PRELIMINARY ASSESSMENT OF THE CALLISON WASTE METAL/ OLD QUIGLEY LANDFILL SITE

Arctic Environment Strategy - Action on Waste
Department of Indian Affairs and Northern Development
Whitehorse, Yukon

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OVERVIEW

J.Gibson & Associates was contracted by Arctic Environmental Strategy Action on Waste (Department of Indian Affairs and Northern Development) to conduct a preliminary assessment of an abandoned dumpsite in the Dawson area locally referred to as the "old Quigley dump" or the "Callison Waste Metal Dump" in regards to public concerns over the possible presence of contaminants at the site.

The contaminants of concern are:

- Organochlorines
- Polychlorinated Biphenyls (PCB's)

The preliminary assessment was divided into three phases:

1. A literature search of public and private records and reports for any indications of the above contaminants being landfilled at the site.

2. Conduct oral interviews with local residents, past and present employees of Dawson area businesses who would have utilized the dump.

3. A field sampling and laboratory analysis program of water and soils in and around the site, focusing on organochlorines and PCB's.

An assessment report detailing results of the above work and any recommendations for further action was to be submitted to the Action on Waste representative.

BACKGROUND

ORGANOCHLORINES

Organochlorines or chlorinated hydrocarbons are the active ingredient in pesticides (herbicides, insecticides and piscicides). In the post World War II era, large quantities of pesticides were manufactured and used world wide under a variety of product names.

Documented use of pesticides in the Yukon Territory includes DDT products as insecticides for mosquito control, 2, 4, 5-T as a herbicide for brush control at microwave or electrical substations, and toxaphene as a piscicides to remove unwanted fish species from selected lakes (Laberge Environmental Service L.E.S. 1993).

POLY CHLORINATED BIPHENYLS (PCB'S)

Poly Chlorinated Biphenyls were used for a variety of industrial uses from the 1930's until the product was banned in 1975. Laberge Environmental Services 1993 states that "Pre-war use of PCB's in the Yukon was very limited. The substance was not likely used in significant quantities until the wartime construction era". PCB use in the territory occurred in electrical transformers and capacitors, hydraulic fluids and open end uses such as plastics, paints, cutting oils and dust control products.

DISPOSAL PRACTICES

Laberge Environmental Services 1993 notes that there is little information available on disposal practices for organochlorine products in the Yukon. In their opinion, discarded containers would have ended up in local garbage dumps.

Disposal of PCB contaminated material may have occurred by a number of methods:

- waste oil disposal in local sumps or landfills
- applications of waste oil for dust control
- burial of discarded electrical equipment

