contained measurable levels of PCBs. The main problem with the water samples from the wells is that they are not always clear and some are very cloudy. Clearly, given the level of PCBs in the nearby soil, any soil contamination in the water is likely to give measurable PCB levels. The water cannot be filtered since this process would remove the PCBs from the water. In the laboratory, the samples were allowed to stand for at least 24 hours and then the water to be analysed was carefully decanted. Results for well 1A which is above the landfill, all gave values of < 0.02 ppb. For wells MW 2 and MW 3A only one sample from each was found to give measurable levels and only at 0.03 ppb. For the wells MW 4, MW 5B and MW 6, one high result of 0.54, 0.16 and 0.55 ppb respectively was found in each. The six water samples collected from MW 5A showed <0.02 ppb in three of the samples but 0.33, 0.39 and 0.05 ppb in the other three. The monitoring wells will again be sampled several times during the 2005 season. It is hoped that wells will have stabilized and that less particulate and colloidal material will be present. The PCB results are particularly important since these monitoring wells are to be used to confirm that no PCBs are escaping from the Tier II landfill over the period of many years.

c) TPH

TPH was detected both as lubricating oil and as fuel oil in some of the soil samples. Of the fifteen soil samples analysed, only five were found to contain TPH above the 40 ppm level. Two contained lubricating oil (820 and 240 ppm) while three contained fuel oil (160, 80 and 85 ppm). Two of these samples were from MW 1A which is above the landfill. Clearly this site has been contaminated with various fuel and lubricating oils and levels of these can be found in soils near to the summit. Water samples obtained from the monitoring wells contained low levels of TPH. TPH was only detected in 7 of the 37 samples analysed. The fuel in these samples was found to be a mixture of gasoline and diesel fuel; in 2003, gasoline was found in MW3. These results are in some ways surprising given that gasoline was not detected in the soil samples. A likely explanation is that there is a slow movement of the petroleum products in the sub-surface water layer and the water samples collected represent the contaminant front where the lighter hydrocarbons have moved faster than the heavier, larger molecules.

The hydrocarbon contamination in the monitoring wells as well as the soil samples can be expected to vary over the monitoring period. Dissolved hydrocarbons and solutes in groundwater will be excluded during the freezing process, resulting in a redistribution of contamination in the subsurface. During thawing, the soluble components will "redissolve" in the groundwater, as a function of time and temperature. The cyclic redistribution of hydrocarbons and solutes complicates the interpretation of groundwater and soil monitoring results, as it is difficult to establish baseline concentrations. If hydrocarbon levels rise over time in the water from the monitoring wells, it will be difficult to determine whether their source is the landfill or the surrounding soil. The removal of the TPH contaminated soil from below the landfill will have significantly reduced this as a source of TPH. It is hoped that the ground water flow in the area will be better understood by continuing to obtain monitoring well data and that any changes in TPH levels can be attributed to sources external to the Tier II landfill.

E. Airstrip Landfill Monitoring Program

The remediation of the airstrip dump was completed in 2003 and three monitoring well sites partially developed. Only soil was collected last year from these three locations. The three monitoring wells MW 11, MW 12 and MW 13 were fully installed this year and a fourth, MW 14 added. Their positions relative to the landfill are shown on Map III-3. Results for the water samples from the 4 wells are given in Table III-7. All are very low especially when compared to the water results for the Tier II landfill. No PCBs or TPH were detected and only copper, nickel and zinc were detected at low concentrations. The soil sample locations were slightly different than in 2003. As a result the analytical results are different. For the eight elements of the DEW Line Cleanup criteria, results were similar to those obtained in 2003. However, no TPH was detected this year in the 4 soil samples and only trace amounts of PCBs. This is likely due to the fact that the soil samples were taken from outside of the narrow drainage channels this year. This will be further investigated in 2005.

Map III-3: Monitoring Well and Soil Monitoring Sample Locations at the Airstrip Landfill

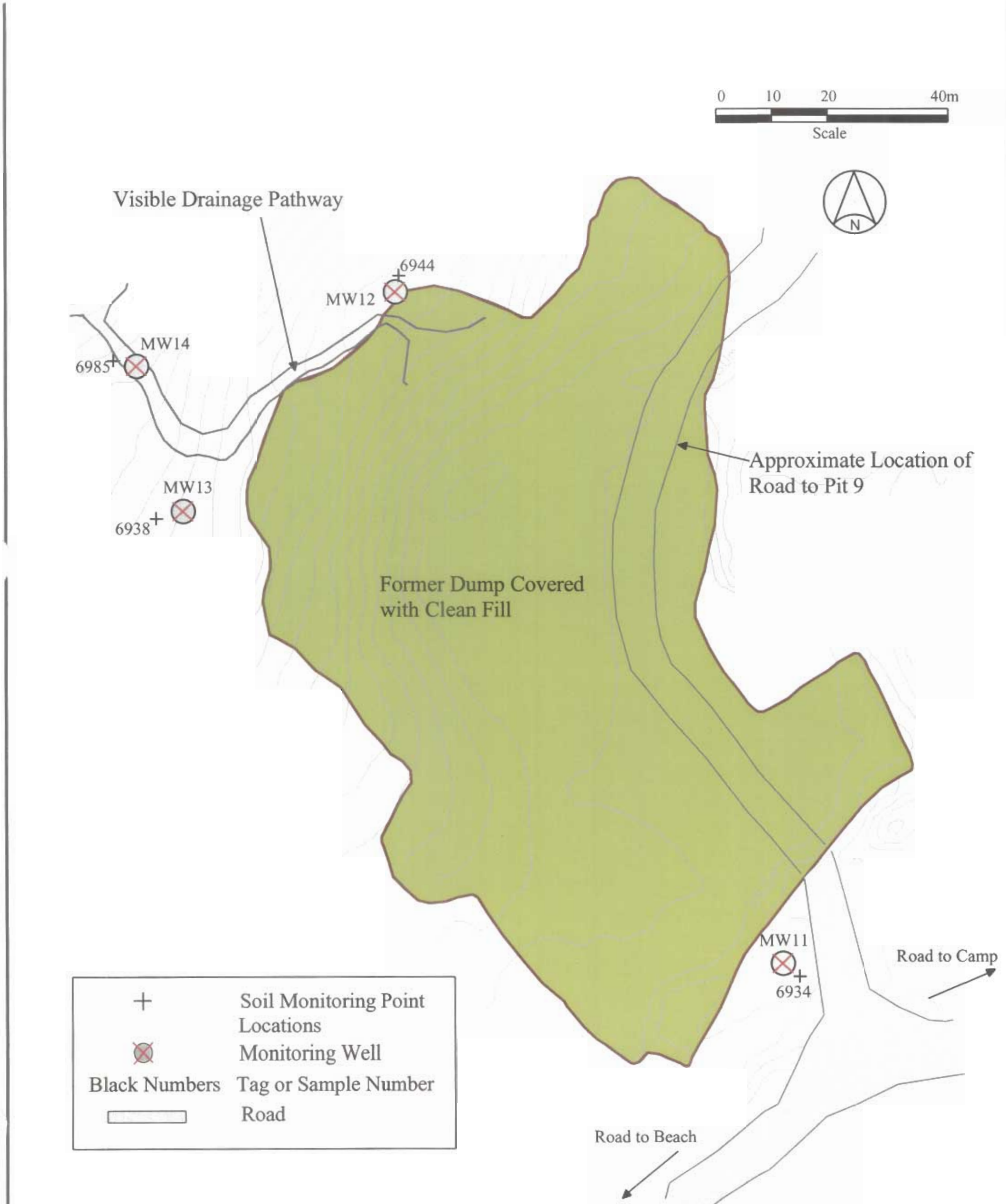


Table III-7: Results of Analyses of Water Samples Taken From the Monitoring Wells at the Airstrip Dump

