	<		<	<	0.16
4-Nitrophenol	0.14	<		<	<	<

Dewline B1 Sites (Soils)

Parameter	MDL	B1-1009	B1-1009R	B1-1010D	B1-1011D	B1-1011SK
	(mg/kg)					
Fluorene	0.03	<		<	<	3.8
4-Chlorophenylphenylether	0.09	<		<	<	4.1
Diethyl phthalate	0.11	<		<	<	3.8
4,6-Dinitro-2-methylphenol	0.15	<		<	<	1.7
N-Nitrosodiphenylamine	0.19	<		<	<	4.8
4-Bromophenylphenylether	0.03	<		<	<	5.1
Hexachlorobenzene	0.20	<		<	<	4.7
Pentachlorophenol	0.11	<		<	<	4.9
Phenanthrene	0.03	<		0.11	<	5.7
Anthracene	0.02	<		<	<	4.8
Di-n-butyl phthalate	0.11		0.21	<	<	4.5
*Benzidine	0.40		<	<	<	<
Fluoranthene	0.02		<	0.1	<	5.4
Pyrene	0.03		<	0.09	<	5.4
Benzyl butyl phthalate	0.06		<	0.09	<	4.2
*3,3'-Dichlorobenzidine	0.20		<	<	<	1
Benzo(a)Anthracene	0.02		<	<	<	5.1
Chrysene	0.03		<	<	<	3.9
Bis(2-ethylhexyl)phthalate	0.14		<	<	0.15	6
Di-n-octyl phthalate	0.11		<	<	<	4.1
Benzo(b)fluoranthene	0.04		<	<	<	3.8
Benzo(k)fluroanthene	0.04		<	<	<	3.9
Benzo(a)pyrene	0.05		<	<	<	3.4
Ideno(1,2,3-cd)pyrene	0.06		<	<	<	3.3
Dibenzo(a,h)anthracene	0.04		<	<	<	4
Benzo(ghi)perylene	0.04		<	<	<	3.5
d5-Phenol	%		85	72	75	78
d5-Nitrobenzene	%		80	63	63	65
2-Fluorobiphenyl	%		110	70	110	130
2,4,6-Tribromophenol	%		93	89	98	110
d-14-p-Terphenyl	%		110	91	84	82

Dewline B1 Sites (Soils)

Parameter	MDL (mg/kg)	B1-1012	B1-1013	B1-1014	B1-1015	B1-1016
METALS						
Arsenic	0.1	6.5	8.7	8.7		3.5
Selenium	0.5	<	0.7	0.7		<
Mercury	0.05	0.06	0.15	0.15		0.1
Barium	1	140	460	460		120
Beryllium	0.5	<	<	<		<
Cadmium	1	<	<	<		<
Chromium	1	29	26	26		24
Lead	10	110	<	11		<
Nickel	5	30	32	32		28
Silver	5	<	<	<		<
TPH	1	<	<	<	47	3800
PCB	0.01	0.03	<	<		<
PESTICIDES						
Aldrin	1.3	<	<	<		<
a-BHC	1.3	<	<	<		<
b-BHC	1.3	<	<	<		<
g-BHC (Lindane)	1.3	<	<	<		<
d-BHC	1.3	<	<	<		<
Chlorodane	1.3					
p,p'-DDD	1.3	<	<	<		<
p,p'-DDE	1.3	<	<	<		<
p,p'-DDT	1.3	<	<	<		<
Dieldrin	1.3	<	<	<		<
a-Endosulfan	1.3	<	<	<		<
b-Endosulfan	1.3	<	<	<		<
Endosulfan Sulfate	1.3	<	<	<		<
Endrin	1.3					
Endrin Aldehyde	1.3					
Heptachlor	1.3	<	<	<		<
Heptachlor Epoxide	1.3	<	<	<		<
Toxaphene	1.3					
VOLATILES						
Cl-Methane	0.011	<	<	<		<0.220
Vinyl Chloride	0.015	<	<	<		<0.290
Br-Methane	0.012	<	<	<		<0.240
Cl-Ethane	0.012	<	<	<		<0.230
Cl3F3-Methane	0.002	<	<	<		<0.030
1,1-Cl2-Ethylene	0.002	<	<	<		<0.036
Methylene Chloride	0.002	<	0.034	<		<0.033
trans 1,2-Cl2-Ethylene	0.002	<	<	<		<0.042
1,1 Cl2-Ethane	0.003	<	<	<		<0.051
Chloroform	0.002	<	<	<		<0.036
1,1,1-Cl3-Ethane	0.003	<	<	<		<0.060
1,2 C12-Ethane	0.002	<	<	<		<0.039
Carbon Tetrachloride	0.002	<	<	<		<0.030
Benzene	0.001	<	0.003	<		<0.359
1,2-Cl2-Propane	0.003	<	<	<		<0.054

Dewline B1 Sites (Soils)

Parameter	MDL	B1-1012	B1-1013	B1-1014	B1-1015	B1-1016
	(mg/kg)					
Cl3-Ethylene	0.002	<	<	<		<0.030
BrCl2-Methane	0.002	<	<	<		<0.040
2-Cl-Ethylvinyl ether	0.014	<	<	<		<0.270
cis-1,2-Cl2-Propylene	0.003	<	<	<		<0.069
Toluene	0.002	<	<	<		<0.039
trans-1,2-Cl2-Propylene	0.006	<	<	<		<0.110
1,1,2-Cl3-Ethane	0.003	<	<	<		<0.057
ClBr2-Methane	0.002	<	<	<		<0.042
C14-Ethylene	0.001	<	<	<		<0.015
Cl-Benzene	0.003	<	<	<		<0.060
Ethyl Benzene	0.002	<	<	<		<0.036
Bromoform	0.002	<	<	<		<0.033
1,1,2,2-Cl4-ethane	0.002	<	<	<		<0.036
d4-1,2-Dichloroethane	%	82	110	110		100
d8-Toluene	%	100	130	110		108
Bromofluorobenzene	%	110	110	90		93
ACID EXT						
*N-Nitrosodimethylamine		<	<	<		<
phenol	0.11	<	<	<		<
Bis(2-chloroethyl)ether	0.18	<	<	<		<
2-Chlorophenol	0.27	<	<	<		<
1,3-Dichlorobenzene	0.20	<	<	<		<
1,4-Dichlorobenzene	0.20	<	<	<		<
1,2-Dichlorobenzene	0.20	<	<	<		<
Bis(2-chloroisopropyl)ether	0.15	<	<	<		<
Hexachloroethane	0.20	<	<	<		<
N-Nitroso-N-Propylamine	0.21	<	<	<		<
Nitrobenzene	0.20	<	<	<		<
Isophrone	0.40	<	<	<		<
2-Nitrophenol	0.14	<	<	<		<
2,4-Dimethylphenol	0.17	<	<	<		<
Bis(2-chloroethoxy)methane	0.13	<	<	<		<
2,4-Dichlorophenol	0.12	<	<	<		<
1,2,4-Trichlorobenzene	0.20	<	<	<		<
Naphthalene	0.03	<	<	<		<
Hexachlorobutadiene	0.20	<	<	<		<
4-Chloro-3-Methylphenol	0.14	<	<	<		<
Hexachlorocyclopentadiene	0.20	<	<	<		<
2,4,6-Trichlorophenol	0.12	<	<	<		<
BASE/NEUTRAL						
2-Chloronaphthalene	0.09	<	<	<		<
Acenaphthylene	0.04	<	<	<		<
Dimethyl phthalate	0.11	<	<	<		<
2,6-Dinitrotoluene	0.06	<	<	<		<
Acenaphthene	0.07	<	<	<		<
2,4-Dinitrophenol	0.48	<	<	<		<
2,4-Dinitrotolulene	0.05	<	<	<		<
4-Nitrophenol	0.14	<	<	<		<

Dewline B1 Sites (Soils)

Parameter	MDL	B1-1012	B1-1013	B1-1014	B1-1015	B1-1016
	(mg/kg)					
Fluorene	0.03	<	<	<		<
4-Chlorophenylphenylether	0.09	<	<	<		<
Diethyl phthalate	0.11	<	<	<		<
4,6-Dinitro-2-methylphenol	0.15	<	<	<		<
N-Nitrosodiphenylamine	0.19	<	<	<		<
4-Bromophenylphenylether	0.03	<	<	<		<
Hexachlorobenzene	0.20	<	<	<		<
Pentachlorophenol	0.11	<	<	<		<
Phenanthrene	0.03	<	<	<		<
Anthracene	0.02	<	<	<		<
Di-n-butyl phthalate	0.11	0.13	<	<		<
*Benzidine	0.40	<	<	<		<
Fluoranthene	0.02	<	<	<		<
Pyrene	0.03	<	<	<		<
Benzyl butyl phthalate	0.06	0.6	<	<		<
*3,3'-Dichlorobenzidine	0.20	<	<	<		<
Benzo(a)Anthracene	0.02	<	<	<		<
Chrysene	0.03	<	<	<		<
Bis(2-ethylhexyl)phthalate	0.14	4.4	0.18	0.3		0.57
Di-n-octyl phthalate	0.11	<	<	0.27		0.48
Benzo(b)fluoranthene	0.04	<	<	<		<
Benzo(k)fluroanthene	0.04	<	<	<		<
Benzo(a)pyrene	0.05	<	<	<		<
Ideno(1,2,3-cd)pyrene	0.06	<	<	<		<
Dibenzo(a,h)anthracene	0.04	<	<	<		<
Benzo(ghi)perylene	0.04	<	<	<		<
d5-Phenol	%	84	75	80		76
d5-Nitrobenzene	%	77	55	66		150
2-Fluorobiphenyl	%	81	99	120		38
2,4,6-Tribromophenol	%	87	120	100		71
d-14-p-Terphenyl	%	89	89	94		120

Dewline B1 Sites (Soils)

Parameter	MDL (mg/kg)	B1-1020	B1-1021D	B1-1022	B1-1023	B1-1024
METALS						
Arsenic	0.1	6.2			7.1	7.8
Selenium	0.5	<			<	<
Mercury	0.05	0.06			0.16	0.06
Barium	1	110			120	110
Beryllium	0.5	<			1	0.6
Cadmium	1	<	<			<
Chromium	1	29			30	28
Lead	10	24	32			21
Nickel	5	31			31	36
Silver	5	<			<	<
TPH	1	<	<		<	12
PCB	0.01	<	<		<	
PESTICIDES						
Aldrin	1.3	<	<			
a-BHC	1.3	<	<			
b-BHC	1.3	<	<			
g-BHC (Lindane)	1.3	<	<			
d-BHC	1.3	<	<			
Chlorodane	1.3					
p,p'-DDD	1.3	<	<			
p,p'-DDE	1.3	<	<			
p,p'-DDT	1.3	<	<			
Dieldrin	1.3	<	<			
a-Endosulfan	1.3	<	<			
b-Endosulfan	1.3	<	<			
Endosulfan Sulfate	1.3	<	<			
Endrin	1.3					
Endrin Aldehyde	1.3					
Heptachlor	1.3	<	<			
Heptachlor Epoxide	1.3	<	<			
Toxaphene	1.3					
VOLATILES						
Cl-Methane	0.011	<	<	<	<	
Vinyl Chloride	0.015	<	<	<	<	
Br-Methane	0.012	<	<	<	<	
Cl-Ethane	0.012	<	<	<	<	
Cl3F3-Methane	0.002	<	<	<	<	
1,1-Cl2-Ethylene	0.002	<	<	<	<	
Methylene Chloride	0.002	<	<	0.06	<	
trans 1,2-Cl2-Ethylene	0.002	<	<	<	<	
1,1 Cl2-Ethane	0.003	<	<	<	<	
Chloroform	0.002	<	<	<	<	
1,1,1-Cl3-Ethane	0.003	<	<	<	<	
1,2 C12-Ethane	0.002	<	<	<	<	
Carbon Tetrachloride	0.002	<	<	<	<	
Benzene	0.001	<	<	<	0.026	
1,2-Cl2-Propane	0.003	<	<	<	<	

Dewline B1 Sites (Soils)

Parameter	MDL	B1-1020	B1-1021D	B1-1022	B1-1023	B1-1024
	(mg/kg)					
Cl3-Ethylene	0.002	<	<	<	<	
BrCl2-Methane	0.002	<	<	<	<	
2-Cl-Ethylvinyl ether	0.014	<	<	<	<	
cis-1,2-Cl2-Propylene	0.003	<	<	<	<	
Toluene	0.002	<	<	<	0.824	
trans-1,2-Cl2-Propylene	0.006	<	<	<	<	
1,1,2-Cl3-Ethane	0.003	<	<	<	<	
ClBr2-Methane	0.002	<	<	<	<	
C14-Ethylene	0.001	<	<	0.006	<	
Cl-Benzene	0.003	<	<	<	<	
Ethyl Benzene	0.002	0.004	<	<	0.135	
Bromoform	0.002	<	<	<	<	
1,1,2,2-Cl4-ethane	0.002	<	<	<	0.03	
d4-1,2-Dichloroethane	%	110	100	83	65	
d8-Toluene	%	110	110	106	36	
Bromofluorobenzene	%	73	100	89	90	
ACID EXT						
*N-Nitrosodimethylamine		<	<			
phenol	0.11	<	<			
Bis(2-chloroethyl)ether	0.18	<	<			
2-Chlorophenol	0.27	<	<			
1,3-Dichlorobenzene	0.20	<	<			
1,4-Dichlorobenzene	0.20	<	<			
1,2-Dichlorobenzene	0.20	<	<			
Bis(2-chloroisopropyl)ether	0.15	<	<			
Hexachloroethane	0.20	<	<			
N-Nitroso-N-Propylamine	0.21	<	<			
Nitrobenzene	0.20	<	<			
Isophrone	0.40	<	<			
2-Nitrophenol	0.14	<	<			
2,4-Dimethylphenol	0.17	<	<			
Bis(2-chloroethoxy)methane	0.13	<	<			
2,4-Dichlorophenol	0.12	<	<			
1,2,4-Trichlorobenzene	0.20	<	<			
Naphthalene	0.03	<	<			
Hexachlorobutadiene	0.20	<	<			
4-Chloro-3-Methylphenol	0.14	<	<			
Hexachlorocyclopentadiene	0.20	<	<			
2,4,6-Trichlorophenol	0.12	<	<			
BASE/NEUTRAL						
2-Chloronaphthalene	0.09	<	<			
Acenaphthylene	0.04	<	<			
Dimethyl phthalate	0.11	<	<			
2,6-Dinitrotoluene	0.06	<	<			
Acenaphthene	0.07	<	<			
2,4-Dinitrophenol	0.48	<	<			
2,4-Dinitrotolulene	0.05	<	<			
4-Nitrophenol	0.14	<	<			