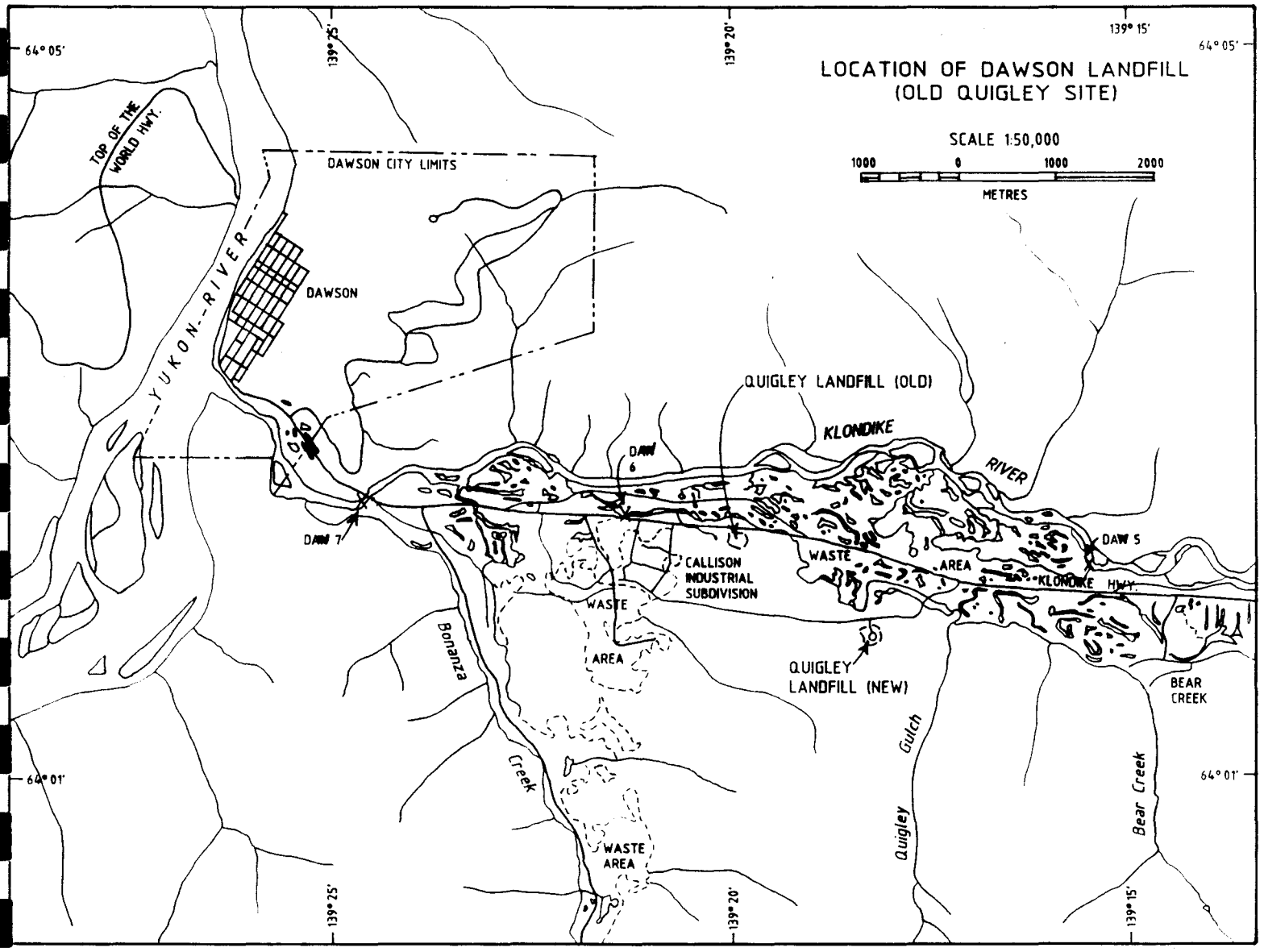
Based on the disposal methods common to the time period that contaminant products were used in the territory, a source and pathway for the contaminants to enter the surrounding environment is established.

INTRODUCTION

The Callison waste metal dump / old Quigley dump is located in the Klondike River Valley adjacent to the Klondike highway approximately ten (10) kilometres east of Dawson City, Yukon *(Figure 1)*. The landfill is located in one of the few areas in this valley reach not mined by the placer gold dredges. With the exception of the area to the south of the dump, the site is bordered by dredge tailings.

The Callison dump operated from 1975 through 1986 (R. Gates- pers comm.) and was originally intended only as a waste metal landfill. In the latter years of operation, the dump became used more for domestic than metal waste although there appears to have been some separation with shallow trenches designated for each waste type.

In 1986 there were studies undertaken for abandonment of the site including a geotechnical investigation and establishment of monitoring standpipes. With opening of the new Quigley dump in July 1988 (located two kilometers to the south), permanent abandonment work of leveling dump trenches and covering the area with a soil fill was done. The site also appears to have been seeded with brome hay. There remains little surface evidence of the site's use as a landfill except for a few pieces of metal debris poking through the soil cover.