Location	Units	MW 11	MW 12	MW 13	MW 14
Sample Prefix RI04-		037W	033W	034W	036W
Arsenic	ppm	<0.003	<0.003	<0.003	<0.003
Cadmium	ppm	<0.001	<0.001	<0.001	<0.001
Cobalt	ppm	<0.003	<0.003	<0.003	<0.003
Chromium	ppm	<0.005	<0.005	<0.005	<0.005
Copper	ppm	0.005	<0.005	0.005	<0.005
Nickel	ppm	0.012	<0.005	0.014	<0.005
Lead	ppm	<0.010	<0.010	<0.010	<0.010
Zinc	ppm	0.012	<0.010	<0.010	<0.010
PCBs	ppb	-	<0.02	<0.02	<0.02
TPH (total)	ppm	<1.0	<1.0	<1.0	<1.0

Table III-8: Results of Analyses of Soil Samples Taken From Close to the Monitoring Wells at the Airstrip Dump

Location	Units	MW 11	MW 12	MW 13	MW 14
Sample Prefix RI04-		201/517	202/343	203/525	206/515
Arsenic	ppm	<1.0	<1.0	<1.0	<1.0
Cadmium	ppm	<1.0	<1.0	<1.0	<1.0
Cobalt	ppm	23	21	24	22
Chromium	ppm	53	51	56	46
Copper	ppm	92	82	91	82
Nickel	ppm	93	109	132	100
Lead	ppm	114	<10	<10	<10
Zinc	ppm	108	109	156	75
PCBs	ppb	<3	4	5	<3
TPH (fuel)	ppm	<40	<40	<40	<40
TPH (lube)	ppm	<40	<40	<40	<40

F. Monitoring of 1994 Barrier Performance

In 1994, barriers were constructed across the drainage pathways where PCB-contaminated soils were found to be present. These pathways comprise the large contaminated area originating at the S1/S4 building complex and extending through the S1/S4 valley to the S1/S4 beach area and the smaller leachate pathway from the furniture dump. A soil monitoring system was instituted at three of the six barriers in 1994 in order to assess their effectiveness. This consisted of a clean cell and a series of soil monitoring points on either side of the barrier. The clean cells were installed on the lower side of the barrier, using PCB-free sand and sphagsorb. As a result, any PCBs passing through the barriers could be detected. Soil monitoring points were positioned on either side of the barriers so that levels of PCBs could be monitored and compared to levels found in the previous years. The full details of barrier construction, clean cells and monitoring points are described elsewhere[1]. The barriers have been inspected and monitored each year since their installation.

The upper furniture dump barrier was removed in 2000 during the excavation of the furniture dump and its drainage pathway; the lower barrier was left in place. The lower barrier was not inspected or tested by ASU in 2004 as a new barrier was installed adjacent to it in 2003 (see chapter VI).

Both barriers in the S1/S4 valley were excavated this year as described in Chapter II. Prior to this the soil points below the northern barrier were sampled. Results obtained are given in Table III-9 and shown on Map III-4. The results fit the pattern shown in previous years.

Table III-9: PCB Concentrations in Soil at the Barrier Monitoring Points

Location	Sample	PCB Concentration (ppm)
S1/S4 Valley – below northern barrier	RI04-BES5	0.8
S1/S4 Valley – below northern barrier	RI04-BES6	6.1
S1/S4 Valley – below northern barrier	RI04-BES7	3.7
S1/S4 Valley – below northern barrier	RI04-BES8	4.1

[1] Analytical Services Unit (1995) Environmental Study of a Military Installation at Resolution Island, BAF-5: Volume Two. Prepared for Indian and Northern Affairs Canada.

The upper barrier at the S1/S4 beach area was excavated this year as described in chapter II. The lower barrier was inspected and found to be in good condition. It will be removed next year and be replaced by a permanent new barrier similar to that constructed at the end of the S1/S4 valley.

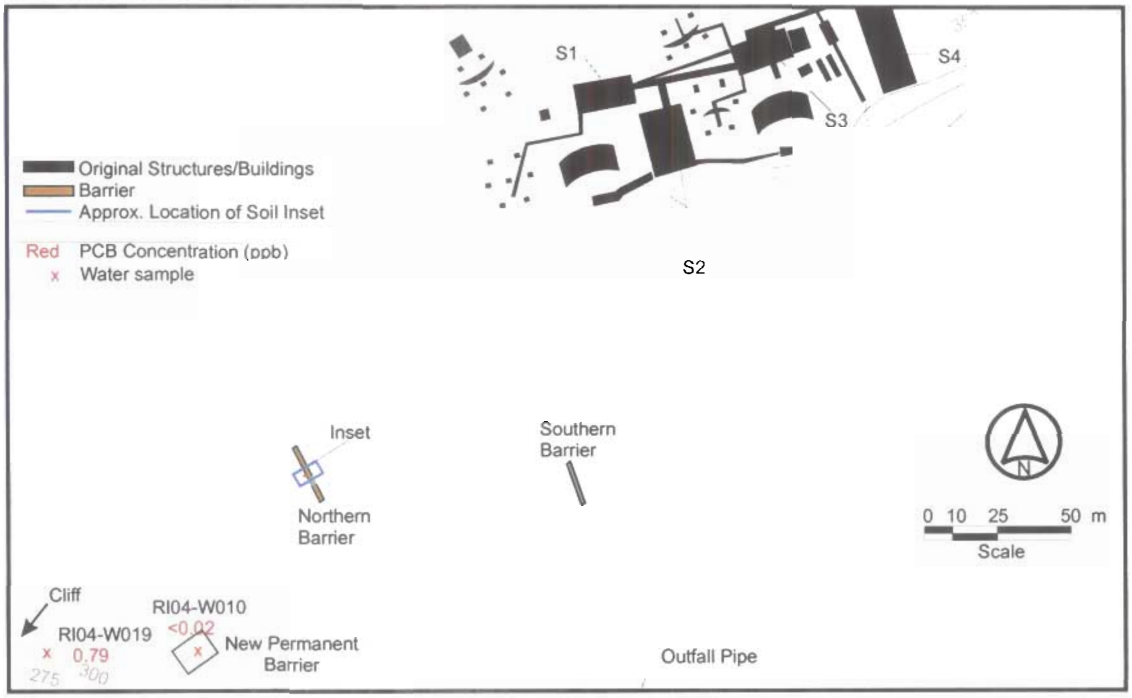
Five water samples were collected from the S1/S4 valley and beach areas this year and analysed for PCBs. Results are given in Table III-10. RI04-019W taken from the top of the cliff contained 0.79 ppb PCBs. This high concentration is likely due to the excavation of Tier II soil nearby. RI04-010W was collected from the funnel of the new barrier when this was full and the low value of 0.07 ppb represents a diluted relatively stagnant sample. The remaining three samples were taken at the S1/S4 beach area and show very low levels in water above the excavation area and a non detectable level as the water drains into the sea.