Dewline B1 Sites (Soils)

Parameter	MDL	B1-1020	B1-1021D	B1-1022	B1-1023	B1-1024
	(mg/kg)					
Fluorene	0.03	<	<			
4-Chlorophenylphenylether	0.09	<	<			
Diethyl phthalate	0.11	<	<			
4,6-Dinitro-2-methylphenol	0.15	<	<			
N-Nitrosodiphenylamine	0.19	<	<			
4-Bromophenylphenylether	0.03	<	<			
Hexachlorobenzene	0.20	<	<			
Pentachlorophenol	0.11	<	<			
Phenanthrene	0.03	<	<			
Anthracene	0.02	<	<			
Di-n-butyl phthalate	0.11	<	<			
*Benzidine	0.40	<	<			
Fluoranthene	0.02	<	<			
Pyrene	0.03	<	<			
Benzyl butyl phthalate	0.06	<	<			
*3,3'-Dichlorobenzidine	0.20	<	<			
Benzo(a)Anthracene	0.02	<	<			
Chrysene	0.03	<	<			
Bis(2-ethylhexyl)phthalate	0.14	0.27	1.9			
Di-n-octyl phthalate	0.11	<	<			
Benzo(b)fluoranthene	0.04	<	<			
Benzo(k)fluroanthene	0.04	<	<			
Benzo(a)pyrene	0.05	<	<			
Ideno(1,2,3-cd)pyrene	0.06	<	<			
Dibenzo(a,h)anthracene	0.04	<	<			
Benzo(ghi)perylene	0.04	<	<			
d5-Phenol	%	65	55			
d5-Nitrobenzene	%	39	45			
2-Fluorobiphenyl	%	68	64			
2,4,6-Tribromophenol	%	40	42			
d-14-p-Terphenyl	%	110	110			

Dewline B1 Sites (Soils)

Parameter	MDL	B1-1025	B1-1026	B1-1027	B1-1028	B1-1029
	(mg/kg)					
METALS						
Arsenic	0.1	5.9	2	21	7.5	
Selenium	0.5	<	0.9	0.9	<	
Mercury	0.05	0.07	0.07	0.17	0.1	
Barium	1	160	240	280	140	176
Beryllium	0.5	0.7	0.7	<	0.7	0.8
Cadmium	1	<	<	1	<	1
Chromium	1	26	26	42	24	25
Lead	10	12	<	84	19	<
Nickel	5	30	28	36	31	31
Silver	5	<	<	<	<	<
TPH	1	<	<	8	<	<
PCB	0.01			0.07	<	<
PESTICIDES						
Aldrin	1.3			<		
a-BHC	1.3			<		
b-BHC	1.3			<		
g-BHC (Lindane)	1.3			<		
d-BHC	1.3			<		
Chlorodane	1.3					
p,p'-DDD	1.3			<		
p,p'-DDE	1.3			<		
p,p'-DDT	1.3			<		
Dieldrin	1.3			<		
a-Endosulfan	1.3			<		
b-Endosulfan	1.3			<		
Endosulfan Sulfate	1.3			<		
Endrin	1.3					
Endrin Aldehyde	1.3					
Heptachlor	1.3			<		
Heptachlor Epoxide	1.3			<		
Toxaphene	1.3					
VOLATILES						
Cl-Methane	0.011			<		
Vinyl Chloride	0.015			<		
Br-Methane	0.012			<		
Cl-Ethane	0.012			<		
Cl3F3-Methane	0.002			<		
1,1-Cl2-Ethylene	0.002			<		
Methylene Chloride	0.002			<		
trans 1,2-Cl2-Ethylene	0.002			<		
1,1 Cl2-Ethane	0.003			<		
Chloroform	0.002			<		
1,1,1-Cl3-Ethane	0.003			<		
1,2 C12-Ethane	0.002			<		
Carbon Tetrachloride	0.002			<		
Benzene	0.001			<		
1,2-Cl2-Propane	0.003			<		

Dewline B1 Sites (Soils)

Parameter	MDL	B1-1025	B1-1026	B1-1027	B1-1028	B1-1029
	(mg/kg)					
Cl3-Ethylene	0.002			<		
BrCl2-Methane	0.002			<		
2-Cl-Ethylvinyl ether	0.014			<		
cis-1,2-Cl2-Propylene	0.003			<		
Toluene	0.002			0.048		
trans-1,2-Cl2-Propylene	0.006			<		
1,1,2-Cl3-Ethane	0.003			<		
ClBr2-Methane	0.002			<		
C14-Ethylene	0.001			<		
Cl-Benzene	0.003			<		
Ethyl Benzene	0.002			<		
Bromoform	0.002			<		
1,1,2,2-Cl4-ethane	0.002			<		
d4-1,2-Dichloroethane	%			110		
d8-Toluene	%			110		
Bromofluorobenzene	%			100		
ACID EXT						
*N-Nitrosodimethylamine				<		
phenol	0.11			<		
Bis(2-chloroethyl)ether	0.18			<		
2-Chlorophenol	0.27			<		
1,3-Dichlorobenzene	0.20			<		
1,4-Dichlorobenzene	0.20			<		
1,2-Dichlorobenzene	0.20			<		
Bis(2-chloroisopropyl)ether	0.15			<		
Hexachloroethane	0.20			<		
N-Nitroso-N-Propylamine	0.21			<		
Nitrobenzene	0.20			<		
Isophrone	0.40			<		
2-Nitrophenol	0.14			<		
2,4-Dimethylphenol	0.17			<		
Bis(2-chloroethoxy)methane	0.13			<		
2,4-Dichlorophenol	0.12			<		
1,2,4-Trichlorobenzene	0.20			<		
Naphthalene	0.03			<		
Hexachlorobutadiene	0.20			<		
4-Chloro-3-Methylphenol	0.14			<		
Hexachlorocyclopentadiene	0.20			<		
2,4,6-Trichlorophenol	0.12			<		
BASE/NEUTRAL						
2-Chloronaphthalene	0.09			<		
Acenaphthylene	0.04			<		
Dimethyl phthalate	0.11			<		
2,6-Dinitrotoluene	0.06			<		
Acenaphthene	0.07			<		
2,4-Dinitrophenol	0.48			<		
2,4-Dinitrotolulene	0.05			<		
4-Nitrophenol	0.14			<		

Dewline B1 Sites (Soils)

Parameter	MDL	B1-1025	B1-1026	B1-1027	B1-1028	B1-1029
	(mg/kg)					
Fluorene	0.03			<		
4-Chlorophenylphenylether	0.09			<		
Diethyl phthalate	0.11			<		
4,6-Dinitro-2-methylphenol	0.15			<		
N-Nitrosodiphenylamine	0.19			<		
4-Bromophenylphenylether	0.03			<		
Hexachlorobenzene	0.20			<		
Pentachlorophenol	0.11			<		
Phenanthrene	0.03			<		
Anthracene	0.02			<		
Di-n-butyl phthalate	0.11			<		
*Benzidine	0.40			<		
Fluoranthene	0.02			<		
Pyrene	0.03			<		
Benzyl butyl phthalate	0.06			<		
*3,3'-Dichlorobenzidine	0.20			<		
Benzo(a)Anthracene	0.02			<		
Chrysene	0.03			<		
Bis(2-ethylhexyl)phthalate	0.14			0.6		
Di-n-octyl phthalate	0.11			<		
Benzo(b)fluoranthene	0.04			<		
Benzo(k)fluroanthene	0.04			<		
Benzo(a)pyrene	0.05			<		
Ideno(1,2,3-cd)pyrene	0.06			<		
Dibenzo(a,h)anthracene	0.04			<		
Benzo(ghi)perylene	0.04			<		
d5-Phenol	%			16		
d5-Nitrobenzene	%			11		
2-Fluorobiphenyl	%			36		
2,4,6-Tribromophenol	%			50		
d-14-p-Terphenyl	%			42		

Dewline B1 Sites (Soils)

Parameter	MDL	B1-1030D	B1-1031D	B1-1032	B1-1033	B1-1036
	(mg/kg)					
METALS						
Arsenic	0.1				4.3	5.8
Selenium	0.5				<	<
Mercury	0.05				0.06	<
Barium	1				110	200
Beryllium	0.5				0.7	<
Cadmium	1				<	<
Chromium	1				29	26
Lead	10				93	<
Nickel	5				32	31
Silver	5				<	<
TPH	1	4200	2900	<	3400	<
PCB	0.01					<
PESTICIDES						
Aldrin	1.3					<
a-BHC	1.3					<
b-BHC	1.3					<
g-BHC (Lindane)	1.3					<
d-BHC	1.3					<
Chlorodane	1.3					
p,p'-DDD	1.3					<
p,p'-DDE	1.3					<
p,p'-DDT	1.3					<
Dieldrin	1.3					<
a-Endosulfan	1.3					<
b-Endosulfan	1.3					<
Endosulfan Sulfate	1.3					<
Endrin	1.3					
Endrin Aldehyde	1.3					
Heptachlor	1.3					<
Heptachlor Epoxide	1.3					<
Toxaphene	1.3					
VOLATILES						
Cl-Methane	0.011					<
Vinyl Chloride	0.015					<
Br-Methane	0.012					<
Cl-Ethane	0.012					<
Cl3F3-Methane	0.002					<
1,1-Cl2-Ethylene	0.002					<
Methylene Chloride	0.002					<
trans 1,2-Cl2-Ethylene	0.002					<
1,1 Cl2-Ethane	0.003					<
Chloroform	0.002					<
1,1,1-Cl3-Ethane	0.003					<
1,2 C12-Ethane	0.002					<
Carbon Tetrachloride	0.002					<
Benzene	0.001					<
1,2-Cl2-Propane	0.003					<

Dewline B1 Sites (Soils)

Parameter	MDL	B1-1030D	B1-1031D	B1-1032	B1-1033	B1-1036
	(mg/kg)					
Cl3-Ethylene	0.002					<
BrCl2-Methane	0.002					<
2-Cl-Ethylvinyl ether	0.014					<
cis-1,2-Cl2-Propylene	0.003					<
Toluene	0.002					<
trans-1,2-Cl2-Propylene	0.006					<
1,1,2-Cl3-Ethane	0.003					<
ClBr2-Methane	0.002					<
Cl4-Ethylene	0.001					<
Cl-Benzene	0.003					<
Ethyl Benzene	0.002					<
Bromoform	0.002					<
1,1,2,2-Cl4-ethane	0.002					<
d4-1,2-Dichloroethane	%					89
d8-Toluene	%					100
Bromofluorobenzene	%					120
ACID EXT						
*N-Nitrosodimethylamine						<
phenol	0.11					<
Bis(2-chloroethyl)ether	0.18					<
2-Chlorophenol	0.27					<
1,3-Dichlorobenzene	0.20					<
1,4-Dichlorobenzene	0.20					<
1,2-Dichlorobenzene	0.20					<
Bis(2-chloroisopropyl)ether	0.15					<
Hexachloroethane	0.20					<
N-Nitroso-N-Propylamine	0.21					<
Nitrobenzene	0.20					<
Isophrone	0.40					<
2-Nitrophenol	0.14					<
2,4-Dimethylphenol	0.17					<
Bis(2-chloroethoxy)methane	0.13					<
2,4-Dichlorophenol	0.12					<
1,2,4-Trichlorobenzene	0.20					<
Naphthalene	0.03					<
Hexachlorobutadiene	0.20					<
4-Chloro-3-Methylphenol	0.14					<
Hexachlorocyclopentadiene	0.20					<
2,4,6-Trichlorophenol	0.12					<
BASE/NEUTRAL						
2-Chloronaphthalene	0.09					<
Acenaphthylene	0.04					<
Dimethyl phthalate	0.11					<
2,6-Dinitrotoluene	0.06					<
Acenaphthene	0.07					<
2,4-Dinitrophenol	0.48					<
2,4-Dinitrotolulene	0.05					<
4-Nitrophenol	0.14					<

Dewline B1 Sites (Soils)

Parameter	MDL	B1-1030D	B1-1031D	B1-1032	B1-1033	B1-1036
	(mg/kg)					
Fluorene	0.03					<
4-Chlorophenylphenylether	0.09					<
Diethyl phthalate	0.11					<
4,6-Dinitro-2-methylphenol	0.15					<
N-Nitrosodiphenylamine	0.19					<
4-Bromophenylphenylether	0.03					<
Hexachlorobenzene	0.20					<
Pentachlorophenol	0.11					<
Phenanthrene	0.03					<
Anthracene	0.02					<
Di-n-butyl phthalate	0.11					<
*Benzidine	0.40					<
Fluoranthene	0.02					<
Pyrene	0.03					<
Benzyl butyl phthalate	0.06					<
*3,3'-Dichlorobenzidine	0.20					<
Benzo(a)Anthracene	0.02					<
Chrysene	0.03					<
Bis(2-ethylhexyl)phthalate	0.14					0.4
Di-n-octyl phthalate	0.11					<
Benzo(b)fluoranthene	0.04					<
Benzo(k)fluroanthene	0.04					<
Benzo(a)pyrene	0.05					<
Ideno(1,2,3-cd)pyrene	0.06					<
Dibenzo(a,h)anthracene	0.04					<
Benzo(ghi)perylene	0.04					<
d5-Phenol	%					67
d5-Nitrobenzene	%					56
2-Fluorobiphenyl	%					94
2,4,6-Tribromophenol	%					120
d-14-p-Terphenyl	%					80