LOCATION OF DAWSON LANDFILL
(OLD QUIGLEY SITE)
SCALE 1:50,000
1000 0 1000 2000
METRES
64° 05'
64° 01'
139° 25'
139° 20'
139° 15'
TOP OF THE WORLD HWY.
DAWSON CITY LIMITS
DAWSON
YUKON RIVER
QUIGLEY LANDFILL (OLD)
KLONDIKE
RIVER
DAW 6
DAW 7
DAW 5
CALLISON INDUSTRIAL SUBDIVISION
WASTE AREA
KLONDIKE HWY.
QUIGLEY LANDFILL (NEW)
BEAR CREEK
Bonanza Creek
Quigley Gulch
Bear Creek

METHODS AND PROCEDURES

LITERATURE SEARCH

A literature search of published reports, current and historical public and private files was conducted for data or references to any organochlorine or PCB contamination of the Callison dump site. A list of the researched material is contained in Appendix 1.

ORAL INTERVIEWS

In conjunction with the literature search, oral interviews were conducted with people familiar with the dump site and the Dawson area for the period the landfill was in use. In addition, private and public employees who generated or controlled domestic, municipal or industrial waste were interviewed to determine the types of materials landfilled at the Callison site.

Results of oral interviews are contained in Appendix 2. Each interview is numbered for reference to the main body of the report.

CONTAMINANT SAMPLING AND ANALYSIS

On September 1 and 2, 1994, a site survey was done of the Callison waste metal dump. The survey consisted of:

1. Site mapping - documenting dump size, slopes, features and surrounding topography. *(Figure 2)* A site profile and water level profile was done by level circuit *(Figure 3).*
2. Water sampling - Seven water quality stations were established at or near the Callison dump site. Sample station locations are shown in both Figure 1 and 2. Station descriptions are:

   Dawson # 1 - sample of standing water taken from monitoring pipe at eastern edge of dumpsite (Piez 1)

   Dawson # 2 - sample of standing water taken from monitoring pipe at northern edge of dumpsite (Piez 2)

   Dawson # 3 - sample of standing water taken from monitoring pipe at western edge of dumpsite (Piez 3)

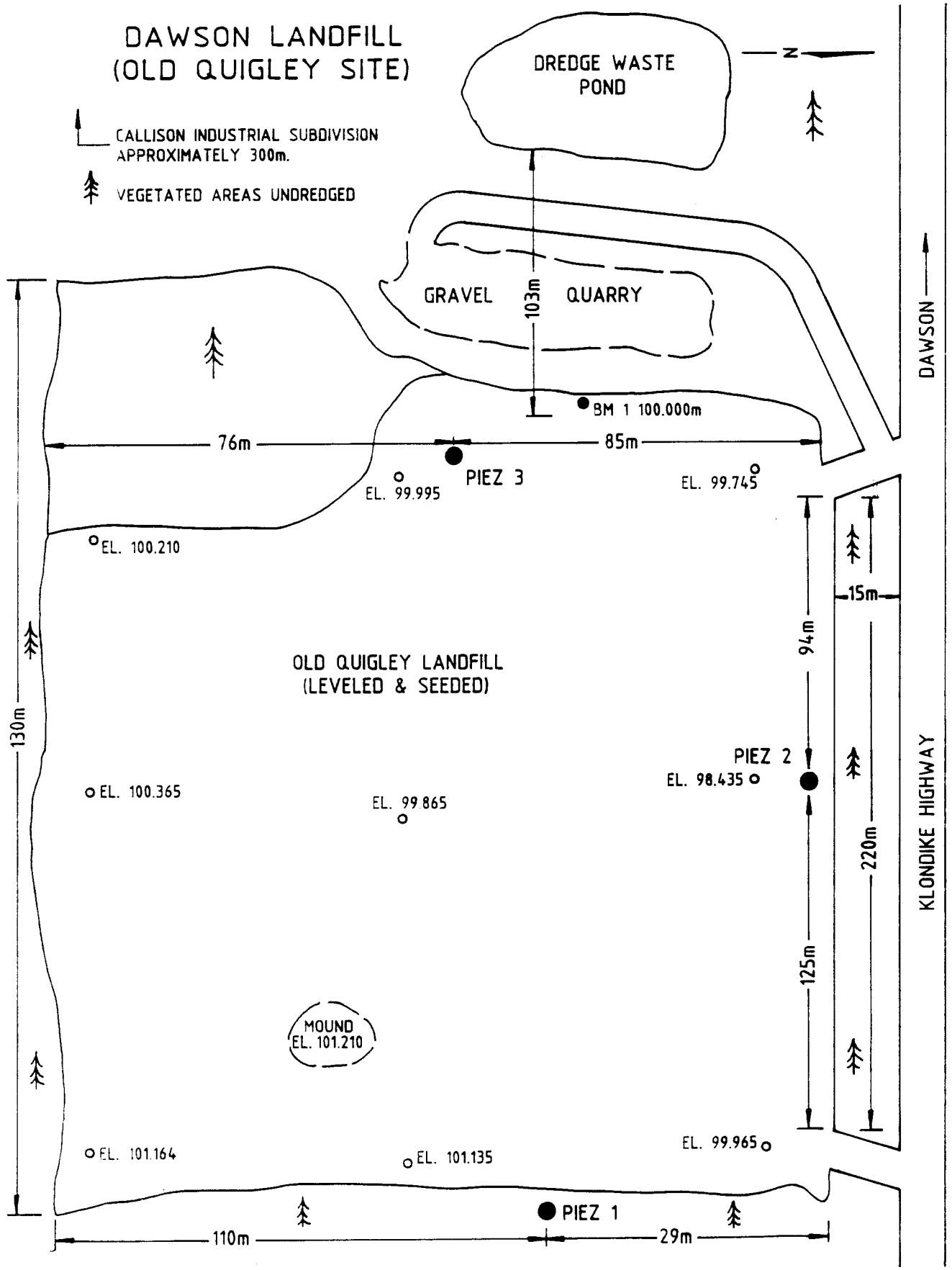
   Dawson # 4 - sample of water contained in dredge waste pond located 100 meters west of landfill site.