Table III-10: PCB Concentrations in Water Taken in the S1/S4 Drainage Pathway

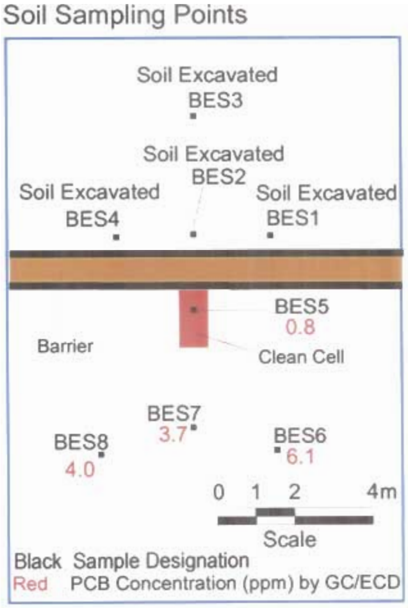
Location	Sample	PCB Concentration (ppb)
S1/S4 valley by cliff	RI04-019W	0.79
From the funnel of new permanent barrier	RI04-10W	0.07
S1/S4 beach on cliff above excavation area	RI04-011W	0.04
S1/S4 beach on cliff above excavation area	RI04-012W	0.03
Beach as drainage enters sea	RI04-026W	<0.02

Map III-4: Sampling Points and PCB Concentrations at the Northern Barrier in the S1/S4 Valley

Barriers in the S1/S4 Valley



Soil Sampling Points



G. Barrels and Their Contents

Eight samples of liquid materials from barrels were analysed early this year. The first two barrels in Table III-11 were filled by draining the generators in S4 prior to its demolition. The samples H012 to H014 came from near the camp generator. The remaining three were from three barrels near the incinerator location. The contents of six of the eight were suitable for on site incineration (Table III-12).

Table III-11: Description of Barrels and Description and Identity of Barrel Contents

Number	Amount	Description of Contents	Identity of Barrel Contents
RI04-H009	full	2 phases: top brown liquid, bottom clear liquid with brown sediment 1:2	top: fuel oil: lubricating oil and grease 1:6 bottom: water
RI04-H010	full	2 phases: top brown oil, bottom clear liquid 2:1	top: fuel oil: lubricating oil and grease 1:6 bottom: water
RI04-H012	¾ full	2 phases 1:4 top orange-tinted liquid, bottom clear liquid	top: fuel oil ; bottom: water
RI04-H013	¼ full	2 phases 4:1 top clear liquid, bottom clear liquid	top: fuel oil ; bottom: water
RI04-H014	7/8 full	Clear liquid	fuel oil
RI04-H016	-	2 phases 1:1 top brown liquid, bottom brown liquid	top: lubricating oil and grease; bottom: water
RI04-H018	-	2 phases 1:1 top brown liquid, bottom clear liquid	top: gasoline; bottom: water
RI04-H023	full	white solid in liquid base	white solid in an organic solvent primarily toluene, white sample contained toluene 28 %

Table III-12: PCB, Chlorine, and Metal Concentrations of Barrel Contents

Barrel #	PCBs	Chlorine	Chromium	Lead	Cadmium	Disposal Option
	ppm[a]					
RI04-H009	<2.0	<1000	<10	<100	<2.0	incinerate
RI04-H010	<2.0	<1000	<10	<100	<2.0	incinerate
RI04-H012	<2.0	<1000	<10	<100	<2.0	incinerate
RI04-H013	<2.0	<1000	<10	<100	<2.0	incinerate
RI04-H014	<2.0	<1000	<10	<100	<2.0	incinerate
RI04-H016	<2.0	<1000	<10	<100	<2.0	incinerate
RI04-H018	<2.0	<1000	<10	2300	<2.0	ship south
RI04-H023	<2.0	92400	<10	480	<2.0	ship south

[a] Top phase where there are two phases present.

H. Air Sampling for PCBs and Chlorobenzenes

The selection of appropriate personal protective equipment for respiration when working with PCB contaminated materials at the site is important. In the Resolution Island Health and Safety Plan (HASP), Appendix 5, a dust level of 4.4 mg/m^3 is suggested as a trigger for when a dust mask should be worn. This value is calculated using a value of 10 mg/m^3 for an 8 hour day relating to particulates not otherwise classified. A direct reading dust meter is available for use at the site. In practice dust masks must be worn in dusty conditions or at any time workers may wish to do so. Half-face respirators equipped with filters and organic vapour cartridges are worn whenever the odour of chlorobenzenes is encountered. Regulations with respect to PCBs are given in the HASP and these are in the range 0.5 to 2.0 mg/m^3, that is less than the 4.4 mg/m^3 for dust suppression. However, it should also be noted that NIOSH has set a recommended exposure limit of 0.001 mg/m^3 or about one thousandth of the NWT occupational exposure limits. The situation with PCBs is also complicated by the fact that they were manufactured and sold as mixtures, often referred to as Askarels, which contained not only PCBs but also chlorobenzenes. These more volatile compounds are responsible for the characteristic PCB odour. Regulations respecting Occupational Safety and Health made under Part II of the Canada Labour Code give a ceiling value of 5 ppm or 40 mg/m^3 for chlorobenzenes: NIOSH has the same standard for their time weighted average (TWA) concentration for a 10 hour working day.

In order to determine the levels of PCBs in the air, samples were collected using NIOSH method 5503 with an air pump and ORBO-60 adsorption tubes. The pump was run at a rate of about 170 mL/min for about 3-4 hours. Twenty four air samples have been taken during the last four field seasons and all have given results below the detection limit and NIOSH level of 0.001 mg/m^3. Three samples were collected this year from the locations specified in Table III-13. Analysis of these samples all gave results of < 0.001 mg/m^3.

In order to determine the level of chlorobenzenes in the air, samples were collected and analysed using NIOSH method 5517. The XAD-2 tubes and filters were extracted with hexane and the extracts run on a gas chromatograph with a mass spectrometric detector (GC/MS). This year four samples were collected from various locations where CEPA soils were being processed. Samples were analysed for all di-, tri-, tetra-, penta- and hexa- chlorobenzenes.

Results are presented in Tables III-14 and III-15. Sample RI04-159 was from inside B2 while the stored soil was still present, RI04-651 was on the Tier II contaminated road behind the laboratory, and RI04-742 and RI04-744 were taken from beside the screener. In previous years only tri- and tetra- chlorobenzenes were detected. This year no chlorobenzenes were detected. The PCB contaminated soil from the S1/S4 beach area is known to have a much lower chlorobenzene content than soil from the S1/S4 valley. This is likely due to evaporation of the chlorobenzenes as they move down the valley and ultimately cascade over the 300 m cliffs.

Table III-13: PCB Concentrations in Air Samples Collected at Resolution Island

Sample	Location	PCB per tube (μg)	PCB Concentration. in air (mg/m^3)
RI04-198	Outside building B2, on the N side close to filling of conical containers	<0.05	<0.001
RI04-735	10 m from screener in operation on soils from the S1/S4 beach area	<0.05	<0.001
RI04-748	10 m from screener on windy dry day during operation	<0.05	<0.001

Table III-14: Chlorobenzene Compounds Found in Air Samples Collected at Resolution Island (ug per tube plus filter)

Sample	RI04-159	RI04-651	RI04-742	RI04-744
1,2- dichlorobenzene	<0.01	<0.01	<0.01	<0.01
1,3- dichlorobenzene	<0.01	<0.01	<0.01	<0.01
1,4- dichlorobenzene	<0.01	<0.01	<0.01	<0.01
1,2,3 trichlorobenzene	<0.01	<0.01	<0.01	<0.01
1,2,4 trichlorobenzene	<0.01	<0.01	<0.01	<0.01
1235, 1245- tetra chlorobenzene	<0.01	<0.01	<0.01	<0.01
1,2,3,4 tetrachlorobenzene	<0.01	<0.01	<0.01	<0.01
pentachlorobenzene	<0.01	<0.01	<0.01	<0.01
hexachlorobenzene	<0.01	<0.01	<0.01	<0.01

Table III-15: Chlorobenzene Concentrations in Air Samples Collected at Resolution Island (mg per m^3)

Sample	RI04-159	RI04-651	RI04-742	RI04-744
1,2- dichlorobenzene	<0.001	<0.001	<0.001	<0.001
1,3- dichlorobenzene	<0.001	<0.001	<0.001	<0.001
1,4- dichlorobenzene	<0.001	<0.001	<0.001	<0.001
1,2,3 trichlorobenzene	<0.001	<0.001	<0.001	<0.001
1,2,4 trichlorobenzene	<0.001	<0.001	<0.001	<0.001
1235, 1245 - tetra chlorobenzene	<0.001	<0.001	<0.001	<0.001
1,2,3,4 - tetrachlorobenzene	<0.001	<0.001	<0.001	<0.001
pentachlorobenzene	<0.001	<0.001	<0.001	<0.001
hexachlorobenzene	<0.001	<0.001	<0.001	<0.001

I. Drinking Water

1. Analysis

A thorough testing of the drinking water at Resolution Island was performed three times during the summer. In addition, the new drinking water lake was sampled and analyzed to comply with the water board requirements.