Dewline B1 Sites (Soils)

Parameter	MDL	B1-1037	B1-1038	B1-1038L	B1-1038SK	B1-1039
	(mg/kg)					
METALS						
Arsenic	0.1		5.5			
Selenium	0.5		<			
Mercury	0.05		0.07			
Barium	1		220			
Beryllium	0.5		<			
Cadmium	1		<			
Chromium	1		27			
Lead	10		<			
Nickel	5		28			
Silver	5		<			
TPH	1	<	<			<
PCB	0.01	<	<			<
PESTICIDES						
Aldrin	1.3					
a-BHC	1.3					
b-BHC	1.3					
g-BHC (Lindane)	1.3					
d-BHC	1.3					
Chlorodane	1.3					
p,p'-DDD	1.3					
p,p'-DDE	1.3					
p,p'-DDT	1.3					
Dieldrin	1.3					
a-Endosulfan	1.3					
b-Endosulfan	1.3					
Endosulfan Sulfate	1.3					
Endrin	1.3					
Endrin Aldehyde	1.3					
Heptachlor	1.3					
Heptachlor Epoxide	1.3					
Toxaphene	1.3					
VOLATILES						
Cl-Methane	0.011		<	<	0.024	
Vinyl Chloride	0.015		<	<	0.023	
Br-Methane	0.012		<	<	0.023	
Cl-Ethane	0.012		<	<	0.027	
Cl3F3-Methane	0.002		<	<	0.021	
1,1-Cl2-Ethylene	0.002		<	<	0.022	
Methylene Chloride	0.002		<	<	0.023	
trans 1,2-Cl2-Ethylene	0.002		<	<	0.029	
1,1 Cl2-Ethane	0.003		<	<	0.03	
Chloroform	0.002		<	<	0.032	
1,1,1-Cl3-Ethane	0.003		<	<	0.036	
1,2 C12-Ethane	0.002		<	<	0.035	
Carbon Tetrachloride	0.002		<	<	0.027	
Benzene	0.001		<	<	0.036	
1,2-Cl2-Propane	0.003		<	<	0.043	

Dewline B1 Sites (Soils)

Parameter	MDL	B1-1037	B1-1038	B1-1038L	B1-1038SK	B1-1039
	(mg/kg)					
Cl3-Ethylene	0.002		<	<	0.036	
BrCl2-Methane	0.002		<	<	0.038	
2-Cl-Ethylvinyl ether	0.014		<	<	<	
cis-1,2-Cl2-Propylene	0.003		<	<	0.049	
Toluene	0.002		<	<	0.033	
trans-1,2-Cl2-Propylene	0.006		<	<	0.028	
1,1,2-Cl3-Ethane	0.003		<	<	0.041	
ClBr2-Methane	0.002		<	<	0.038	
Cl4-Ethylene	0.001		<	<	0.031	
Cl-Benzene	0.003		<	<	0.036	
Ethyl Benzene	0.002		<	<	0.035	
Bromoform	0.002		<	<	0.034	
1,1,2,2-Cl4-ethane	0.002		<	<	0.036	
d4-1,2-Dichloroethane	%		110	110	110	
d8-Toluene	%		110	120	100	
Bromofluorobenzene	%		100	96	72	
ACID EXT						
*N-Nitrosodimethylamine			<			
phenol	0.11		<			
Bis(2-chloroethyl)ether	0.18		<			
2-Chlorophenol	0.27		<			
1,3-Dichlorobenzene	0.20		<			
1,4-Dichlorobenzene	0.20		<			
1,2-Dichlorobenzene	0.20		<			
Bis(2-chloroisopropyl)ether	0.15		<			
Hexachloroethane	0.20		<			
N-Nitroso-N-Propylamine	0.21		<			
Nitrobenzene	0.20		<			
Isophrone	0.40		<			
2-Nitrophenol	0.14		<			
2,4-Dimethylphenol	0.17		<			
Bis(2-chloroethoxy)methane	0.13		<			
2,4-Dichlorophenol	0.12		<			
1,2,4-Trichlorobenzene	0.20		<			
Naphthalene	0.03		<			
Hexachlorobutadiene	0.20		<			
4-Chloro-3-Methylphenol	0.14		<			
Hexachlorocyclopentadiene	0.20		<			
2,4,6-Trichlorophenol	0.12		<			
BASE/NEUTRAL						
2-Chloronaphthalene	0.09		<			
Acenaphthylene	0.04		<			
Dimethyl phthalate	0.11		<			
2,6-Dinitrotoluene	0.06		<			
Acenaphthene	0.07		<			
2,4-Dinitrophenol	0.48		<			
2,4-Dinitrotolulene	0.05		<			
4-Nitrophenol	0.14		<			

Dewline B1 Sites (Soils)

Parameter	MDL (mg/kg)	B1-1037	B1-1038	B1-1038L	B1-1038SK	B1-1039
Fluorene	0.03		<			
4-Chlorophenylphenylether	0.09		<			
Diethyl phthalate	0.11		<			
4,6-Dinitro-2-methylphenol	0.15		<			
N-Nitrosodiphenylamine	0.19		<			
4-Bromophenylphenylether	0.03		<			
Hexachlorobenzene	0.20		<			
Pentachlorophenol	0.11		<			
Phenanthrene	0.03		<			
Anthracene	0.02		<			
Di-n-butyl phthalate	0.11		<			
*Benzidine	0.40		<			
Fluoranthene	0.02		<			
Pyrene	0.03		<			
Benzyl butyl phthalate	0.06		<			
*3,3'-Dichlorobenzidine	0.20		<			
Benzo(a)Anthracene	0.02		<			
Chrysene	0.03		<			
Bis(2-ethylhexyl)phthalate	0.14		<			
Di-n-octyl phthalate	0.11		<			
Benzo(b)fluoranthene	0.04		<			
Benzo(k)fluroanthene	0.04		<			
Benzo(a)pyrene	0.05		<			
Ideno(1,2,3-cd)pyrene	0.06		<			
Dibenzo(a,h)anthracene	0.04		<			
Benzo(ghi)perylene	0.04		<			
d5-Phenol	%		19			
d5-Nitrobenzene	%		17			
2-Fluorobiphenyl	%		35			
2,4,6-Tribromophenol	%		52			
d-14-p-Terphenyl	%		41			

Dewline B1 Sites (Soils)

Parameter	MDL	B1-1100	B1-1103	B1-1104	B1-1106	B1-1006R
	(mg/kg)					
METALS						
Arsenic	0.1			5.6	6.5	6.5
Selenium	0.5			<	0.8	0.8
Mercury	0.05			0.21	0.11	
Barium	1			160	490	
Beryllium	0.5			<	1	
Cadmium	1			<	<	
Chromium	1			27	38	
Lead	10			36	<	
Nickel	5			30	39	
Silver	5			<	<	
TPH	1	10000	8	<	<	
PCB	0.01	0.09	0.05	<	<	
PESTICIDES						
Aldrin	1.3				<	<
a-BHC	1.3				<	<
b-BHC	1.3				<	<
g-BHC (Lindane)	1.3				<	<
d-BHC	1.3				<	<
Chlorodane	1.3				<	<
p,p'-DDD	1.3					
p,p'-DDE	1.3				<	<
p,p'-DDT	1.3				<	<
Dieldrin	1.3				<	<
a-Endosulfan	1.3				<	<
b-Endosulfan	1.3				<	<
Endosulfan Sulfate	1.3				<	<
Endrin	1.3				<	<
Endrin Aldehyde	1.3					
Heptachlor	1.3				<	<
Heptachlor Epoxide	1.3				<	<
Toxaphene	1.3					
VOLATILES						
Cl-Methane	0.011		<			
Vinyl Chloride	0.015		<			
Br-Methane	0.012		<			
Cl-Ethane	0.012		<			
Cl3F3-Methane	0.002		<			
1,1-Cl2-Ethylene	0.002		<			
Methylene Chloride	0.002		<			
trans 1,2-Cl2-Ethylene	0.002			0.028		
1,1 Cl2-Ethane	0.003		<			
Chloroform	0.002		<			
1,1,1-Cl3-Ethane	0.003		<			
1,2 C12-Ethane	0.002		<			
Carbon Tetrachloride	0.002		<			
Benzene	0.001		<			
1,2-Cl2-Propane	0.003		<			

Dewline B1 Sites (Soils)

Parameter	MDL	B1-1100	B1-1103	B1-1104	B1-1106	B1-1006R
	(mg/kg)					
Cl3-Ethylene	0.002			<		
BrCl2-Methane	0.002			<		
2-Cl-Ethylvinyl ether	0.014			<		
cis-1,2-Cl2-Propylene	0.003			<		
Toluene	0.002			<		
trans-1,2-Cl2-Propylene	0.006			<		
1,1,2-Cl3-Ethane	0.003			<		
ClBr2-Methane	0.002			<		
C14-Ethylene	0.001			<		
Cl-Benzene	0.003			<		
Ethyl Benzene	0.002			<		
Bromoform	0.002			<		
1,1,2,2-Cl4-ethane	0.002			<		
d4-1,2-Dichloroethane	%			91		
d8-Toluene	%			120		
Bromofluorobenzene	%			110		
ACID EXT						
*N-Nitrosodimethylamine				<	<	<
phenol	0.11			<	<	<
Bis(2-chloroethyl)ether	0.18			<	<	<
2-Chlorophenol	0.27			<	<	<
1,3-Dichlorobenzene	0.20			<	<	<
1,4-Dichlorobenzene	0.20			<	<	<
1,2-Dichlorobenzene	0.20			<	<	<
Bis(2-chloroisopropyl)ether	0.15			<	<	<
Hexachloroethane	0.20			<	<	<
N-Nitroso-N-Propylamine	0.21			<	<	<
Nitrobenzene	0.20			<	<	<
Isophrone	0.40			<	<	<
2-Nitrophenol	0.14			<	<	<
2,4-Dimethylphenol	0.17			<	<	<
Bis(2-chloroethoxy)methane	0.13			<	<	<
2,4-Dichlorophenol	0.12			<	<	<
1,2,4-Trichlorobenzene	0.20			<	<	<
Naphthalene	0.03			<	<	<
Hexachlorobutadiene	0.20			<	<	<
4-Chloro-3-Methylphenol	0.14			<	<	<
Hexachlorocyclopentadiene	0.20			<	<	<
2,4,6-Trichlorophenol	0.12			<	<	<
BASE/NEUTRAL						
2-Chloronaphthalene	0.09			<	<	<
Acenaphthylene	0.04			<	<	<
Dimethyl phthalate	0.11			<	<	<
2,6-Dinitrotoluene	0.06			<	<	<
Acenaphthene	0.07			<	<	<
2,4-Dinitrophenol	0.48			<	<	<
2,4-Dinitrotolulene	0.05			<	<	<
4-Nitrophenol	0.14			<	<	<

Dewline B1 Sites (Soils)

Parameter	MDL	B1-1100	B1-1103	B1-1104	B1-1106	B1-1006R
	(mg/kg)					
Fluorene	0.03			<	<	<
4-Chlorophenylphenylether	0.09			<	<	<
Diethyl phthalate	0.11			<	<	<
4,6-Dinitro-2-methylphenol	0.15			<	<	<
N-Nitrosodiphenylamine	0.19			<	<	<
4-Bromophenylphenylether	0.03			<	<	<
Hexachlorobenzene	0.20			<	<	<
Pentachlorophenol	0.11			<	<	<
Phenanthrene	0.03			<	<	<
Anthracene	0.02			<	<	<
Di-n-butyl phthalate	0.11			<	<	<
*Benzidine	0.40			<	<	<
Fluoranthene	0.02			<	<	<
Pyrene	0.03			<	<	<
Benzyl butyl phthalate	0.06			<	<	<
*3,3'-Dichlorobenzidine	0.20			<	<	<
Benzo(a)Anthracene	0.02			<	<	<
Chrysene	0.03			<	<	<
Bis(2-ethylhexyl)phthalate	0.14			0.16	1.6	0.96
Di-n-octyl phthalate	0.11			<	<	<
Benzo(b)fluoranthene	0.04			<	<	<
Benzo(k)fluroanthene	0.04			<	<	<
Benzo(a)pyrene	0.05			<	<	<
Ideno(1,2,3-cd)pyrene	0.06			<	<	<
Dibenzo(a,h)anthracene	0.04			<	<	<
Benzo(ghi)perylene	0.04			<	<	<
d5-Phenol	%			17	92	79
d5-Nitrobenzene	%			14	78	73
2-Fluorobiphenyl	%			40	87	83
2,4,6-Tribromophenol	%			42	89	93
d-14-p-Terphenyl	%			38	92	100

Dewline B1 Sites (Soils)

Parameter	MDL (mg/kg)	B1-1202	B1-1204
METALS			
Arsenic	0.1		8.8
Selenium	0.5		<
Mercury	0.05		0.19
Barium	1		110
Beryllium	0.5		<
Cadmium	1		<
Chromium	1		31
Lead	10		22
Nickel	5		32
Silver	5		<
TPH	1	-	<
PCB	0.01	-	<
PESTICIDES			
Aldrin	1.3		<
a-BHC	1.3		<
b-BHC	1.3		<
g-BHC (Lindane)	1.3		<
d-BHC	1.3		<
Chlorodane	1.3		
p,p'-DDD	1.3		<
p,p'-DDE	1.3		<
p,p'-DDT	1.3		<
Dieldrin	1.3		<
a-Endosulfan	1.3		<
b-Endosulfan	1.3		<
Endosulfan Sulfate	1.3		<
Endrin	1.3		
Endrin Aldehyde	1.3		
Heptachlor	1.3		<
Heptachlor Epoxide	1.3		<
Toxaphene	1.3		
VOLATILES			
Cl-Methane	0.011	<	<
Vinyl Chloride	0.015	<	<
Br-Methane	0.012	<	<
Cl-Ethane	0.012	<	<
Cl3F3-Methane	0.002	<	<
1,1-Cl2-Ethylene	0.002	<	<
Methylene Chloride	0.002	0.12	<
trans 1,2-Cl2-Ethylene	0.002	<	<
1,1 Cl2-Ethane	0.003	<	<
Chloroform	0.002	<	<
1,1,1-Cl3-Ethane	0.003	<	<
1,2 C12-Ethane	0.002	<	<
Carbon Tetrachloride	0.002	<	<
Benzene	0.001	0.017	<
1,2-Cl2-Propane	0.003	<	<