   Dawson #5 - Klondike River waters upstream of Quigley Gulch

   Dawson #6 - Flows at culverted highway crossing downstream of the Callison Industrial subdivision. Sample will include influence of Bear and Quigley Creek flows.

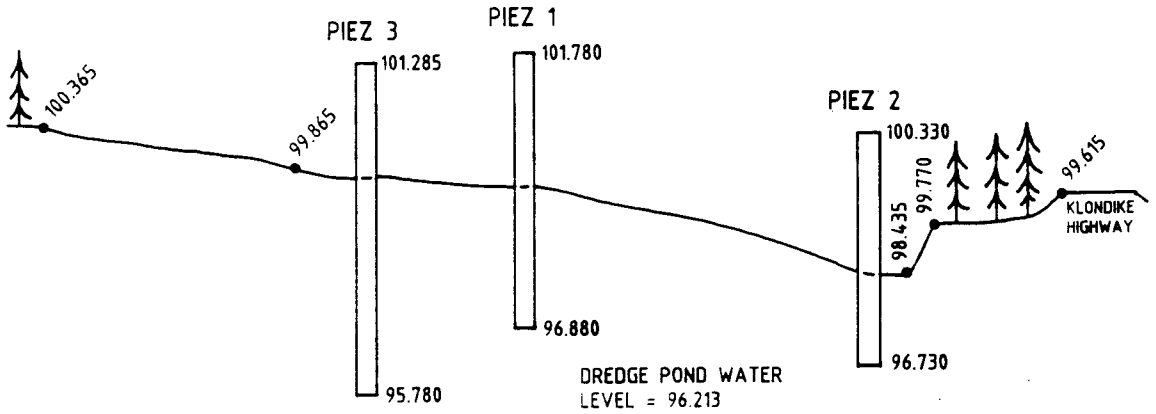
   Dawson #7 - Klondike River at the highway bridge.

All water quality sample were taken using a one liter amber glass jar with the lid foil protected. Water samples taken from monitoring pipes (Dawson 1, 2 and 3) were of standing water, not active water from a pump/recharge situation. Samples were taken using a one liter plastic baler. All other samples (Dawson 4, 5, 6 and 7) were taken at surface from flowing water (if possible). All sample bottles were labeled with location, station number, date, and required analysis. All samples were kept refrigerated after sampling and during shipment to the laboratory.