2. Methods

Water samples were collected in one litre polyethylene bottles for general water quality parameters and inorganic elements analysis and in one litre Teflon bottles for PCB analysis. For the analysis of phenols, a bottle containing an aliquot of phosphoric acid was used, for mercury, a bottle with an aliquot of sodium dichromate solution was used and, for bacteriological measurements, a sterile bottle was employed. Upon receipt in the laboratory, all samples were stored at 4 ^{o}C. Tests were performed using standard laboratory procedures

3. Drinking Water

Analytical results are shown in Table III-16. None of the parameters measured, with the exception of the pH levels were outside of the OME guidelines. The water at Resolution Island contains no buffering capacity and is quite acidic. Addition of sodium carbonate was undertaken this year and pH values given in Table III-17 were measured daily. The pH values ranged from 4.7 to 8.9 with a mean value of 6.5.

Table III-16: Drinking Water Results and Guidelines

Parameter	Units	7 July 2004	23 July 2004	4 Sept 2004	OME Guidelines
Alkalinity	mg/L	2	1	7	30-500
Ammonia	mg/L	<0.1	<0.1	<0.1	-
Calcium	mg/L	3.0	5.7	8.0	-
COD	mg/L	<3	21	<3	-
Conductivity	uS/cm	38	102	102	-
Copper	mg/L	0.045	0.213	0.041	<1.0
Hardness	mg/L	14	26	36	80-100

Parameter	Units	7 July 2004	23 July 2004	4 Sept 2004	OME Guidelines
Iron	mg/L	<0.05	<0.05	<0.05	<0.30
Lead	mg/L	<0.010	<0.010	<0.010	<0.010
Magnesium	mg/L	1.6	2.8	4.0	-
PCB	ug/L	<3.0	<3.0	<3.0	< 3.0
pH	-	6.0	5.1	5.7	6.5-8.5
Phenols	ug/L	<1.0	<1.0	<1.0	-
Potassium	mg/L	<0.2	0.32	0.34	-
Sodium	mg/L	5.7	4.0	12.8	<200
Sulphate	mg/L	19.3	35	52	<500
Nitrate	mg/L	0.11	<0.05	<0.05	<10
Nitrite	mg/L	<0.05	<0.05	<0.05	<1.0
Chloride	mg/L	6.5	4.4	4.7	<250
TDS	mg/L	55	96	100	<500
TKN	mg/L	0.51	<0.03	0.10	-
TSS	mg/L	<4.0	<4.0	<4.0	<500
Zinc	mg/L	0.037	0.072	0.061	5
Total Coliforms	Cts/100 mL	0	0	1	5
Faecal Coliforms	Cts/100 mL	0	0	0	0
Faecal Streptococci	Cts/100 mL	0	0	0	0
E coli	Cts/100 mL	0	0	0	0
Standard Plate Ct (48hrs)	Cts/1 mL	0	1	1	500
Background Count	Cts/100 mL	0	0	17	250

Table III-17: Drinking Water pH Results

Date/Time	pH	Date/Time	pH
1-July-04	8.72	2-Aug-04	5.71
2-July-04	8.82	3-Aug-04	4.95
3-July-04	8.36	4-Aug-04	7.05

Date/Time	pH	Date/Time	pH
4-July-04	7.71	5-Aug-04	6.67
5-July-04	5.77	6-Aug-04	7.09
6-July-04	6.51	8-Aug-04	5.02
7-July-04	6.73	9-Aug-04	6.90
9-July-04	6.36	10-Aug-04	7.05
10-July-04	5.73	12-Aug-04	7.02
11-July-04	5.89	13-Aug-04	6.78
12-July-04	4.97	15-Aug-04	6.69
13-July-04	6.30	17-Aug-04	7.43
14-July-04	6.80	18-Aug-04	6.63
15-July-04	7.36	19-Aug-04	6.59
16-July-04	7.06	20-Aug-04	6.67
17-July-04	6.59	22-Aug-04	5.61
18-July-04	6.35	24-Aug-04	7.41
19-July-04	6.82	26-Aug-04	5.63
22-July-04	4.73	27-Aug-04	5.49
23-July-04	4.89	30-Aug 04	5.95
24-July-04	5.17	1-Sept-04	6.82
25-July-04	7.30	3-Sept-04	5.94
26-July-04	7.20	4-Sept-04	6.06
27-July-04	8.93	5-Sept-04	4.84
29-July-04	7.01	6-Sept-04	5.30
30-July-04	7.03	8-Sept-04	5.24
31-July-04	7.00	9-Sept-04	5.63
1-Aug-04	6.83	Season Average	6.49

J. Lake Water

In order to comply with the water board licence, water samples were required to be collected from the water lake and runoff from the new non-hazardous landfills. However, there was no runoff from the two non-hazardous landfills so only results from the water lake are presented here. A sample of lake water was collected on 16 August 2004 and analyzed to give the results presented in Table III-18. The value of 0.13 ppm for manganese and those for other metals are consistent with the results from previous years. The manganese value is greater than the drinking water criterion but this is an aesthetic guideline.

Table III-18: Lake Water Results

Parameter	Unit	Lake Water
Copper	mg/L	0.017
Iron	mg/L	<0.05
Lead	mg/L	<0.005
Manganese	mg/L	0.13
Mercury	mg/L	<0.0005
Cadmium	mg/L	<0.001
Nickel	mg/L	0.086
Chromium	mg/L	<0.005
Cobalt	mg/L	0.021
Zinc	mg/L	0.045
Phenols	ug/L	<1.0
pH	-	4.5
TSS	mg/L	<4.0
Nitrate	mg/L	0.07
Nitrite	mg/L	<0.05
Oil and Grease	mg/L	2.0
BOD	mg/L	<3
Faecal Coliforms	Cts/100 mL	0

K. Background Water Samples

In order to establish background data, water samples were again collected this year from several locations and analysed for PCBs, and the eight elements of the DEW Line Clean Up Criteria. Analytical procedures were used to give low detection limits; metals are for the dissolved fraction. Results are given in Tables III-19 and III-20.

Results for eight elements in the DLCU criteria given in Table III-20. These show that for arsenic, cadmium, chromium and lead all results were below the method detection limits as has been found in previous years. Copper, cobalt, nickel and zinc levels are relatively constant and similar to data from previous years except in the two cases discussed in the next paragraph. Data collected from the 1993 assessment report and for the last seven years for lake water and surface waters have been pooled together to give the results given in Table III-21. These background levels are very similar for the lake and surface run off except for zinc where the runoff levels are twice the lake levels.

Water from the furniture dump runoff was collected for the first time this year; there is no water generally flowing from mid-July onwards. The results for the four metals fall within the normal ranges given in Table III-21 except for copper which at 0.088 ppm is well above the normal range of 0.007-0.020 ppm. Also collected, for the first time this year was water from the stream that flows from a pond below the cliff near the S1/S4 beach area to the sea. A road was constructed across this stream this year in order to access the CEPA soil at the S1/S4 beach area. Water was taken from the stream below the crossing point after road construction was complete. Results for this sample show levels for cobalt, copper and nickel above the normal background levels. This could be due to the construction activity or the fact that the water could be described as glacial in that it flows from the old water lake over the cliff area that is covered with permanent snow to a lake whose colour, on occasion, resembles that of alpine glacial lakes. Water should be collected above the road and in the pond next year.