Dewline B1 Sites (Soils)

Parameter	MDL	B1-1202	B1-1204
	(mg/kg)		
Cl3-Ethylene	0.002	<	<
BrCl2-Methane	0.002	<	<
2-Cl-Ethylvinyl ether	0.014	<	<
cis-1,2-Cl2-Propylene	0.003	<	<
Toluene	0.002	0.051	<
trans-1,2-Cl2-Propylene	0.006	<	<
1,1,2-Cl3-Ethane	0.003	<	<
ClBr2-Methane	0.002	<	<
C14-Ethylene	0.001	<	<
Cl-Benzene	0.003	<	<
Ethyl Benzene	0.002	<	<
Bromoform	0.002	<	<
1,1,2,2-Cl4-ethane	0.002	<	<
d4-1,2-Dichloroethane	%	84	96
d8-Toluene	%	100	110
Bromofluorobenzene	%	84	100
ACID EXT			
*N-Nitrosodimethylamine			<
phenol	0.11		<
Bis(2-chloroethyl)ether	0.18		<
2-Chlorophenol	0.27		<
1,3-Dichlorobenzene	0.20		<
1,4-Dichlorobenzene	0.20		<
1,2-Dichlorobenzene	0.20		<
Bis(2-chloroisopropyl)ether	0.15		<
Hexachloroethane	0.20		<
N-Nitroso-N-Propylamine	0.21		<
Nitrobenzene	0.20		<
Isophrone	0.40		<
2-Nitrophenol	0.14		<
2,4-Dimethylphenol	0.17		<
Bis(2-chloroethoxy)methane	0.13		<
2,4-Dichlorophenol	0.12		<
1,2,4-Trichlorobenzene	0.20		<
Naphthalene	0.03		<
Hexachlorobutadiene	0.20		<
4-Chloro-3-Methylphenol	0.14		<
Hexachlorocyclopentadiene	0.20		<
2,4,6-Trichlorophenol	0.12		<
BASE/NEUTRAL			
2-Chloronaphthalene	0.09		<
Acenaphthylene	0.04		<
Dimethyl phthalate	0.11		<
2,6-Dinitrotoluene	0.06		<
Acenaphthene	0.07		<
2,4-Dinitrophenol	0.48		<
2,4-Dinitrotolulene	0.05		<
4-Nitrophenol	0.14		<

Dewline B1 Sites (Soils)

Parameter	MDL	B1-1202	B1-1204
	(mg/kg)		
Fluorene	0.03		<
4-Chlorophenylphenylether	0.09		<
Diethyl phthalate	0.11		<
4,6-Dinitro-2-methylphenol	0.15		<
N-Nitrosodiphenylamine	0.19		<
4-Bromophenylphenylether	0.03		<
Hexachlorobenzene	0.20		<
Pentachlorophenol	0.11		<
Phenanthrene	0.03		<
Anthracene	0.02		<
Di-n-butyl phthalate	0.11		0.12
*Benzidine	0.40		<
Fluoranthene	0.02		<
Pyrene	0.03		<
Benzyl butyl phthalate	0.06		<
*3,3'-Dichlorobenzidine	0.20		<
Benzo(a)Anthracene	0.02		<
Chrysene	0.03		<
Bis(2-ethylhexyl)phthalate	0.14		<
Di-n-octyl phthalate	0.11		<
Benzo(b)fluoranthene	0.04		<
Benzo(k)fluroanthene	0.04		<
Benzo(a)pyrene	0.05		<
Ideno(1,2,3-cd)pyrene	0.06		<
Dibenzo(a,h)anthracene	0.04		<
Benzo(ghi)perylene	0.04		<
d5-Phenol	%		75
d5-Nitrobenzene	%		46
2-Fluorobiphenyl	%		71
2,4,6-Tribromophenol	%		61
d-14-p-Terphenyl	%		110

Dewline B1 Sites (Water)

Parameter	MDL	Units	B1-A	B1-B	B1-C(D)	B1-D(D)	B1-E
METALS							
Arsenic	0.001	mg/L			<	<	<
Selenium	0.005	mg/L			<	<	<
Mercury	0.05	ug/L			<	<	<
Barium	0.01	mg/L			0.15	0.15	0.17
Beryllium	0.005	mg/L			<0.01	<0.01	<0.01
Cadmium	0.01	mg/L			<	<	<
Chromium	0.01	mg/L			<	<	<
Lead	0.1	mg/L			<	<	<
Nickel	0.05	mg/L			<	<	<
Silver	0.05	mg/L			<	<	<
TPH	5	ug/L			120	<	<
PCB	0.05	ug/L			<	<	<
PESTICIDES							
Aldrin	10	ug/L			<	<	<
a-BHC	10	ug/L			<	<	<
b-BHC	10	ug/L			<	<	<
g-BHC (Lindane)	10	ug/L			<	<	<
d-BHC	10	ug/L			<	<	<
Chlorodane	100	ug/L			<	<	<
p,p'-DDD	10	ug/L			<	<	<
p,p'-DDE	10	ug/L			<	<	<
p,p'-DDT	10	ug/L			<	<	<
Dieldrin	10	ug/L			<	<	<
a-Endosulfan	10	ug/L			<	<	<
b-Endosulfan	10	ug/L			<	<	<
Endosulfan Sulfate	10	ug/L			<	<	<
Endrin	10	ug/L			<	<	<
Endrin Aldehyde	10	ug/L			<	<	<
Heptachlor	10	ug/L			<	<	<
Heptachlor Epoxide	10	ug/L			<	<	<
Toxaphene	300	ug/L			<	<	<
VOLATILES							
Cl-Methane	2.2	ug/L	<	<	<	<	<
Vinyl Chloride	2.9	ug/L	<	<	<	<	<
Br-Methane	2.4	ug/L	<	<	<	<	<
Cl-Ethane	2.5	ug/L	<	<	<	<	<
Cl3F3-Methane	0.3	ug/L	<	<	<	<	<
1,1-Cl2-Ethylene	0.36	ug/L	<	<	<	<	<
Methylene Chloride	0.33	ug/L	<	<	<	<	<
trans 1,2-Cl2-Ethylene	0.42	ug/L	<	<	<	<	<
1,1 Cl2-Ethane	0.51	ug/L	<	<	<	<	<
Chloroform	0.36	ug/L	<	<	<	<	<
1,1,1-Cl3-Ethane	0.75	ug/L	<	<	<	<	<
1,2 C12-Ethane	0.39	ug/L	<	0.93	<	<	<
Carbon Tetrachloride	0.3	ug/L	<	<	<	<	<
Benzene	0.2	ug/L	<	<	<	<	<
1,2-Cl2-Propane	0.54	ug/L	<	<	<	<	<

Dewline B1 Sites (Water)

Parameter	MDL	Units	B1-A	B1-B	B1-C(D)	B1-D(D)	B1-E
Cl3-Ethylene	0.3	ug/L	<	<	<	<	<
BrCl2-Methane	0.4	ug/L	<	<	<	<	<
2-Cl-Ethylvinyl ether	2.0	ug/L	<	<	<	<	<
cis-1,2-Cl2-Propylene	0.69	ug/L	<	<	<	<	<
Toluene	0.4	ug/L	<	<	<	<	<
trans-1,2-Cl2-Propylene	1.1	ug/L	<	<	<	<	<
1,1,2-Cl3-Ethane	0.57	ug/L	<	<	<	<	<
ClBr2-Methane	0.42	ug/L	<	<	<	<	<
C14-Ethylene	0.15	ug/L	<	<	<	<	<
Cl-Benzene	0.6	ug/L	<	<	<	<	<
Ethyl Benzene	0.4	ug/L	<	<	<	<	<
Bromoform	0.33	ug/L	<	<	<	<	<
1,1,2,2-Cl4-ethane	0.36	ug/L	<	<	<	<	<
d4-1,2-Dichloroethane		%	100	100	99	110	110
d8-Toluene		%	110	110	110	120	97
Bromofluorobenzene		%	110	110	110	110	94
ACID EXT							
*N-Nitrosodimethylamine							
phenol	0.1	ug/L			<	<	<
Bis(2-chloroethyl)ether	0.8	ug/L			<	<	<
2-Chlorophenol	0.7	ug/L			<	<	<
1,3-Dichlorobenzene	2	ug/L			<	<	<
1,4-Dichlorobenzene	2	ug/L			<	<	<
1,2-Dichlorobenzene	2	ug/L			<	<	<
Bis(2-chloroisopropyl)ether	0.5	ug/L			<	<	<
Hexachloroethane	2	ug/L			<	<	<
N-Nitroso-N-Propylamine	0.1	ug/L			<	<	<
Nitrobenzene	2	ug/L			<	<	<
Isophrone	4	ug/L			<	<	<
2-Nitrophenol	0.4	ug/L			<	<	<
2,4-Dimethylphenol	0.7	ug/L			<	<	<
Bis(2-chloroethoxy)methane	0.3	ug/L			<	<	<
2,4-Dichlorophenol	0.2	ug/L			<	<	<
1,2,4-Trichlorobenzene	2	ug/L			<	<	<
Naphthalene	0.3	ug/L			<	<	<
Hexachlorobutadiene	2	ug/L			<	<	<
4-Chloro-3-Methylphenol	0.4	ug/L			<	<	<
Hexachlorocyclopentadiene	2	ug/L			<	<	<
2,4,6-Trichlorophenol	0.2	ug/L			<	<	<
BASE/NEUTRAL							
2-Chloronaphthalene	0.9	ug/L			<	<	<
Acenaphthylene	0.4	ug/L			<	<	<
Dimethyl phthalate	0.1	ug/L			<	<	<
2,6-Dinitrotoluene	0.6	ug/L			<	<	<
Acenaphthene	0.7	ug/L			<	<	<
2,4-Dinitrophenol	0.8	ug/L			<	<	<
2,4-Dinitrotolulene	0.5	ug/L			<	<	<
4-Nitrophenol	0.4	ug/L			<	<	<
Fluorene	0.3	ug/L			<	<	<

Dewline B1 Sites (Water)

Parameter	MDL	Units	B1-A	B1-B	B1-C(D)	B1-D(D)	B1-E
4-Chlorophenylphenylether	0.9	ug/L			<	<	<
Diethyl phthalate	0.1	ug/L			<	<	<
4,6-Dinitro-2-methylphenol	0.5	ug/L			<	<	<
N-Nitrosodiphenylamine	0.9	ug/L			<	<	<
4-Bromophenylphenylether	0.3	ug/L			<	<	<
Hexachlorobenzene	0	ug/L			<	<	<
Pentachlorophenol	0.1	ug/L			<	<	<
Phenanthrene	0.3	ug/L			<	<	<
Anthracene	0.2	ug/L			<	<	<
Di-n-butyl phthalate	0.1	ug/L			<	<	<
*Benzidine							
Fluoranthene	0.2	ug/L			<	<	<
Pyrene	0.3	ug/L			<	<	<
Benzyl butyl phthalate	0.6	ug/L			<	<	<
*3,3'-Dichlorobenzidine							
Benzo(a)Anthracene	0.2	ug/L			<	<	<
Chrysene	0.3	ug/L			<	<	<
Bis(2-ethylhexyl)phthalate	0.4	ug/L			0.6	2.8	2.7
Di-n-octyl phthalate	0.1	ug/L			1.7	7.4	12
Benzo(b)fluoranthene	0.4	ug/L			<	<	<
Benzo(k)fluroanthene	0.4	ug/L			<	<	<
Benzo(a)pyrene	0.5	ug/L			<	<	<
Ideno(1,2,3-cd)pyrene	0.6	ug/L			<	<	<
Dibenzo(a,h)anthracene	0.4	ug/L			<	<	<
Benzo(ghi)perylene	0.4	ug/L			<	<	<
d5-Phenol		%			24	47	34
d5-Nitrobenzene		%			13	75	24
2-Fluorobiphenyl		%			59	71	61
2,4,6-Tribromophenol		%			110	110	110
d-14-p-Terphenyl		%			100	120	130

Dewline B1 Sites (Water)

Parameter	MDL	Units	B1-F	B1-G	B1-H	B1-H(L)	B1-I
METALS							
Arsenic	0.001	mg/L					
Selenium	0.005	mg/L					
Mercury	0.05	ug/L					
Barium	0.01	mg/L					
Beryllium	0.005	mg/L					
Cadmium	0.01	mg/L					
Chromium	0.01	mg/L					
Lead	0.1	mg/L					
Nickel	0.05	mg/L					
Silver	0.05	mg/L					
TPH	5	ug/L					
PCB	0.05	ug/L					
PESTICIDES							
Aldrin	10	ug/L			<	<	
a-BHC	10	ug/L			<	<	
b-BHC	10	ug/L			<	<	
g-BHC (Lindane)	10	ug/L			<	<	
d-BHC	10	ug/L			<	<	
Chlorodane	100	ug/L					
p,p'-DDD	10	ug/L			<	<	
p,p'-DDE	10	ug/L			<	<	
p,p'-DDT	10	ug/L			<	<	
Dieldrin	10	ug/L			<	<	
a-Endosulfan	10	ug/L			<	<	
b-Endosulfan	10	ug/L			<	<	
Endosulfan Sulfate	10	ug/L			<	<	
Endrin	10	ug/L					
Endrin Aldehyde	10	ug/L					
Heptachlor	10	ug/L			<	<	
Heptachlor Epoxide	10	ug/L			<	<	
Toxaphene	300	ug/L					
VOLATILES							
Cl-Methane	2.2	ug/L	<	<			<
Vinyl Chloride	2.9	ug/L	<	<			<
Br-Methane	2.4	ug/L	<	<			<
Cl-Ethane	2.5	ug/L	<	<			<
Cl3F3-Methane	0.3	ug/L	<	<			<
1,1-Cl2-Ethylene	0.36	ug/L	<	<			<
Methylene Chloride	0.33	ug/L	<	<			<
trans 1,2-Cl2-Ethylene	0.42	ug/L	<	<			<
1,1 Cl2-Ethane	0.51	ug/L	<	<			<
Chloroform	0.36	ug/L	<	<			<
1,1,1-Cl3-Ethane	0.75	ug/L	<	<			<
1,2 C12-Ethane	0.39	ug/L	<	<			<
Carbon Tetrachloride	0.3	ug/L	<	<			<
Benzene	0.2	ug/L	<	<			<
1,2-Cl2-Propane	0.54	ug/L	<	<			<