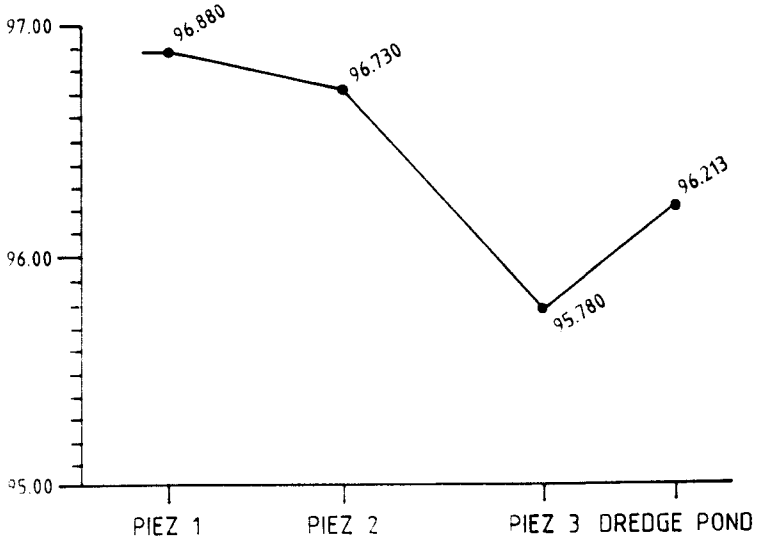

DAWSON LANDFILL
(OLD QUIGLEY SITE)
CALLISON INDUSTRIAL SUBDIVISION
APPROXIMATELY 300m.
VEGETATED AREAS UNDREDGED
DREDGE WASTE
POND
N
GRAVEL QUARRY
103m
DAWSON
BM 1 100.000m
76m
85m
PIEZ 3
EL. 99.995
EL. 99.745
EL. 100.210
15m
94m
OLD QUIGLEY LANDFILL
(LEVELED & SEEDED)
130m
PIEZ 2
EL. 98.435
EL. 100.365
EL. 99.865
220m
KLONDIKE HIGHWAY
125m
MOUND
EL. 101.210
EL. 99.965
EL. 101.164
EL. 101.135
PIEZ 1
110m
29m

DAWSON LANDFILL

SITE PROFILE



WATER LEVEL PROFILE



RESULTS

LITERATURE SEARCH AND ORAL INTERVIEWS

The literature search and oral interviews provided no document evidence of the disposal of PCB or organochlorine contaminated material in the Callison waste metal dump.

A number of people interview did note the possibility of such materials being dumped in view of handling and disposal practices common to the times.

Documented use of electrical equipment with possible PCB contamination occurred in the Dawson area by the North Fork power station, Yukon consolidated Gold Corporation (YCGC) and the Yukon Electrical Company (YEC) . N. Webster (Int D-8) is confident that oil used in electrical transformers by the North Fork power station was of a non- -PCB variety.

Disposal of the electrical equipment when the power station and YCGC dredges ceased operations in the 1960's became a copper salvage operation by the company and contractors. All transmission lines and transformers were stripped of copper at each site with the remaining equipment carcass abandoned where they were located (H. Campbell Int D-3). The Callison waste metal dump did not begin operating until the mid 1970's, and it appears unlikely any of the electrical equipment was disposed of there.

Reger, 1983 and J. Gould (Int D-7) confirm that an electrical transformer dump was located at nearby Bear Creek. The transformers and other equipment was removed and disposed of outside the territory when Parks Canada purchased the property in the late 1970's.

Reger, 1983 site inventory of the Callison waste metal dump does not list any electrical transformers or capacitors.

Yukon Electrical Company conducted a PCB assessment and cleanup program of all their sites between 1985 and 1990. All material with greater than 50 parts per million PCB was disposed of at Swan Hills Alberta. V. Parkin (Int D-9) felt it extremely unlikely any contaminated material would have been deposited in the Callison dump. Organochlorine based pesticides were used in the Damson area but with the exception of insecticides for the mosquito control program, use appears to be limited.