The PCB levels in two water samples taken from near the old officer's mess both gave slightly elevated results. PCBs were also detected this year in the stream by the beach dump but again at only slightly elevated levels. PCB levels in the furniture dump drainage pathway were found at a higher level of 0.69 ppb. This is consistent with results reported in Chapter VI related to the barrier constructed there.

Table III-19: Sampling Locations and Collection Dates of Background Water Samples

Sample Number	Sample Description and Location	Date Collected
RI04-W005	Water flowing in the furniture dump drainage pathway	29 June 2004
RI04-W009	Water flowing from the maintenance dump	30 June 2004
RI04-W025	Water flowing in the beach dump stream	12 July 2004
RI04-W027	Water flowing in stream below the S1/S4 Beach, now crossed by Road	13 July 2004
RI04-W032	Water flowing by the old officer's mess	14 July 2004
RI04-W075	Water flowing by the old officer's mess	02 Sept 2004
RI04-W076	Water flowing behind imploded tank	02 Sept 2004

Table III-20: Analytical Results Obtained from Background Water Samples

Element	Unit	RI04-W005	RI04-W009	RI04-W025	RI04-W027	RI04-W032	RI04-W075	RI04-W076
		Furniture dump	Maint. dump	Beach dump	Stream by S1/S4 beach	Officer's mess	Officer's mess	Imploded tank
PCBs	ppb	0.69	-	0.08	<0.02	0.04	0.03	<0.02
As	ppm	<0.003	<0.003	<0.003	<0.003	<0.003	-	<0.003
Cd	ppm	<0.001	<0.001	<0.001	<0.001	<0.001	-	<0.001
Cr	ppm	<0.005	<0.005	<0.005	<0.005	<0.005	-	<0.005
Co	ppm	0.014	0.003	0.017	0.030	0.009	-	0.023
Cu	ppm	0.088	<0.005	0.016	0.037	0.007	-	0.027
Pb	ppm	<0.010	<0.010	<0.010	<0.010	<0.010	-	<0.010
Ni	ppm	0.078	0.008	0.065	0.142	0.058	-	0.063
Zn	ppm	0.048	0.095	0.032	0.077	0.082	-	0.049

Table III-21: Analytical Results Obtained from Background Water Samples

	Cobalt	Copper	Nickel	Zinc
Surface Runoff	ppm	ppm	ppm	ppm
Mean	0.016	0.015	0.057	0.059
Standard Deviation	0.004	0.005	0.021	0.026
Range	0.010-0.023	0.007-0.020	0.021-0.082	0.031-0.122
Lake Water				
Mean	0.014	0.015	0.059	0.032
Standard Deviation	0.004	0.004	0.023	0.007
Range	0.010-0.022	0.011-0.022	0.033-0.095	0.023-0.040

L. Background Plant Samples

Background plant samples were collected and analysed for PCBs again this year. The locations as shown on Map III-5 (RI04 numbers) were sampled this year on 31 August 2004. The results for the 13 samples are given in Table III-22.

1. Analytical Method

Plant samples were wrapped in foil and placed in ziplock bags. Samples were not washed and were kept frozen prior to analysis. Samples were air dried in the laboratory. Once dried 0.5 g of dried sample was accurately weighed and then ground in a mortar and pestle with sodium sulphate and Ottawa sand. The ground sample was transferred to a thimble, spiked with DCBP, and extracted by soxhlet for 4 hours at 4 - 6 cycles per hour using 250 mL of dichloromethane. The extract was then concentrated to approximately 10 mL, passed through a 0.45 um filter and then further concentrated to 1.0 mL. This concentrated extract was applied to a GPC column to separate the PCBs from the lipids. The PCB fraction was rotoevaporated, the solvent exchanged to hexane and the extract applied to a Florisil column for cleanup. This final extract was concentrated to 0.5 mL and run by GC/ECD. Values are reported on a dry weight basis.

2. Plant Analysis Results

Plants are thought to be a good biological indicator of airborne PCBs. Results obtained over the past three seasons therefore represent the scenario during the active remediation of the site. PCB levels are expected to be higher at present than in future years when the cleanup is over. At that time nearly all the PCBs will have been removed from the site or buried and therefore much less airborne PCBs is expected to be present. Willow samples were taken in all locations except at the new water lake where willow could not be found this year.

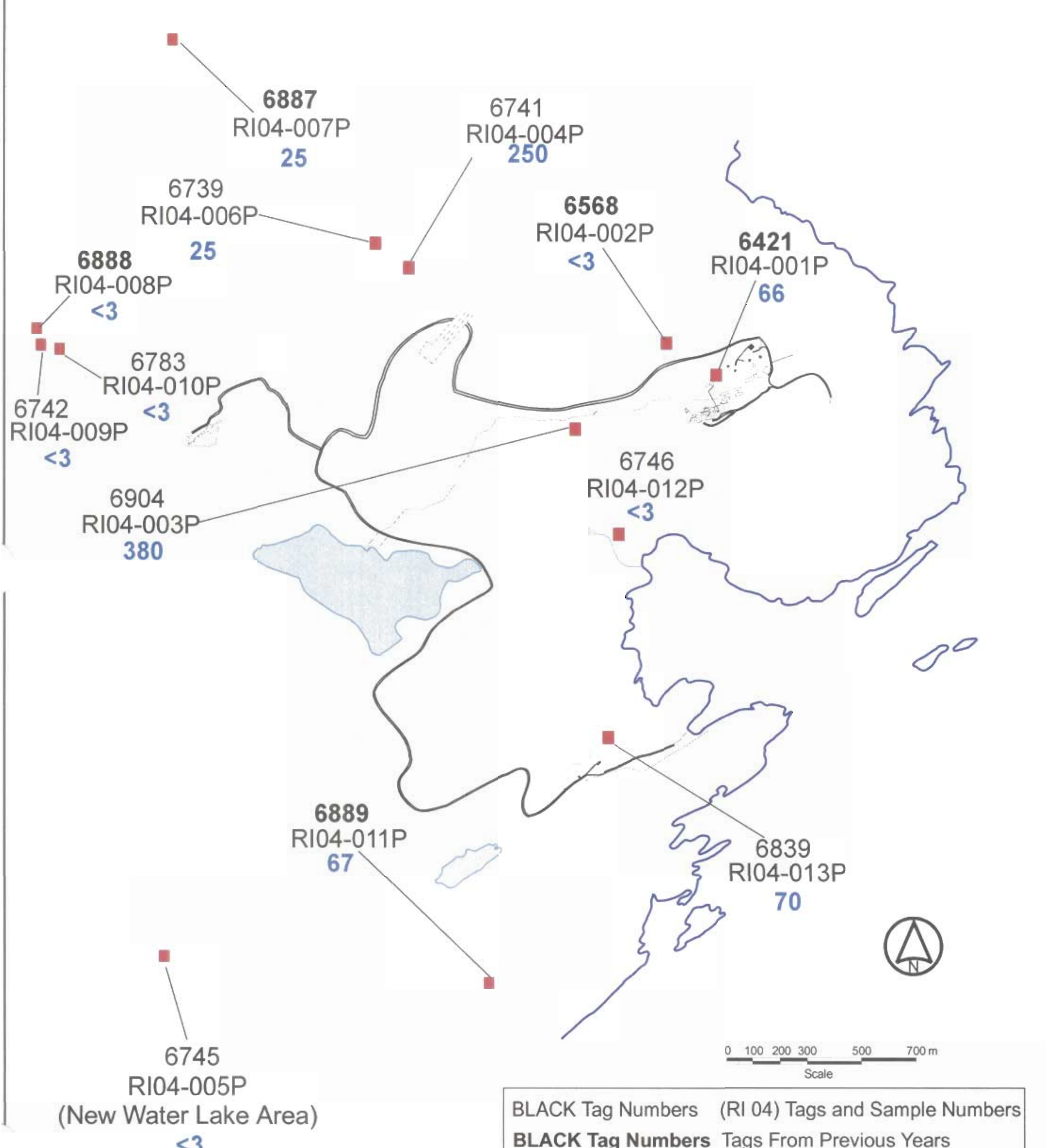
All PCBs showed the Aroclor 1260 pattern. Results indicate that the level of PCBs in the plants in many of the areas has already dropped. Generally this year's results are similar to last year's with respect to which areas are higher, however, in most locations levels have lower concentrations. This year all plants collected contained levels below 1 ppm. This is in contrast to last year where plants near to PCB contaminated areas contained Tier I and Tier II levels of PCBs. For example the sample near the imploded tank was 3300 ppb last year but only 380 ppb this year. At the officers mess this year the concentration in the plant sample was 66 ppb as compared to 1700 ppb last year. Three samples were taken at Radio Hill because of the anomalously high value there last year. These samples all contained <3 ppb PCBs.