Dewline B1 Sites (Water)

Parameter	MDL	Units	B1-F	B1-G	B1-H	B1-H(L)	B1-I
Cl3-Ethylene	0.3	ug/L	<	<			<
BrCl2-Methane	0.4	ug/L	<	<			<
2-Cl-Ethylvinyl ether	2.0	ug/L	<	<			<
cis-1,2-Cl2-Propylene	0.69	ug/L	<	<			<
Toluene	0.4	ug/L	<	<			<
trans-1,2-Cl2-Propylene	1.1	ug/L	<	<			<
1,1,2-Cl3-Ethane	0.57	ug/L	<	<			<
ClBr2-Methane	0.42	ug/L	<	<			<
C14-Ethylene	0.15	ug/L	<	<			<
Cl-Benzene	0.6	ug/L	<	<			<
Ethyl Benzene	0.4	ug/L	<	<			<
Bromoform	0.33	ug/L	<	<			<
1,1,2,2-Cl4-ethane	0.36	ug/L	<	<			<
d4-1,2-Dichloroethane		%	110	120			89
d8-Toluene		%	100	110			85
Bromofluorobenzene		%	96	110			107
ACID EXT							
*N-Nitrosodimethylamine							
phenol	0.1	ug/L			<	<	
Bis(2-chloroethyl)ether	0.8	ug/L			<	<	
2-Chlorophenol	0.7	ug/L			<	<	
1,3-Dichlorobenzene	2	ug/L			<	<	
1,4-Dichlorobenzene	2	ug/L			<	<	
1,2-Dichlorobenzene	2	ug/L			<	<	
Bis(2-chloroisopropyl)ether	0.5	ug/L			<	<	
Hexachloroethane	2	ug/L			<	<	
N-Nitroso-N-Propylamine	0.1	ug/L			<	<	
Nitrobenzene	2	ug/L			<	<	
Isophrone	4	ug/L			<	<	
2-Nitrophenol	0.4	ug/L			<	<	
2,4-Dimethylphenol	0.7	ug/L			<	<	
Bis(2-chloroethoxy)methane	0.3	ug/L			<	<	
2,4-Dichlorophenol	0.2	ug/L			<	<	
1,2,4-Trichlorobenzene	2	ug/L			<	<	
Naphthalene	0.3	ug/L			<	<	
Hexachlorobutadiene	2	ug/L			<	<	
4-Chloro-3-Methylphenol	0.4	ug/L			<	<	
Hexachlorocyclopentadiene	2	ug/L			<	<	
2,4,6-Trichlorophenol	0.2	ug/L			<	<	
BASE/NEUTRAL							
2-Chloronaphthalene	0.9	ug/L			<	<	
Acenaphthylene	0.4	ug/L			<	<	
Dimethyl phthalate	0.1	ug/L			<	<	
2,6-Dinitrotoluene	0.6	ug/L			<	<	
Acenaphthene	0.7	ug/L			<	<	
2,4-Dinitrophenol	0.8	ug/L			<	<	
2,4-Dinitrotolulene	0.5	ug/L			<	<	
4-Nitrophenol	0.4	ug/L			<	<	
Fluorene	0.3	ug/L			<	<	

Dewline B1 Sites (Water)

Parameter	MDL	Units	B1-F	B1-G	B1-H	B1-H(L)	B1-I
4-Chlorophenylphenylether	0.9	ug/L			<	<	
Diethyl phthalate	0.1	ug/L			<	<	
4,6-Dinitro-2-methylphenol	0.5	ug/L			<	<	
N-Nitrosodiphenylamine	0.9	ug/L			<	<	
4-Bromophenylphenylether	0.3	ug/L			<	<	
Hexachlorobenzene	0	ug/L			<	<	
Pentachlorophenol	0.1	ug/L			<	<	
Phenanthrene	0.3	ug/L			<	<	
Anthracene	0.2	ug/L			<	<	
Di-n-butyl phthalate	0.1	ug/L					
*Benzidine							
Fluoranthene	0.2	ug/L					
Pyrene	0.3	ug/L					
Benzyl butyl phthalate	0.6	ug/L					
*3,3'-Dichlorobenzidine							
Benzo(a)Anthracene	0.2	ug/L					
Chrysene	0.3	ug/L					
Bis(2-ethylhexyl)phthalate	0.4	ug/L					
Di-n-octyl phthalate	0.1	ug/L					
Benzo(b)fluoranthene	0.4	ug/L					
Benzo(k)fluroanthene	0.4	ug/L					
Benzo(a)pyrene	0.5	ug/L					
Ideno(1,2,3-cd)pyrene	0.6	ug/L					
Dibenzo(a,h)anthracene	0.4	ug/L					
Benzo(ghi)perylene	0.4	ug/L					
d5-Phenol		%					
d5-Nitrobenzene		%					
2-Fluorobiphenyl		%					
2,4,6-Tribromophenol		%					
d-14-p-Terphenyl		%					

Dewline B1 Sites (Water)

Parameter	MDL	Units	B1-J	B1-K	B1-L	T-BLANK	F-BLANK
METALS							
Arsenic	0.001	mg/L	<	<	<		<
Selenium	0.005	mg/L	<	<	<		<
Mercury	0.05	ug/L	<	<	<		
Barium	0.01	mg/L	0.05	0.04	0.11		<
Beryllium	0.005	mg/L	<0.01	<0.01	<0.01		<
Cadmium	0.01	mg/L	<	<	<		<
Chromium	0.01	mg/L	<	<	<		<
Lead	0.1	mg/L	<	<	<		<
Nickel	0.05	mg/L	0.11	0.14	0.55		<
Silver	0.05	mg/L	<	<	<		<
TPH	5	ug/L	2200	<	<		
PCB	0.05	ug/L	<	<	<		
PESTICIDES							
Aldrin	10	ug/L	<	<	<	<	
a-BHC	10	ug/L	<	<	<	<	
b-BHC	10	ug/L	<	<	<	<	
g-BHC (Lindane)	10	ug/L	<	<	<	<	
d-BHC	10	ug/L	<	<	<	<	
Chlorodane	100	ug/L	<	<	<	<	
p,p'-DDD	10	ug/L	<	<	<	<	
p,p'-DDE	10	ug/L	<	<	<	<	
p,p'-DDT	10	ug/L	<	<	<	<	
Dieldrin	10	ug/L	<	<	<	<	
a-Endosulfan	10	ug/L	<	<	<	<	
b-Endosulfan	10	ug/L	<	<	<	<	
Endosulfan Sulfate	10	ug/L	<	<	<	<	
Endrin	10	ug/L	<	<	<	<	
Endrin Aldehyde	10	ug/L	<	<	<	<	
Heptachlor	10	ug/L	<	<	<	<	
Heptachlor Epoxide	10	ug/L	<	<	<	<	
Toxaphene	300	ug/L	<	<	<	<	
VOLATILES							
Cl-Methane	2.2	ug/L	<	<	<	<	
Vinyl Chloride	2.9	ug/L	<	<	<	<	
Br-Methane	2.4	ug/L	<	<	<	<	
Cl-Ethane	2.5	ug/L	<	<	<	<	
Cl3F3-Methane	0.3	ug/L	<	<	<	<	
1,1-Cl2-Ethylene	0.36	ug/L	<	<	<	<	
Methylene Chloride	0.33	ug/L	<	<	96	<	
trans 1,2-Cl2-Ethylene	0.42	ug/L	<	<	<	<	
1,1 Cl2-Ethane	0.51	ug/L	<	<	<	<	
Chloroform	0.36	ug/L	1.4	<	<	<	
1,1,1-Cl3-Ethane	0.75	ug/L	<	<	<	<	
1,2 C12-Ethane	0.39	ug/L	<	<	<	<	
Carbon Tetrachloride	0.3	ug/L	<	<	<	<	
Benzene	0.2	ug/L	<	<	12	<	
1,2-Cl2-Propane	0.54	ug/L	<	<	<	<	

Dewline B1 Sites (Water)

Parameter	MDL	Units	B1-J	B1-K	B1-L	T-BLANK	F-BLANK
Cl3-Ethylene	0.3	ug/L	<	<	<	<	
BrCl2-Methane	0.4	ug/L	<	<	<	<	
2-Cl-Ethylvinyl ether	2.0	ug/L	<	<	<	<	
cis-1,2-Cl2-Propylene	0.69	ug/L	<	<	<	<	
Toluene	0.4	ug/L	<	<	<	<	
trans-1,2-Cl2-Propylene	1.1	ug/L	<	<	<	<	
1,1,2-Cl3-Ethane	0.57	ug/L	<	<	<	<	
ClBr2-Methane	0.42	ug/L	<	<	<	<	
C14-Ethylene	0.15	ug/L	<	<	<	<	
Cl-Benzene	0.6	ug/L	<	<	<	<	
Ethyl Benzene	0.4	ug/L	<	<	<	<	
Bromoform	0.33	ug/L	<	<	<	<	
1,1,2,2-Cl4-ethane	0.36	ug/L	<	<	<	<	
d4-1,2-Dichloroethane		%	110	110	87	98	
d8-Toluene		%	120	120	87	110	
Bromofluorobenzene		%	110	110	109	110	
ACID EXT							
*N-Nitrosodimethylamine							
phenol	0.1	ug/L	<	<	<	<	
Bis(2-chloroethyl)ether	0.8	ug/L	<	<	<	<	
2-Chlorophenol	0.7	ug/L	<	<	<	<	
1,3-Dichlorobenzene	2	ug/L	<	<	<	<	
1,4-Dichlorobenzene	2	ug/L	<	<	<	<	
1,2-Dichlorobenzene	2	ug/L	<	<	<	<	
Bis(2-chloroisopropyl)ether	0.5	ug/L	<	<	<	<	
Hexachloroethane	2	ug/L	<	<	<	<	
N-Nitroso-N-Propylamine	0.1	ug/L	<	<	<	<	
Nitrobenzene	2	ug/L	<	<	<	<	
Isophrone	4	ug/L	<	<	<	<	
2-Nitrophenol	0.4	ug/L	<	<	<	<	
2,4-Dimethylphenol	0.7	ug/L	<	<	<	<	
Bis(2-chloroethoxy)methane	0.3	ug/L	<	<	<	<	
2,4-Dichlorophenol	0.2	ug/L	<	<	<	<	
1,2,4-Trichlorobenzene	2	ug/L	<	<	<	<	
Naphthalene	0.3	ug/L	<	<	<	<	
Hexachlorobutadiene	2	ug/L	<	<	<	<	
4-Chloro-3-Methylphenol	0.4	ug/L	<	<	<	<	
Hexachlorocyclopentadiene	2	ug/L	<	<	<	<	
2,4,6-Trichlorophenol	0.2	ug/L	<	<	<	<	
BASE/NEUTRAL							
2-Chloronaphthalene	0.9	ug/L	<	<	<	<	
Acenaphthylene	0.4	ug/L	<	<	<	<	
Dimethyl phthalate	0.1	ug/L	<	<	<	<	
2,6-Dinitrotoluene	0.6	ug/L	<	<	<	<	
Acenaphthene	0.7	ug/L	<	<	<	<	
2,4-Dinitrophenol	0.8	ug/L	<	<	<	<	
2,4-Dinitrotolulene	0.5	ug/L	<	<	<	<	
4-Nitrophenol	0.4	ug/L	<	<	<	<	
Fluorene	0.3	ug/L	<	<	<	<	

Dewline B1 Sites (Water)

Parameter	MDL	Units	B1-J	B1-K	B1-L	T-BLANK	F-BLANK
4-Chlorophenylphenylether	0.9	ug/L	<	<	<	<	
Diethyl phthalate	0.1	ug/L	<	<	<	<	
4,6-Dinitro-2-methylphenol	0.5	ug/L	<	<	<	<	
N-Nitrosodiphenylamine	0.9	ug/L	<	<	<	<	
4-Bromophenylphenylether	0.3	ug/L	<	<	<	<	
Hexachlorobenzene	0	ug/L	<	<	<	<	
Pentachlorophenol	0.1	ug/L	<	<	<	<	
Phenanthrene	0.3	ug/L	<	<	<	<	
Anthracene	0.2	ug/L	<	<	<	<	
Di-n-butyl phthalate	0.1	ug/L	<	<	<	<	
*Benzidine							
Fluoranthene	0.2	ug/L	<	<	<	<	
Pyrene	0.3	ug/L	<	<	<	<	
Benzyl butyl phthalate	0.6	ug/L	<	<	<	<	
*3,3'-Dichlorobenzidine							
Benzo(a)Anthracene	0.2	ug/L	<	<	<	<	
Chrysene	0.3	ug/L	<	<	<	<	
Bis(2-ethylhexyl)phthalate	0.4	ug/L	<	1	0.6	0.5	
Di-n-octyl phthalate	0.1	ug/L	1	1.9	1.3	0.5	
Benzo(b)fluoranthene	0.4	ug/L	<	<	<	<	
Benzo(k)fluroanthene	0.4	ug/L	<	<	<	<	
Benzo(a)pyrene	0.5	ug/L	<	<	<	<	
Ideno(1,2,3-cd)pyrene	0.6	ug/L	<	<	<	<	
Dibenzo(a,h)anthracene	0.4	ug/L	<	<	<	<	
Benzo(ghi)perylene	0.4	ug/L	<	<	<	<	
d5-Phenol		%	45	35	63	34	
d5-Nitrobenzene		%	74	76	76	67	
2-Fluorobiphenyl		%	80	74	81	70	
2,4,6-Tribromophenol		%	100	95	110	91	
d-14-p-Terphenyl		%	100	94	95	100	

APPENDIX D QUALITY ASSURANCE/QUALITY CONTROL RESULTS

D-1 QA/QC WATER

Water samples were collected at 12 locations throughout the site (Figure 6.1). Samples from six of these locations were submitted for the full suite of analysis. Five of the remaining six were analyzed for volatile organic compounds only, and two were not submitted for analysis.