The North Fork power station used 2, 4, 5-T herbicide for brush/weed control along their supply ditch (N. Webster Int D-8) and an unknown herbicide was used once in the early 1970's for brush/weed control on the airport (G. Nagano Int D-5).

Herbicides were not used by the territorial highway department as the cost was prohibitive (A. Close, G. Nagano).

Use of organochlorine (DDT) insecticide for mosquito control was discontinued in the late 1960's prior to the Callison dump opening. The control program switched to organophosphorus based insecticides such as Abate, Malathion and Cythion due to the growing controversy regarding DDT.

NorthwesTel utilized a herbicide for brush control at microwave sites until 1979 when the practice was discontinued (L. E. S. 1993). It is assumed the herbicide would have been used in the Dawson area but there is no evidence of herbicide contaminated materials being deposited in the Callison dump.

The amount of organochlorine based pesticides used domestically for gardening or mosquito control in unknown. Supply containers would have been treated as domestic waste and landfilled in the local dumps. The literature search did provide some background geotechnical and water quality data for the Callison dump. In October 1986 a geotechnical investigation of the Callison site was done by EBA Engineering Consultants. A 12.5 meter borehole was drilled along the south edge of the dump perimeter. Soil stratigraphy is detailed as surficial organic silt and peat layers (2.4 meter thick) overlying a gravel layer, overlying a graphitic schist bedrock. Soils were frozen throughout the borehole. G. Gammie (Int D-4) noted that prior to the site being used as a metal dump, it was used as a gravel quarry. With the exception of a few small gravel seams, the site was frozen in permafrost. When the existing trenches were filled, expansion was not an option due to the permafrost and was a contributing factor to the dumps closure.

Results of water quality samples taken by YTG Municipal Engineering on three occasions (October 1987, July 1981 and November 1992) are listed in Appendix 1 Table A-1 along with the maximum acceptable concentrations for Canadian drinking water.

The water samples are taken from the three monitoring wells shown in figure 2. The water quality results for the three sample dates above show groundwater quality exceeds drinking water maximum acceptable concentrations for parameters iron and manganese only. Guideline concentrations for both iron and manganese are based on aesthetic considerations rather than on health concerns.

CONTAMINANT SAMPLING

Laboratory results for Polychlorinated Biphenyls and organochlorine analysis done on the seven water samples are contained in Table 1.

Polychlorinated Biphenyls concentrations in all seven water samples were below detection limits.

Organochlorine concentrations for all parameters included were below their respective detection limits with the exception of methoxychlor in sample Dawson #3 (standing water in monitoring well #3 at western edge of site). The concentration of methoxychlor detected in sample Dawson #3 was 0.58 ug/l (ppb).

Table 1. Laboratory Analysis Results for Callison Waste

Parameter	D-1 Water	D-2 Water	D-3 Water	D-4 Water	D-5 Water	D-6 Water	D-7 Water	Detection Limit
TOTAL PCB	ND	ND	ND	ND	ND	ND	ND	0.02
Aldrin	ND	ND	ND	ND	ND	ND	ND	0.01
BHC(alpha)	ND	ND	ND	ND	ND	ND	ND	0.01
4,4'DDD	ND	ND	ND	ND	ND	ND	ND	0.01
4,4'DDE	ND	ND	ND	ND	ND	ND	ND	0.01
2,4'DDT	ND	ND	ND	ND	ND	ND	ND	0.01
4,4'DDT	ND	ND	ND	ND	ND	ND	ND	0.02
Dieldrin	ND	ND	ND	ND	ND	ND	ND	0.01
Endosulfan I	ND	ND	ND	ND	ND	ND	ND	0.01
Endosulfan II	ND	ND	ND	ND	ND	ND	ND	0.01
Endrin	ND	ND	ND	ND	ND	ND	ND	0.01
Heptachlor	ND	ND	ND	ND	ND	ND	ND	0.01
Heptachlor Epoxide	ND	ND	ND	ND	ND	ND	ND	0.01
Hexachlorobenzene	ND	ND	ND	ND	ND	ND	ND	0.01
Lindane	ND	ND	ND	ND	ND	ND	ND	0.01
Methoxychlor	ND	ND	0.58	ND	ND	ND	ND	0.03
Mirex	ND	ND	ND	ND	ND	ND	ND	0.01
	ug/l	ug/l	ug/l	ug/l	ug/l	ug/L	ug/L	