It is difficult to obtain samples in exactly the same location each year and therefore a few more years of sampling will be necessary to clearly demonstrate that the levels are decreasing, however, the substantive decrease this year is promising.

Table III-22: Results of Analyses of Background Plant Samples

Sample	Tag	PCBs (ng/g)	Location
RI04-001P	6421	66	Officer's Mess
RI04-002P	6568	<3	NE of Tier II Landfill
RI04-003P	6904	380	Imploded tank (TPH drainage pathway)
RI04-004P	6741	250	Airstrip dump drainage pathway
RI04-005P	6745	<3	New water lake
RI04-006P	6739	25	100 m N of airstrip dump drainage pathway
RI04-007P	6887	25	1000 m NE of airstrip
RI04-008P	6888	<3	Radio Hill
RI04-009P	6742	<3	Radio Hill
RI04-010P	6783	<3	Radio Hill
RI04-011P	6889	67	1000 m S of Barrel Cache Valley
RI04-012P	6746	<3	S1/S4 beach
RI04-013P	6839	70	Lead beach dump

Map III-5: Locations and PCB Concentrations of Background Plant Samples Collected in 2004



BLACK Tag Numbers	(RI 04) Tags and Sample Numbers
BLACK Tag Numbers	Tags From Previous Years
BLUE Numbers	PCB Concentrations (ppb)

M. Miscellaneous Activities

Fuel was observed to be seeping from ground into ocean below the location of the beach dump which has been removed. The seepage area was below the high water line from a fracture in the rock cliff face. The hydrocarbon was identified as gasoline. It is suggested that an investigation by excavation inland from the fracture be undertaken in an attempt to find the source of the hydrocarbon.

Several containers were analysed from the PCB storage area after they were emptied in order to determine their fate. Four pieces of plastic were cut from the blue barrels that contained soil from the Iqaluit cleanup; the soil had been previously emptied on to the stock pile of CEPA soil from around the site. Results of the analysis given in Table III-23 show that this material contained levels between 6 and 290 ppm. As a result the empty barrels where crushed and containerized and are now awaiting disposal to a southern facility. The lids from the other blue barrels that contained concrete from Iqaluit were similarly tested. Their PCB levels ranged from 2.6 to 10.4 ppm. Given their small volume they were treated as the blue barrels that contained the Iqaluit soils. The concrete and the blue barrels minus their lids were packaged for southern disposal as described in Chapter IV. Six red vaults, which had previously contained wood and debris, were swabbed and the swabs analysed for PCBs. Results are given in Table III-24. The swabs were from a 10 cm by 10 cm area. The concentration of PCBs on the steel can be calculated from these results using the thickness of the vaults, the density of steel and assuming the surface layer thickness is very much smaller than the thickness of the steel. From this calculation the concentration of PCBs in the vaults is < 1.0 ppm. Sample RI04-604 and RI04-384 were from swabbing of two of the small conical steel containers that previously stored PCB contaminated materials. Again using a similar calculation, the concentration of PCBs is < 1.0 ppm. Similarly sample RI04-521 is from one of the three large conical steel containers that previously stored PCB contaminated wood. Again the calculated concentration is <1.0 ppm. All these containers can therefore be buried in the non-hazardous landfills on site. The swab sample RI04-524 was found to contain 3800 ug of PCBs. This was from a single unique barrel which was filled from the furniture dump with soil than had surrounded a transformer which contained pure Askarel.

A soil sample was collected from about 10 m in front of the door to building B2 where soil had previously been transferred to the large conical steel containers. The PCB in this sample was found to be <1.0 ppm indicating that no further cleanup in this area is required.

Table III-23: PCB Concentrations of PCB Containers

Container Material	Sample Number	PCB Concentration (ppm)
Sample from blue barrel previously containing CEPA soil from Iqaluit	RI04-435	6.0
Sample from blue barrel previously containing CEPA soil from Iqaluit	RI04-436	160
Sample from blue barrel previously containing CEPA soil from Iqaluit	RI04-437	210
Sample from blue barrel previously containing CEPA soil from Iqaluit	RI04-438	290
Sample from blue barrel lid previously containing CEPA concrete from Iqaluit	RI04-439	10.4
Sample from blue barrel lid previously containing CEPA concrete from Iqaluit	RI04-440	10.3
Sample from blue barrel lid previously containing CEPA concrete from Iqaluit	RI04-440D	10.1
Sample from blue barrel lid previously containing CEPA concrete from Iqaluit	RI04-547	2.6

Table III-24: PCB from Swabbing PCB Storage Containers

Container	Sample Number	PCB ug/swab
Red vault	RI04-520	290
Red vault	RI04-520D	280
Red vault	RI04-523	130
Red vault	RI04-526	7.4
Red vault	RI04-527	62
Red vault	RI04-529	5.2
Small conical steel container	RI04-604	<0.1
Small conical steel container	RI04-384	<0.1
Large conical steel container	RI04-521	32
Barrel of soil from Furniture dump	RI04-524	3800

N. Quality Control Data

The ASU is accredited by the Standards Council of Canada (SCC), in cooperation with the Canadian Association for Environmental and Analytical Laboratories (CAEAL), for specific tests listed in the scope of accreditation approved by the SCC. Quality control was maintained through the analysis of standards, duplicates, and blanks. Most tables are self explanatory and show good control of the quality of results. Results presented here are for all the analyses presented in this report's seven chapters. The results for PCBs and TPH, for which a large number of analyses were conducted, are discussed below. The ASU report for the lake water analysis is also given at the end of this chapter.

1. PCB Quality Control/Quality Assurance

Samples were analyzed for PCBs by the GC/ECD method in the laboratories at Resolution Island and Queen's University. Table III-25 gives the results for blanks and spiked QA/QC soil samples. The relative standard deviations given in Table III-26 for laboratory duplicates demonstrate that the analyses were effective. The average of 15 %, as would be expected, is lower than for the average of 30 % for the field duplicate results given in Table III-27. This high value for the field duplicates illustrates the difficulty in obtaining representative samples from heterogeneously contaminated soil. Table III-28 gives the results for blanks and spiked QA/QC water samples; duplicate data was not obtained since the sample volumes required for these analyses (800 mL) are large. Table III-29 gives the results for blanks and spiked QA/QC plant samples.