For BAR-1 the QA/QC program for water consisted of:

(1) 1 trip blank analyzed.
(2) 1 field blank analyzed.
(3) 1 field replicate sample analyzed.
(4) surrogate recoveries for all samples analyzed for organics.

The single field replicate sample fulfils the QA/QC requirements for field replication of water samples as defined for this project.

Results for the field replicate water sample, B1-C, show close correlation with the original sample, B1-D(D), except in the cases of two phthalate compounds. As established in earlier sections, however, phthalates are present due their unintended introduction from contact with plastics during sampling and/or analysis. The concentrations of these compounds would not be expected to be consistent between replicates, and therefore the replicate results are considered acceptable.

Metals were analyzed in the field blank and no detectable indicator chemicals were found.

The trip blank results indicate that phthalates were introduced during shipping and handling of samples.

Surrogate recoveries are acceptable according to guidelines set out in the relevant analytical procedures (EPA Procedure 6240 and EPA Procedure 6270).

D-2 QA/QC SOIL

Soil samples were collected at 49 locations throughout the site. Samples from 37 of these locations were submitted for full and partial analysis. A summary of soil QA/QC indicator chemicals is as follows:

(1) 3 field duplicates collected.
(2) 3 field duplicates analyzed.
(3) 8 field replicates collected.
(4) 4 field replicates analyzed.
(5) 2 laboratory replicate analyzed.
(6) 1 matrix spike analyzed.
(7) surrogate recoveries for all samples analyzed for organics.

The quantity of field replicates and duplicates analyzed does not meet the QA/QC requirement for field replication and duplication of one in ten soil samples, as set for this project.

Data for duplicate and replicate samples indicate that the sampled soils are relatively homogeneous, and that sampling and analytical methods have not resulted in variability of concern.

Surrogate recoveries were generally acceptable according to guidelines set out in the relevant analytical procedures (EPA Procedure 6240 and EPA Procedure 6270).

APPENDIX E RISK ASSESSMENT

E-1 OVERVIEW

E-1.1 ASSESSMENT METHODS

The methodology used to assess the potential risks of contaminants found at the BAR-1 site was described in Volume 2, Section 3.3.1 entitled, Risk Assessment Study Approach. This methodology was categorized according to data evaluation, exposure assessment, toxicity assessment, and risk characterization and results from the BAR-1 risk assessment are similarly organized in the following subsections.

E-1.2 GENERAL ASSESSMENT DATA

Risk assessment data which were common to all 21 DEW Station Sites were not repeated in each site report but rather they were documented in Volume 2, Section 6.0 entitled, General Risk Assessment Data. General pathway equation variables used in the BAR-1 exposure assessment were described in Volume 2, subsection 6.1 and detailed in Volume 2, Appendix B. References to toxicity information used in the BAR-1 toxicity assessment were also described in Volume 2 but in a separate subsection, 6.2. This general data documented in Volume 2 has been repeated in the present volume only where necessary to clarify results.

E-2 DATA EVALUATION

E-2.1 CONTAMINANT MAP

The areal extent of each contaminant was estimated qualitatively based on the field observations and the geological and hydrological data presented in Section 3.0. Only at Landfill A location were contaminants identified in a sufficient number of samples to permit contouring of concentration maps as described in Volume 2. Areas covered by contaminant sites such as landfills, outfalls, POLs, pallet lines and stain areas are shown in Figure E-1. For each of these sites, the areal extent of all elevated levels was estimated along with the associated average concentration to provide the required inputs for the exposure assessment.

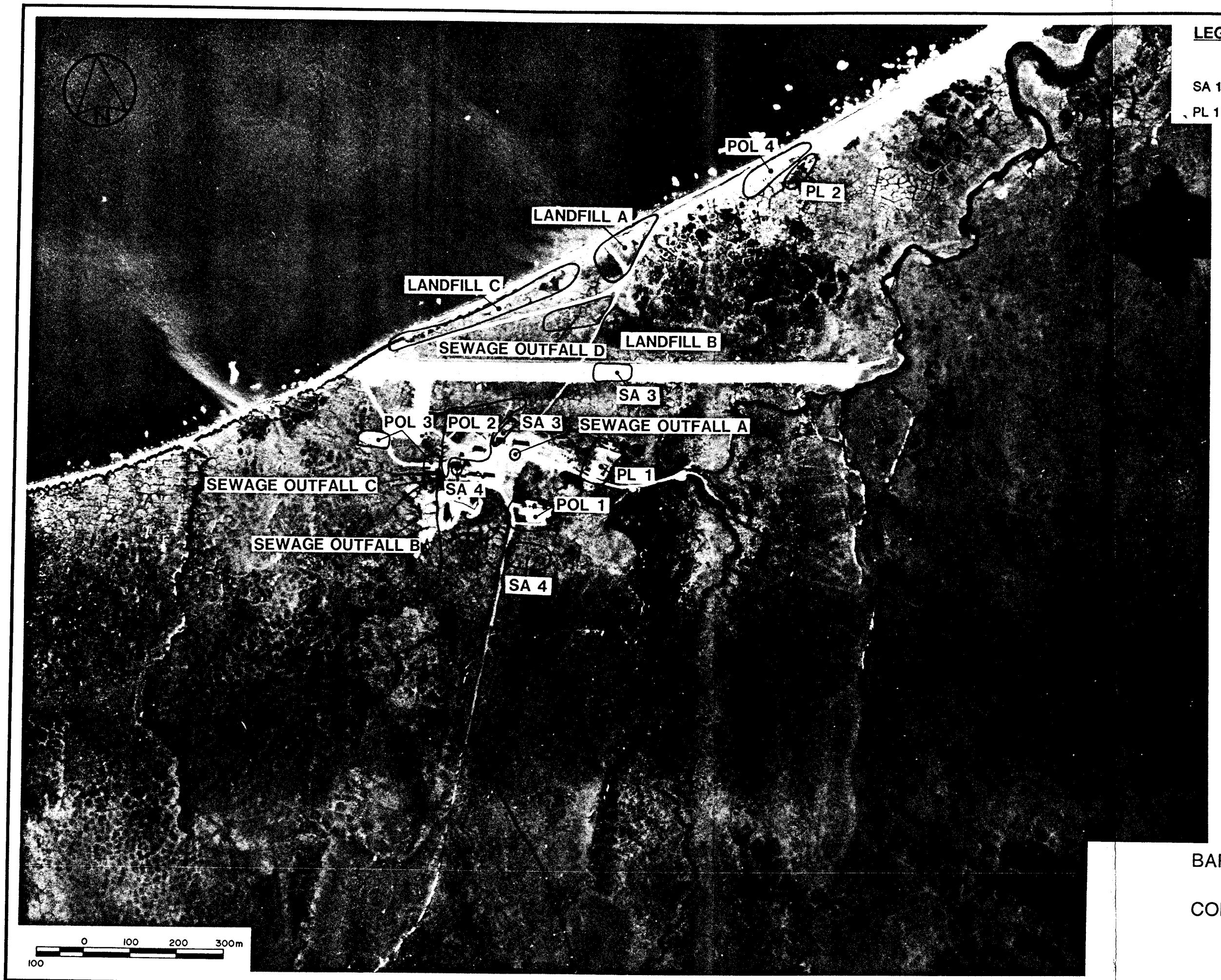
E-2.2 SUMMARY OF SIGNIFICANT CONTAMINANTS

Laboratory results and implications of these results for all contaminants found at BAR-1 were described in subsection 6.0. The examined sites were assessed and contaminant concentrations in both soil and water were compared with Canadian Federal and Provincial clean-up criteria. Laboratory data were reviewed in terms of concentrations calculated, error estimates, and minimum equipment detection limits and then compared with background values and government regulations and guidelines. The assessment criteria and rationale were previously described in Volume 2.

A summary of the significant soil contaminants found at BAR-1 is given in Table E-1. Each location shown in Figure E-1 is listed in this table if a significant soil contaminant concentration was found from the lab analysis. No significant contaminants were found at Sewage Outfall C, POL 4 or Stain Area 1, 3, or 4 locations. As may be seen, ten contaminants were found in one or more locations and the number of contaminant

TABLE E-1 SOIL DATA EVALUATION FOR EXPOSURE ASSESSMENT: BAR-1

Contaminant	Contaminant Conc. Ranges (mg/kg)				Pathway Analysis				Remarks
	Lab Data	Comparitive Data			Total Contaminated Area (m^2)	Worker Exposure Fraction	Caribou Exposure Fraction	% Area with Vegetation	
		MDL	Back-ground	Guidelines					
Lead	11-500	10	<10	50-600	16,000	-	0.006	20	2 Samples > 100 mg/kg
Arsenic	2-21	0.1	6.5	10-50	22,000	0.13	0.01	25	Hot spot in Sewage Outfall A
Mercury	0.06-0.21	0.05	0.11	0.2-10	14,000	0.12	0.01	-	Concentrations < Lower Guideline
Cadmium	1-2	1	<1	1.5-20	9,000	0.06	0.001	30	Concentrations < Lower Guideline
Selenium	0.9-1	0.5	0.8	1-10	3,000	0.02	-	-	Concentrations < Lower Guideline
TPH	47-10,000	1	<1	100-5,000	2,000	0.09	0.004	-	Isolated hot spots SA 2
PCB	0.03-0.67	0.01	<0.01	0.1-10	5000	0.06	0.001	30	Isolated low concentrations
PAH	0.09-0.11	0.02	-	1-200	3,000	0.005	-	-	Isolated low concentrations
Toluene	0.3 - 0.8	0.002	-	0.1-30	5,000	0.06	0.001	-	Found only in Landfill A and POL 1
Ethyl Benzene	0.1-0.2	0.002	-	0.1-50	5,000	0.01	-	-	Found only in Landfill A and POL 1



LEGEND

	CONTAMINANT BOUNDARY
SA 1	SPILL AREA
PL 1	PALLET AREA

BAR-1 KOMAKUK BEACH

CONTAMINANT MAP

FIGURE E.1

concentrations found to be greater than the method detection limit in any one location varied from 1 to 8. No contaminants were found generally throughout the site. PAHs included four different polynuclear aromatic hydrocarbons which were evaluated as a group.

Twelve water samples from the POLs, landfills and site ponds were analyzed and contaminants were found above MDL concentrations in seven samples. A low concentration < 17 percent of the criterion for barium was found in six contaminated samples. Three samples contained nickel and the background sample concentration was near the criterion. TPHs were found in 2 samples, one of which was near the criterion concentration. One volatile, 1, 1 C12 Ethane, was found in one sample.

E-2.3 EVALUATION FOR EXPOSURE ASSESSMENT

Contaminant data identified in Subsections E-2.1 and E-2.2 were evaluated in order to determine the requirements for each pathway analysis. A summary of soil data required for the exposure assessment is presented in Table E-2. For each contaminant, the concentration ranges from lab data and comparative data are listed. Comparative data includes the minimum lab equipment detection limit (MDL), background concentrations and cleanup guidelines, all previously described in Subsection 6.0.

The indicator chemicals used in the pathway analysis include contaminant concentration and its areal extent, and an estimated exposure for each receptor being analyzed. The total contaminated area shown in Table E-2 is the sum of individual areas from the different locations previously identified. These areas define the contaminant concentration above background levels though for the purposes of risk assessment all contaminated areas were included and the results were then interpreted for background impacts. All contaminants were only identified over relatively small areas covering a total of less than 22000 m^2.

The exposure fraction given in Table E-2 is the fraction of time a receptor may be exposed to the contaminated area based on criteria defined in Volume 2. For example, 75 percent of the workers' time is spent in the main camp area. Exposure fractions are not additive, because some contaminant areas overlap. Caribou are assumed to graze on site for 10 days a year, and in the contaminated area for a percentage of time equal to the ratio of contaminated to complete site area. The final receptor pathway analyzed was for vegetation, specifically grasses, and the percent of contaminated area covered with vegetation was estimated from field notes.

Water contaminants were identified in POL 1, Landfill C, and the background pond. Potential water pathways may affect Caribou drinking but would not affect human water supplies.

E-2.4 UNCERTAINTY ASSESSMENT

Uncertainties associated with the data evaluation were described in Volume 2 including strategies to identify all contaminant locations, the laboratory errors, and the limited background sampling. Such uncertainties specifically associated with the BAR-1 data were described in Volume 2. For those contaminants identified at concentrations above background, the areal extent of contamination was conservatively estimated to

TABLE E-2 - SUMMARY OF SOIL CONTAMINANT LOCATIONS: BAR-1

LOCATION	SIGNIFICANT SOIL CONTAMINANT (No. of sample results > MDL)									
	Arsenic	Selenium	Lead	PAH	Mercury	Cadmium	PCB	Toluene	Ethyl Benzene	TPH
Landfill B	1	1	1	1	-	-	-	-	-	-
Sewage Outfall D	2	-	-	-	2	-	1	-	-	-
Landfill A	8	6	6	3	7	2	5	1	1	-
POL 1	-	-	-	-	-	-	-	-	-	1
Pallet Line 1	1	-	-	-	-	-	-	-	-	-
POL 2	-	-	-	-	-	-	-	-	-	-
Pallet Line 3	3	1	-	-	-	-	-	-	-	-
Sewage Outfall A	1	1	1	-	1	1	1	-	-	-
Sewage Outfall B	1	-	-	-	-	1	-	-	-	-
POL 3	1	-	1	-	1	-	-	-	-	1
POL 4	1	-	-	-	-	-	-	-	-	-
Landfill C	1	-	-	-	-	-	-	-	-	-
Stain Area 2	-	-	-	-	-	-	1	-	-	1
POL 2	2	-	1	-	2	-	-	1	1	1
Pallet Line 2	1	-	-	-	1	-	-	-	-	-

ensure an over-prediction of risk, rather than an under-prediction. Barium, nickel and benzene were found only at concentrations below background. Five significant metal contaminants were found at concentrations above those noted in the background sample, however, only lead and mercury concentrations were also above the typical range of background concentrations in the region as identified in Section 3.0.

Finally, although the water sampling was limited, some contamination was found in surface ponds. Water quality may change depending on environmental changes and therefore there may be large uncertainties in assuming the samples analyzed were representative. Sediments which may affect aquatic life were not analyzed and the potential for mercury to migrate into such sediments was evaluated qualitatively as mercury is known to biotransform in sediments. Though only low concentrations of mercury were found, samples located in Landfill A are near the Beaufort Seashore.

E-3 EXPOSURE ASSESSMENT

E-3.1 EXPOSURE PATHWAYS

Exposure pathways were analyzed for each of the significant contaminants described in Subsection E-2.3. All potential pathways by which contaminants are transported from the source to the receptor were described in Volume 2 for humans, fauna, and flora. Those relevant pathways through which BAR-1 contaminants can affect people included soil and air mediums leading to dermal, ingestion, and inhalation forms of intake. The contaminant concentrations used for the air inhalation pathway were derived from soil contaminant concentrations assuming uptake of soil dust through such mechanisms as wind action. Fauna pathways were similar with the addition of water and flora ingestion. Caribou, from the Porcupine Caribou herd, as described in subsection 3.2.4, were used as surrogates for estimating fauna risks. Finally, contaminant uptakes through soil were evaluated in order to estimate flora risks. The vegetation cover in the BAR-1 site was previously described in Subsection 3.2.3 and grasses were used as surrogates for estimating flora risks.

Locations without vegetation were generally noted during the field survey and documented in the sample site descriptions given in Appendix A. It was noted for example that the area was characterized by a nearly continuous cover of vegetation except in disturbed areas. Where vegetation cover was evident the potential flora risks from contaminant uptakes through soil were estimated.

E-3.2 EXPOSURE INTAKES

Results from the pathway analysis of BAR-1 site contaminants for worker exposure are presented in Table E-3. For each relevant pathway, the contaminants are identified along with the chronic daily intakes calculated for both carcinogenic and non-carcinogenic effects. A range of values was calculated for the chronic daily intakes to correspond with a potential range of exposure input indicator chemical values previously described in Volume 2.

Chronic daily intakes were calculated for contaminants transported by the three principal pathways previously defined; namely, ingestion in soil, dermal contact with soil, and inhalation. As shown in Table E-3, intakes were estimated for each

TABLE E-3 BAR-1 SITE: WORKER EXPOSURE INTAKE RESULTS

Pathway	Contaminant	Chronic Daily Intake Range (10^{-6} mg/kg day)	
		Carcinogenic Effects	Non-carcinogenic Effects
Ingestion of Contaminant in Soil	Mercury	-	0.0005-0.002
	Lead	toxic	toxic
	TPH	-	2-9
	PCB	0.00001-0.00006	-
	Arsenic	0.007-0.03	0.05-0.2
	Selenium	-	0.00006-0.0003
	Cadmium	-	0.0009-0.004
	Ethyl Benzene	-	10^{-12}
	Toluene	-	0.00001-0.00006
	PAH		10^{-12}
Dermal Contact with Contaminant in Soil	Mercury	-	0.01-0.02
	Lead	toxic	toxic
	TPH	-	39-85
	PCB	0.0003-0.0006	-
	Arsenic	0.1-0.3	1-2
	Selenium	-	0.001-0.003
	Cadmium	-	0.02-0.04
	Ethyl Benzene	-	0.00005-0.0001
	Toluene	-	0.002-0.004
	PAH	-	0.0001-0.0002
Inhalation of Airborne Contaminant	Mercury	-	0.003-0.007
	Lead	toxic	toxic
	TPH	-	16-38
	PCB	0.0001-0.003	-
	Arsenic	0.03-0.06	0.2-0.4
	Selenium	-	0.004-0.01
	Cadmium	0.0005-0.001	0.003-0.008
	Ethyl Benzene	-	0.00006-0.008
	Toluene	-	0.00006-0.0001
	PAH	-	0.002-0.005
			0.0004-0.0009

significant contaminant found on site except for lead. Risk estimates for lead were based on cleanup rather than toxicity criteria as further described in Subsection E-4.

One primary TPH hot spot of 10,000 mg/kg in Stain Area 2 was identified. The TPH concentration is less than the criterion for potential acute exposures and therefore the hot spot was only evaluated for chronic exposures.

The exposure intake results from the fauna pathway analysis are given in Table E-4 in a similar format to that used for human exposure intake results. Additional pathways, for ingestion of water and grasses, were evaluated for caribou. As discussed in Volume 2, only non-carcinogenic intakes were evaluated due to lack of environmental toxicity data.

Toxicity criteria for plants were available for arsenic, nickel, cadmium, lead and PCBs and the corresponding concentrations in grasses covering the contaminant areas were estimated at 0.2, 1.8, 0.6, 5, and 0.02 mg/kg, respectively.

E-3.3 UNCERTAINTY ASSESSMENT

Data evaluation uncertainties included the strategies for sampling, identification of contaminant location, laboratory errors, and the limited background sampling as described previously in subsection E-2.4 Further uncertainties in the exposure assessment were generally described in Volume 2. For example the range of values used to estimate exposure for each pathway were presented. These data ranges were used as input for a sensitivity analysis of the exposure assessment in order to determine the corresponding impacts on chronic daily intakes.

Exposure of workers to the different contaminant areas was based on a conservative distribution of a worker's time at each area as described in Volume 2. Native exposures were considered as a sensitivity analysis based on additional pathways such as caribou and fish intake. Fauna and flora exposures on site were also evaluated. For each potential receptor the reasonable maximum exposure to a contaminant transported over all principal pathways was estimated. Results could therefore be used directly in the risk assessment where risks associated with a particular contaminant are summed over all pathways through which the contaminant may be exposed to the receptor.

The higher values for the sensitivity results given previously in Table E-3 were subsequently used for the risk assessment in order to represent a maximum exposure level. Such levels were then evaluated to determine the reasonable maximum exposure for one particular receptor given each of the potential pathways for a particular contaminant.

The extent of contaminant migration was based on analysis of limited data from the field survey. In some locations the data was used to find closure on the areal extend of a contaminant however closure was often qualitatively estimated through assessment of the geology and hydrology data. The resulting estimate of contaminant areal extent was conservative in order to over predict the contamination area and therefore over estimate the potential risk. Nickel, barium and benzene were found at concentrations less than that found in the background sample and therefore were not included in the risk assessment. Other contaminants were found at concentrations above and below

background. Due to the uncertainty associated with one background sample, all exposures for these contaminants were included in the risk assessment. Results were then interpreted to account for the portion of the total risk which is associated with background concentrations. In general all contaminant concentrations were near the lower level guidelines except for isolated lead and TPH samples.

E-4 TOXICITY ASSESSMENT

E-4.1 SITE CONTAMINANT TOXICITIES

The ten site contaminants identified from the exposure assessment as potential risk concerns were evaluated for both carcinogenic and non-carcinogenic human toxicity. Reference toxicity data including the associated uncertainties were collated for all contaminants identified in all 21 DEW Station Sites and presented in Volume 2, Subsection 6.2. The carcinogen slope factors and non-carcinogen reference dose toxicity measures from this reference are presented in Table E-5 for each of the contaminants. A carcinogenic risk slope factor is unverified at present for lead. The U.S. EPA considers the contaminants for which no slope factors are given as less likely carcinogens. Chronic reference doses were available for all contaminants except PCB and lead. PCBs are considered carcinogens and due to the present lack of knowledge about lead, its reference dose was based on cleanup guidelines as recommended by the U.S. EPA.

The environmental risk assessment was based on a review of the limited toxicity data to determine safe levels of contaminant intake or ambient concentrations for caribou, and grasses. Safe intake values were available for seven contaminants based on exposure to dairy cows, and plants and these values were assumed representative for caribou, and grasses as given in Table E-5.

E-4.1 UNCERTAINTY ASSESSMENT

Uncertainties associated with the carcinogenic and non-carcinogenic human toxicity data and the environmental toxicity data were generally described in Volume 2. Specific impacts for the BAR-1 contaminants are summarized in this subsection.

Arsenic is classified by the U.S. EPA as a known human carcinogen. PCBs, lead and nickel are classified as probable carcinogens based on animal data while cadmium is a probable carcinogen based on limited human data. The chronic reference doses were based on varying uncertainty factors depending on the contaminant as described in Volume 2. The largest uncertainty factor of 3000 was associated with Pyrene, a PAH. Pyrene was used as a surrogate for all PAHs found on site because it is associated with a conservative reference dose. The TPH chronic reference dose was based on an acceptable daily intake value for petroleum distillates. TPH is a mixture of many components whereas toxicity values are estimated for specific components and therefore an acceptable daily intake for a mixture of petroleum distillates was used as a generic reference.

TABLE E-4 BAR-1 SITE: CARIBOU EXPOSURE INTAKE RESULTS

Pathway	Contaminant	Chronic Daily Intake (10^{-6} mg/kg day)
		Non-carcinogenic Effects
Ingestion of Contaminant in Soil	Mercury	0.0004
	Nickel	0.1
	Lead	0.2
	TPH	2
	PCB	0.0001
	Arsenic	0.02
	Cadmium	0.0004
	Toluene	0.0003
	PAH	0.00005
Inhalation of Airborne Contaminant	Mercury	0.0005
	Nickel	0.1
	Lead	0.3
	TPH	2
	PCB	0.0002
	Arsenic	0.03
	Cadmium	0.0005
	Toluene	0.0004
	PAH	0.00006
Dermal Contact with Contaminant in Soil	Mercury	0.02
	Nickel	6
	Lead	13
	TPH	120
	PCB	0.007
	Arsenic	1
	Cadmium	0.02
	Toluene	0.02
	PAH	0.003
Ingestion of Contaminated Grasses	Mercury	0.2
	Nickel	3
	Lead	4.5
	TPH	7600
	PCB	0.004
	Arsenic	0.4
	Cadmium	0.1
	Toluene	0.02
	PAH	0.05
Ingestion of Contaminant in Water	Nickel	0.2
	TPH	48
	PAH	0.02

TABLE E-5 BAR-1 SITE: CONTAMINANT TOXICITIES

Site Contaminant	Slope Factor Risk Per Unit Dose $(mg/kg/day)^{-1}$	Chronic Reference Dose (mg/kg/day)	Caribou Safe Dose (mg/kg day)	Grass Safe Concentration (mg/kg)
Mercury	-	8×10^{-5}	1×10^{-3}	-
Lead	toxic	toxic	1×10^{-2}	7
TPH	-	1×10^{-1}	70	-
PCB	7.7	-	2×10^{-2}	3
Arsenic	15	4×10^{-4}	5×10^{-1}	7×10^{-1}
Cadmium	6.1	5×10^{-4}	7×10^{-2}	8×10^{-2}
Selenium	-	3×10^{-3}	-	-
Ethyl Benzene	-	1×10^{-1}	-	-
PAH (Pyrene)	-	3×10^{-2}	-	-
Toluene	-	2×10^{-1}	3×10^{-3}	-

TABLE E-6 BAR-1 SITE: CARCINOGENIC RISK ESTIMATES

Pathway	Contaminant	Chronic Daily Intake (10^{-6} mg/kg day)	Slope Factor Risk per Unit Dose $(mg/kg\ day)^{-1}$	Risk
Ingestion of Soil	PCB Arsenic	0.00006 0.03	7.7 15	5×10^{-10} 5×10^{-7}
TOTAL				5×10^{-7}
Dermal Contact of Soil	PCB Arsenic	0.0006 0.03	7.7 15	5×10^{-9} 5×10^{-6}
TOTAL				5×10^{-6}
Inhalation of Airborne Contaminants	PCB Arsenic Cadmium	0.003 0.06 0.001	7.7 15 6.1	2×10^{-8} $9 \times 10^{-7}2$ 6×10^{-9}
TOTAL				9×10^{-7}
BAR-1 Site Total Carcinogen Risk				6×10^{-6}

E-5 RISK CHARACTERIZATION

Results from the BAR-1 site exposure assessment presented in Subsection E-3 and toxicity assessment presented in Subsection E-4 were integrated in order to characterize the site-specific risk. As described in Volume 2, Section 3.0, the methods for characterizing non-carcinogenic risk are different from those used for carcinogenic risk. The quantification of BAR-1 site risk has therefore been segregated according to these categories as presented in the following subsections.

E-5.1 CARCINOGENIC RISK

Worker carcinogenic risks were estimated for contaminant intakes from each of the relevant pathways identified in the exposure assessment. The chronic daily intake estimated from the exposure assessment was multiplied by the slope factor identified in the toxicity assessment in order to quantify the carcinogenic risk. This risk is defined as the incremental cancer risk over the lifetime of a worker who is exposed at the BAR-1 site.

Lead is considered a potential carcinogen by the U.S. EPA however a slope factor has not yet been determined and therefore the Quebec Soil Contamination Guidelines for cleanup of lead were used as recommended to characterize the risk. Lead concentrations in soils varied from 11-500 mg/kg for different locations and these values were compared to the guideline of 600 mg/kg for implementing corrective measures or restricting land use. Based on these guidelines, the risks from lead were generally considered small, however, the hot spot in Landfill B was near the criterion.