2. TPH Quality Control/Quality Assurance

The corresponding tables for TPH follow those for PCBs. Table III-30 presents the results for blanks and spiked QA/QC soil samples. The relative standard deviations given in Tables III-31 and III-32 for laboratory duplicates demonstrate that the analyses were successful. The averages of 13 % and 10 % are lower than for the average of 16 % and 21 % for the field duplicate results given in Tables III-33 and II-34 respectively. Table III-35 gives the gives the results for blanks and spiked QA/QC water samples and Table III-36 for duplicate water samples.

Table III-25: PCB Concentrations in Blank and Spiked QA/QC Soil Samples

Sample	Units	PCB Concentrations (ppm)
Blank	µg/g	<1.0, <1.0, <1.0, <1.0, <1.0, <1.0, <1.0, <1.0, <1.0, <1.0, <1.0, <1.0, <1.0, <1.0, <1.0, <1.0, <1.0, <1.0, <1.0, <1.0, <1.0, <1.0, <1.0, <1.0, <1.0, <1.0, <1.0, <1.0, <1.0, <1.0, <1.0, <1.0, <1.0, <1.0, <1.0, <1.0, <1.0, <1.0, <1.0, <1.0, <1.0, <1.0, <1.0, <1.0, <1.0
Control	µg/g	4.6, 4.7, 4.8, 5.4, 5.4, 4.5, 5.0, 5.5, 5.5, 5.3, 5.5, 5.8, 5.1, 5.5, 5.4, 5.7, 5.6, 4.9, 5.5, 7.2, 6.1, 6.5, 7.0, 6.6, 5.5, 7.7, 7.1, 4.8, 4.8, 6.1, 5.7, 5.2, 5.8, 5.8, 3.7, 5.4, 4.3, 5.5, 4.8, 4.7, 4.9, 4.9, 5.6, 3.8, 5.0
Control Target	µg/g	5.0

Table III-26: PCB Concentrations in Laboratory Duplicate Soil Analysis

Sample Number (prefix: RI04-)	PCB Concentrations (ppm)	Standard Deviation	Relative Standard Deviation (RSD) (%)
373	3.4; 3.2	0.1	4
377	<1.0; <1.0	0	0
327	<1.0; <1.0	0	0
BES8	4.1; 4.0	0.1	2
435	5.9; 6.1	0.1	2
011	16; 17	0.7	4
016	17; 18	0.7	4
022	36; 31	3.5	11
041	19; 16	2.1	12
743	21; 28	4.9	20
116	4.5; 6.1	1.1	21
109	2.5; 1.0	1.1	61
197	1.6; 1.5	0.1	5
212	14; 17	2.1	14
214	1.2; 1.2	0	0
215	31; 30	0.7	2

Sample Number (prefix: RI04-)	PCB Concentrations (ppm)	Standard Deviation	Relative Standard Deviation (RSD) (%)
216	1.5; 2.3	0.6	30
232	1.6; 1.2	0.3	20
235	70; 83	9.2	12
239	40; 48	5.7	13
249	1.3; 5.6	3.0	88
253	4.7; 4.4	0.2	5
255	26; 26	0	0
259	<1.0; <1.0	0	0
267	18; 11	4.9	34
269	2.3; 2.0	0.2	10
271	13; 17	2.8	19
292	2.6; 2.8	0.1	5
424	6.9; 3.7	2.3	43
442	2.8; 3.1	0.2	7
Average RSD	-	-	15

Table III-27: PCB Concentrations in Field Duplicate Soil Analysis

Sample Number (prefix: RI04-)	PCB Concentrations (ppm)	Standard Deviation	Relative Standard Deviation (RSD) (%)
480	0.6; 1.0	0.3	35
010	<1.0; 2.6	1.1	63
020	9.1; 9.2	0.1	1
050	3.4; 5.0	1.1	27
560	22; 19	2.1	10
630	1.7; 2.6	0.6	30
640	6.0; 4.0	1.4	28
030	1.2; 0.9	0.2	20
100	5.6; 3.4	1.6	35

110	<1.0; <1.0	0	0
190	9.7; 11.0	0.9	9
210	11; 20	6.4	41
220	18; 15	2.1	13
200	132; 267	95	48
240	1.8; 2.3	0.4	17
250	<1.0; <1.0	0	0
290	25; 26	0.7	3
300	14; 3.9	7.1	80
450	6.6; 17	7.4	62
460	5.6; 3.5	1.5	33
150	11.2; 2.9	5.9	83
Average RSD	-	-	30

Table III-28: PCB Concentrations in Blank and Spiked QA/QC Water Samples

Sample	Units	PCB Concentrations (ppb)								
Blank	μg/L	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Control	μg/L	0.045	0.054	0.08	0.08	0.10	0.09	0.10	0.10	0.08
Control Target	μg/L	0.063	0.063	0.10	0.10	0.10	0.10	0.10	0.10	0.10

Table III-29: PCB Concentrations in Blank and Spiked QA/QC Plant Samples

Sample	Units	PCB Concentrations (ppb)		
Blank	μg/L	<3	<3	<3
Control	μg/L	15	19	13
Control Target	μg/L	20	20	20

Table III-30: TPH Concentrations in Blank and Spiked QA/QC Soil Samples

Sample	Units	TPH Concentrations (ppm)					
Blank	ppm	<40	<40	<40	<40	<40	<40
Control	ppm	497	451	511	561	556	511
Control Target	ppm	500	500	500	500	500	500

Table III-31: TPH (Fuel) Soil Concentrations in Laboratory Duplicate Analysis

Sample Number (prefix: RI04-)	TPH Concentrations (ppm)	Standard Deviation	Relative Standard Deviation (RSD) (%)
307	1490; 1500	7	0
340	<40; <40	0	0
360	41; 72	22	39
368	860; 1320	325	30
370	<40; <40	0	0
372	300; 310	7	2
373	65; 85	14	19
592	2620; 1940	480	21
603	750; 1210	325	33
676	240; 240	0	0
707	2870; 3090	155	5
723	2740; 2880	99	4
Average RSD	-	-	13

Table III-32: TPH (Lubricating Oil and Grease) Soil Concentrations in Laboratory Duplicate Analysis

Sample Number (prefix: RI04-)	TPH Concentrations (ppm)	Standard Deviation	Relative Standard Deviation (RSD) (%)
307	260; 240	14	6
340	<40; <40	0	0
360	<40; 57	26	68
368	<40; <40	0	0
370	<40; <40	0	0
372	60; 60	0	0
373	370; 420	35	9
592	<40; <40	0	0
603	<40; <40	0	0
676	70; 50	14	24
707	200; 220	14	7
723	240; 220	14	6
Average RSD	-	-	10

Table III-33: TPH (Fuel) Soil Concentrations in Field Duplicate Analysis

Sample Number (prefix: RI04-)	TPH Concentrations (ppm)	Standard Deviation	Relative Standard Deviation (RSD) (%)
350	840; 1000	113	12
490	340; 270	49	16
590	130; 130	0	0
670	1160; 712	316	34
680	400; 450	35	8
700	4160; 2120	1442	46
710	2940; 3200	183	6
720	3890; 3670	155	4
Average RSD	-	-	16

Table III-34: TPH (Lubricating Oil and Grease) Soil Concentrations in Field Duplicate Analysis

Sample Number (prefix: RI04-)	TPH Concentrations (ppm)	Standard Deviation	Relative Standard Deviation (RSD) (%)
350	170; 170	0	0
490	90; 80	7	8
590	<40; <40	0	0
670	290; 110	127	64
680	150; 190	28	17
700	80; 50	21	33
710	170; 300	91	39
720	160; 170	7	4
Average RSD	-	-	21