Results have been summarized in Table E-6. and as may be seen the total carcinogenic risk was estimated at $\leq 6 \times 10^{-6}$. Based on the U.S. EPA site remediation goal of reducing cancer risks below 10^{-4}, the BAR-1 carcinogenic risk is less than criteria. The principal contributor was arsenic intake from the dermal contact of soil pathway as shown in the distribution of risk given in Figure E-2. As previously shown, arsenic concentrations were less than typical background values in the region and therefore the incremental arsenic risk above background would be much less than that used in this assessment.

E-5.2 NON-CARCINOGENIC RISK

The worker non-carcinogenic risk of the BAR-1 site was quantified based on a hazard index previously described in Volume 2, Subsection 3.0. For each contaminant in each pathway identified from the exposure assessment, the chronic daily intake was divided by the comparative reference dose determined from the toxicity assessment. This hazard quotient calculated for each contaminant was summed in order to calculate a pathway total and each pathway total was summed in order to calculate the total exposure hazard index. Should the hazard index exceed unity (1.0) then the contaminant exposure level exceeds the reference and there may be concern for potential non-cancer effects.

The BAR-1 site worker non-carcinogenic hazard index results are summarized in Table E-7. As may be seen dermal contact of soil contributed the largest amount to the risk index. Arsenic was the most significant contaminant as shown in the distribution of hazard quotients given in Figure E-3. The hazard index totals 9×10^{-3}

TABLE E-7 BAR-1 SITE: NON-CARCINOGENIC HAZARD INDEX

Pathway	Contaminant	Chronic Daily Intake (10^{-6} mg/kg day)	Chronic Reference Dose (10^{-6} mg/kg day)	Hazard Quotient
Ingestion of Soil	Mercury	0.002	80	3×10^{-5}
	TPH	9	100,000	9×10^{-5}
	Arsenic	0.2	400	5×10^{-4}
	Selenium	0.0003	3,000	1×10^{-7}
	Cadmium	0.004	500	8×10^{-6}
	Ethyl Benzene	-	100,000	-
	Toluene	0.00006	200,000	-
	PAH	-	3,000	-
TOTAL				6×10^{-4}
Dermal Contact of Soil	Mercury	0.02	80	3×10^{-4}
	TPH	85	100,000	9×10^{-4}
	Arsenic	2	400	5×10^{-3}
	Selenium	0.003	3,000	1×10^{-6}
	Cadmium	0.04	500	8×10^{-5}
	Ethyl Benzene	0.0001	100,000	1×10^{-9}
	Toluene	0.004	200,000	2×10^{-8}
	PAH	0.0002	3,000	7×10^{-8}
TOTAL				6×10^{-3}
Inhalation	Mercury	0.007	80	9×10^{-5}
	TPH	38	100,000	4×10^{-4}
	Arsenic	0.4	400	1×10^{-3}
	Selenium	0.01	3,000	3×10^{-6}
	Cadmium	0.008	500	2×10^{-6}
	Ethyl Benzene	0.0001	100,000	1×10^{-9}
	Toluene	0.05	200,000	3×10^{-7}
	PAH	0.0009	3,000	3×10^{-7}
TOTAL				2×10^{-3}
BAR-1 Site Total Exposure Hazard Index				9×10^{-3}

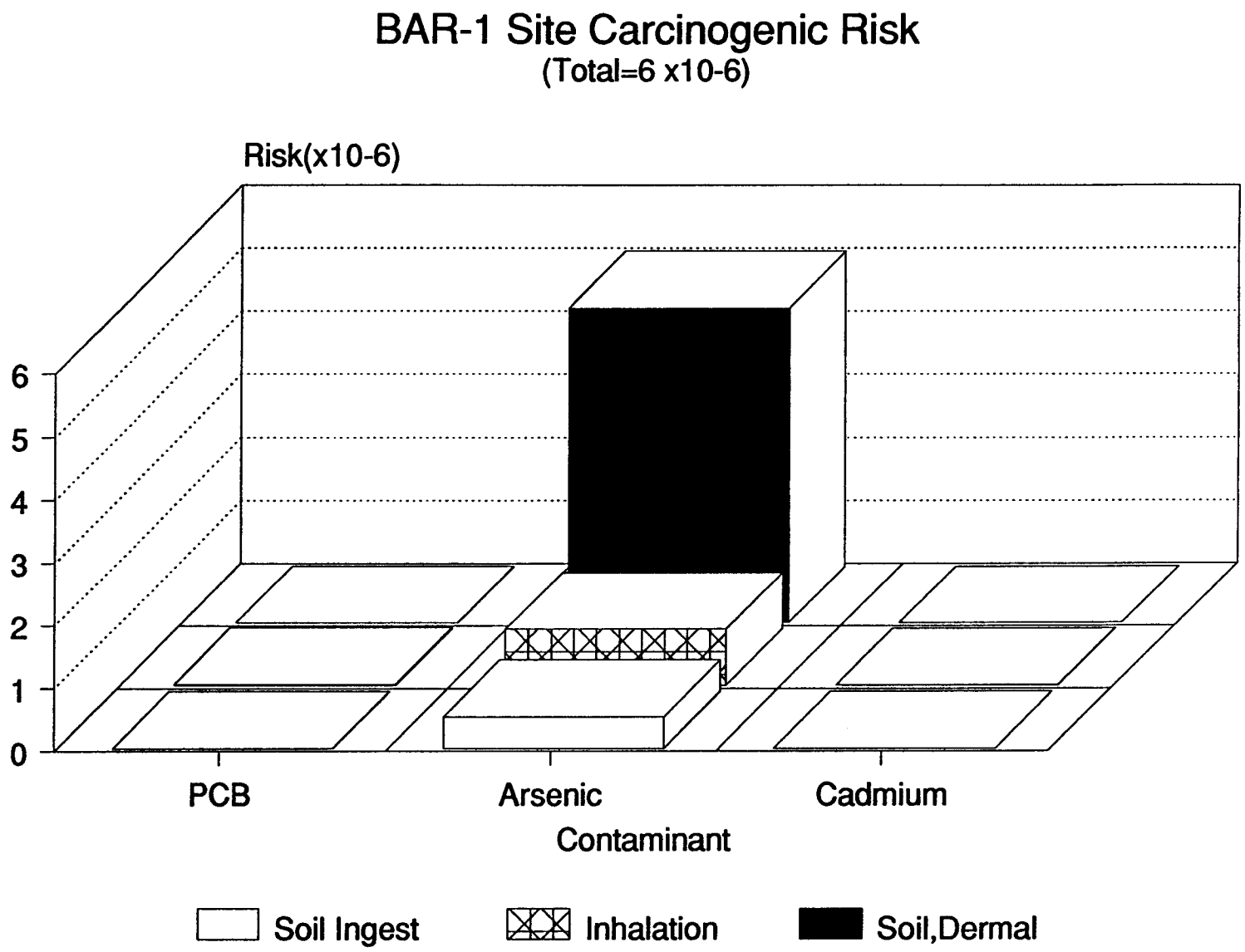

BAR-1 Site Carcinogenic Risk
(Total=6 x10-6)
Risk(x10-6)
6
5
4
3
2
1
0
PCB
Arsenic
Cadmium
Contaminant
Soil Ingest
Inhalation
Soil,Dermal

FIGURE E2

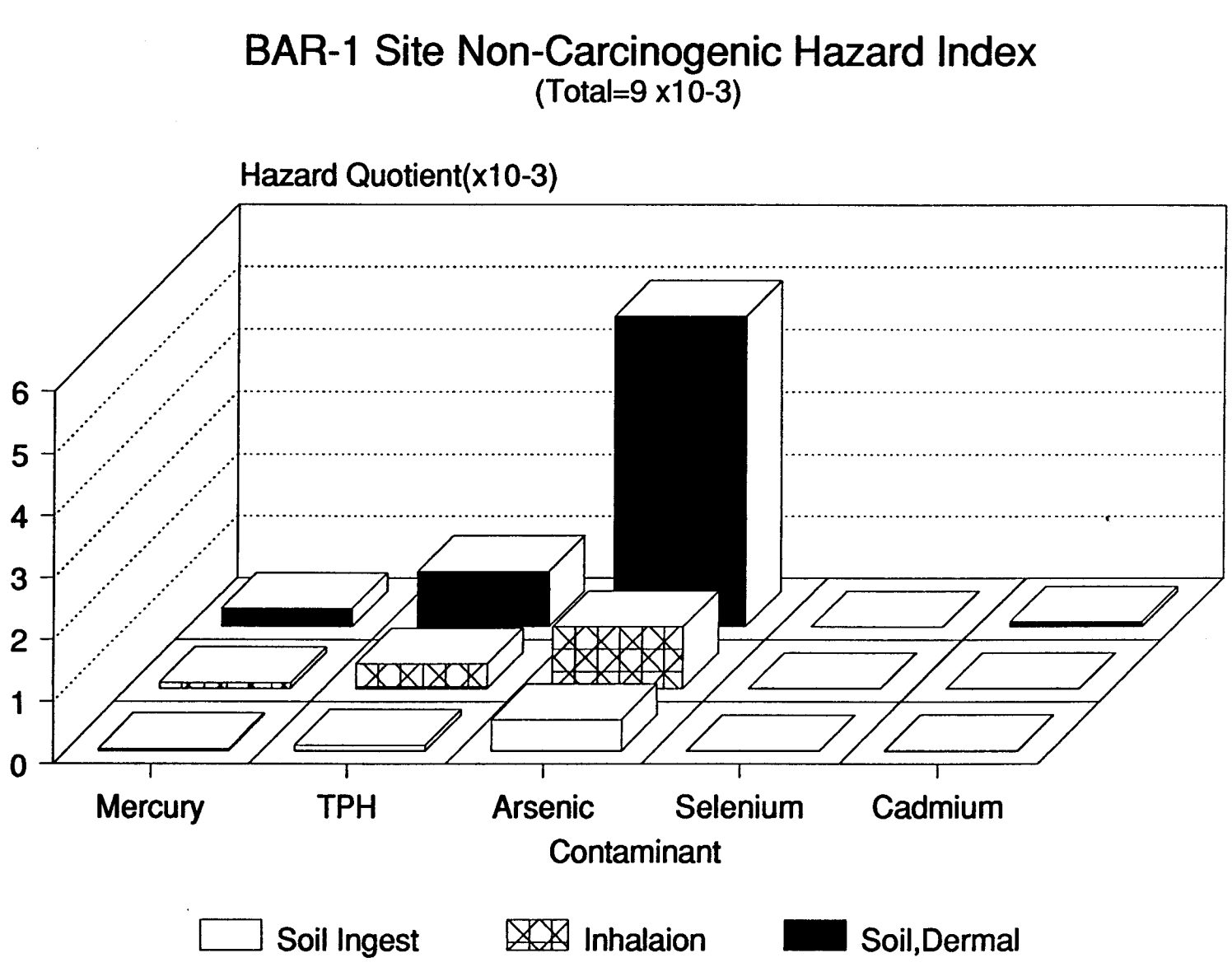

BAR-1 Site Non-Carcinogenic Hazard Index
(Total=9 x10-3)
Hazard Quotient(x10-3)
6
5
4
3
2
1
0
Mercury
TPH
Arsenic
Selenium
Cadmium
Contaminant
Soil Ingest
Inhalaion
Soil,Dermal

FIGURE E3

which is much less than the unity criteria and therefore non-carcinogenic risk is considered small.

Acute exposure estimates for the one TPH hot spot were compared to acute safe levels in a method analogous to that for chronic exposures. The TPH acute hazard quotient was less than the unity criterion, however the implications are addressed in the cleanup recommendations.

The estimated contaminant intakes for caribou and grasses were compared to estimated safe values to characterize risk in a method similar to that used for human non-carcinogenic risk assessment. The sum of all hazard quotients in caribou was significantly smaller than the unity criterion and therefore caribou risks are considered small. Likewise, the hazard quotients for PCBs, arsenic, and nickel in grasses were less than unity. The cadmium hazard quotient for grasses was above unity and therefore there may be potential risks to plant health in the locations identified in Subsection E-2.2. The estimated intakes for the remaining contaminants were small, however, toxicity information was not available and therefore risks could not be quantified.

E-5.3 UNCERTAINTY ASSESSMENT

The uncertainties inherent in the risk assessment were documented in each of the data evaluation, exposure assessment, and toxicity assessment sub-tasks. Conservative assumptions were used to deal with the combination of uncertainties in order to ensure the final results were represented an over estimation of the risks. Quantitative risk estimates have been presented for both carcinogenic and non-carcinogenic hazards however the qualitative assessments and evaluations of uncertainties form an integral part of the results.

The carcinogenic risks were quantified for three contaminants and qualitatively assessed for lead. Results were based on conservative assumptions and therefore actual risks are considered to be lower than those presented in this report. The carcinogenic risk is defined as a probability of developing cancer, not of dying from cancer and the U.S. EPA weight-of-evidence classification for each contaminant varied as previously described. The weight of carcinogenic evidence for lead is uncertain at this time.

The total site non-carcinogenic hazard index was developed by summing the hazard quotients from each contaminant in each pathway. As previously discussed the uncertainties associated with both the exposure assessment and toxicity assessment vary for each contaminant and the uncertainties associated with summing hazard quotients also depend on the contaminant mixture among other factors. As a first order approximation the hazard quotient was based on conservative assumptions and therefore presents an over estimation of the potential site risk. The BAR-1 hazard index of 9×10^{-3} is much less than the unity criterion and represents a risk for which even sensitive populations are unlikely to experience adverse health effects.

Although there were uncertainties due to the limited number of water analyses carried out, the results were used to estimate incremental risk to caribou through water pathways.

Risks to a native camping on site and living from the land as described in Volume 2 were not significantly different from those estimated for the worker. Conclusions for cleanup recommendations presented in Section E-6 were therefore applicable to either exposure scenario.

The uncertainty associated with the background sampling was discussed previously, and exposures to arsenic below background concentrations were the greatest contributors to risk. As the estimated risk levels were small, the assessment of incremental risk above background was not important in developing cleanup recommendations.