Table III-35: TPH Concentrations in Blank and Spiked QA/QC Water Samples

Sample	Units	TPH Concentrations (ppm)								
Blank	μg/mL	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.05	< 0.05	<0.05
Control	μg/mL	20.3	20.3	7.6	7.6	7.6	7.6	0.083	0.320	0.320
Control Target	μg/mL	20.0	20.0	12.4	12.4	12.4	12.4	0.081	0.310	0.316

Table III-36: TPH Water Concentrations in Laboratory Duplicate Analysis

Sample Number (prefix: RI04-)	TPH Concentrations (ppm)	Standard Deviation	Relative Standard Deviation (RSD) (%)
045	2.5; 2.5	0	0
057	1.7; 1.2	0.354	24
022	<1.0; <1.0	0	0
033	<1.0; <1.0	0	0
070	0.084; 0.138	0.038	34
071	0.077; 0.097	0.014	16
072	0.079; 0.108	0.021	22
703	0.063; 0.108	0.032	37
Average RSD	-	-	17

Table III-37: Metal Water Concentrations in Laboratory Blank Determinations

Parameter	Units	Blank						
Arsenic	mg/L	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Cadmium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Chromium	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Cobalt	mg/L	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Copper	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Lead	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Nickel	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Zinc	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010

Table III-38: Metal Water Concentrations in QC Control Samples

Parameter	Units	QC							QC Target
Arsenic	mg/L	1.1	1.2	1.2	1.2	1.2	1.2	1.1	1.2
Cadmium	mg/L	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Chromium	mg/L	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.2
Cobalt	mg/L	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Copper	mg/L	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2
Lead	mg/L	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.2
Nickel	mg/L	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.2
Zinc	mg/L	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2

Table III-39: Metal Soil Concentrations in Blank and Reference Material (ppm)

Parameter	Blank					MESS-3					Target
As	<1.0	<1.0	<1.0	<1.0	<1.0	15.6	15.9	17.0	17.3	16.2	14.6-21.4
Cd	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
Co	<5.0	<5.0	<5.0	<5.0	<5.0	11.7	12.2	10.9	13.0	11.5	9.9-13.3
Cr	<20	<20	<20	<20	<20	39	34	41	40	49	36-50
Cu	<3.0	<3.0	<3.0	<3.0	<3.0	34	35	35	37	35	26.9-35.1
Ni	<5.0	<5.0	<5.0	<5.0	<5.0	34	37	35	37	38	33-41
Pb	<10	<10	<10	<10	<10	17	18	16	19	17	14.7-20.4
Zn	<15	<15	<15	<15	<15	131	140	132	133	125	114-157

Table III-40: Metal Soil Concentrations in Laboratory Duplicate Analysis (ppm)

Parameter	RI04-518		RI04-550		RI04-152		RI04-157		RI04-323	
Arsenic	1.8	1.9	2.1	1.6	1.3	1.1	1.3	1.1	1.9	2.0
Cadmium	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chromium	61	61	36	43	36	31	36	31	39	38
Cobalt	12.4	11.5	11.0	11.7	8.8	7.8	6.1	5.4	12.5	12.3
Copper	67	61	76	84	59	51	52	53	76	76
Lead	56	70	<10	<10	<10	<10	<10	<10	<10	<10
Nickel	55	50	46	47	39	33	26	26	59	59
Zinc	79	75	51	62	53	47	40	39	55	55

Table III-41: Data for Barrel Blank and Quality Control Samples

	PCB	Chlorine
	ug/g	ug/g
Blank	<2.0; <2.0; <2.0	<100; <100; <100
Control	44; 50; 47	1024; 1020; 1020
Control Target	50	1022

Table III-42: Replicate Analysis Results for Barrel Contents

Sample	PCBs	Chlorine	Chromium	Lead	Cadmium
	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)
RI04-H010	<2.0; <2.0	<1000; <1000	-	-	-
RI04-H013	-	<1000; <1000	<10; <10	<100; <100	<2.0; <2.0
RI04-H018	<2.0; <2.0	-	-	-	-
RI04-H023	-	95300; 89500	-	-	-

Annex A

Resolution Island: Removal of CEPA PCB Contaminated Concrete from the Floor of the S4 Building

The S4 building structure has been demolished and the debris removed to a non-hazardous landfill. Multiple samples taken across the concrete foundation determined that in one small section, the concrete was contaminated above the 50ppm level (260ppm). Excavation to a depth of 10cm (where applicable) should be sufficient to bring the area to compliance but this must be confirmed by analysis. Organizational responsibilities are the same as for other excavations at Resolution Island.

Personal Protective Equipment (PPE)
Removing the concrete will require a concrete cutting or pneumatic drilling device and significant quantities of concrete dust may be released. The major exposure route is therefore expected to be through inhalation. Personnel taking part in the excavation will have to wear respirators (Resolution Island Health and Safety Plan, Appendix 5, P4). Activities related to the testing and removal of PCB saturated wood flooring have been safely carried out at this site: *Resolution Island 1998 Scientific Investigations*, Analytical Services Unit, Queens University. It is expected that the same types of PPE as was used for workers removing CEPA contaminated wood will be more than sufficient in this instance where, the contamination levels are much lower and where the expected exposure time to the contaminated concrete will be much less, due to the low area of material to be excavated.

Required Protective Clothing
Rubber safety boots, safety glasses with side shields (to minimize impact risks from grinding and chipping of masonry), hard hats, Saranex coated disposable suit, nitrile gloves (inside) and work gloves (outside). Workers must use half-face respirators with particulate filters and organic vapor cartridges. Enhanced levels of respiratory protection may be afforded by the use of a full-face respirator if available and should be worn if deemed necessary by the on-site Health and Safety Representative. The Saranex suits should be taped shut to minimize the infiltration of PCB containing concrete dust onto the skin.

Dust Suppression and Contamination Confinement
To further minimize any contamination risk, the area to be excavated can be wetted down using a suitable water source. As the concrete is removed larger pieces can be picked up and placed in a suitable container such as a blue plastic barrel. Finer material can be swept up and added to this or a vacuum truck may be used. Any personnel operating the vacuum hose will be in close proximity and should be wearing half face respirators with particulate filters and organic vapor cartridges as well as the usual protective equipment for working in CEPA contaminated areas. The CEPA concrete should be added to the similar material shipped from Iqaluit and subsequently transported and disposed of appropriately.

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ASU #: 7358
Client: DIAND

Method: Standard Methods

Report I.D. RI Lake Water ASU7358
Date Submitted: 18-Aug-04
Date Analysis Initiated: 18-Aug-04
Date Reported: 20 Sept 04
Matrix: Water

Parameter	Units	RI04-W003	BLANK	QC	QC TARGET
Copper	mg/L	0.017	<0.005	2.20	2.20
Iron	mg/L	<0.05	<0.05	14.8	16.0
Lead	mg/L	<0.005	<0.005	2.25	2.20
Manganese	mg/L	0.13	<0.05	2.26	2.20
Mercury	mg/L	<0.0005	<0.0005	0.0022	0.0020
Cadmium	mg/L	<0.001	<0.001	0.42	0.40
Nickel	mg/L	0.086	<0.005	2.21	2.20
Chromium	mg/L	<0.005	<0.005	0.42	0.40
Cobalt	mg/L	0.021	<0.005	2.22	2.20
Zinc	mg/L	0.045	<0.010	1.24	1.20
Phenols	ug/L	<1.0	<1.0	10.0	10.0
pH	-	4.5	-	-	-
TSS	mg/L	<4.0	<2.0	-	-
Nitrate	mg/L	0.07	<0.05	1.03	1.00
Nitrite	mg/L	<0.05	<0.05	0.97	1.00
Oil and Grease	mg/L	2.0	<1.0	14.8	15.6
BOD	mg/L	<3	<3	166	200
Faecal Coliforms	Cts/100 mL	0	0	41	50

Prepared by: a. Nalte

Authorization: [signature]