All waters analyzed to ug/L / ppb
ND = Not Detectable (less than detection limit)
Trace = Present, but less than Limit of Quantitation

Figure 4: Callison Waste Metal Dump - Looking East from Piez#

Figure 5: Callison Dump - Piez #3 with abandoned dump in background

Figure 6: Callison dump - Piez#2. Klondike Highway to the left

Figure 7: **Callison Dump - Piez#1** along eastern edge of Site

Figure 8: **Callison Dump Dredge Pond** located to west of Piez#3

DISCUSSION

The organochlorine based pesticide Methoxychlor is used for control of blackfly larvae in streams. It is also used in homes and gardens, and is registered for use on virtually all fruits and vegetables and a variety of grains (CWQG 1992).

Methoxychlor has been found to adsorb strongly to the soil to which it was applied. This, in combination with it's low solubility in water indicates a tendency to remain in soil or sediment for an extended period of time.

The major removal process for methoxychlor from the water column is sorption to suspended sediments. High order mammals are able to metabolize methoxychlor resulting in a low rate of biomagnification. Methoxychlor has a low mammalian toxicity (LD50, oral = 5,000 dermal = 6,000).

The maximum acceptable concentration for the organochlorine methoxyclor in drinking water is 900 ug/l (ppb) (CCME 1991). The level measured in groundwater at the Callison dump is well below this level but does exceed the "objective" concentration of 5.0×10^{-8} (GCDWQ 1992). There are no published remediation criteria for methoxychlor for freshwater aquatic life, irrigation or livestock watering.

As the organochlorine methoxychlor was detected in only one of the four water samples taken in the immediate dump area, it is assumed the contamination in not widespread. The pesticide is likely absorbed to soils/sediments in the area surrounding the western edge monitoring standpipe (Piez #3).

Methoxychlor was not detected in the two surface water samples taken downstream of the dump site or in the upstream sample.

Groundwater flow in the area is expected to be in a westerly direction, either paralleling the Klondike River or slightly away from the river course (A. Rothwell pers. comm.). As the area immediately surrounding the site was undisturbed by placer dredging operations the water table is likely depressed in relation to the dredged areas where the soil materials have been inverted (soil below/gravel at surface). Groundwater flows in the undisturbed area would be less than in the dredge tailings and restricted to non permafrost frozen gravel seams. The above groundwater regime may limit the dispersion of contaminants by limiting the transportation of suspended sediment

RECOMMENDATIONS

Laboratory analysis of groundwater samples taken from one of the Callison dump monitoring wells identified the organochlorine insecticide methoxychlor in concentrations of 0.58 ug/l. The contamination was detected in only one of the four water samples taken in the immediate area of the dump. The contaminant was not detected in the downstream or upstream samples taken from the Klondike River or its tributary streams.

As the contaminant was detected at concentrations well below the maximum acceptable concentrations for drinking water quality in the immediate dump area and was not detected in downstream samples, there does not appear to be any health threat posed by the presence of methoxychlor at this site. Combined with the limited potential for transport of methoxychlor (absorption to sediment) within the permafrost soils of the site, the probability of future detectable levels of methoxychlor in downstream waters is low.

Although the area's groundwater meets existing drinking water guidelines for all analyzed parameters with the exception of iron and manganese, monitoring for the continued presence of the organochlorine methoxychlor should continue. A monitoring schedule of annual or biannual sampling and analysis should be sufficient.

REFERENCES

British Columbia Ministry of Environment. **Handbook for Pesticide Applicators and Dispensers.**

Canadian Council of Ministers of the Environment. 1991. **Interm Canadian Environmental Quality Criteria for Contaminated Sites.** Report CCME EPC - CS34.

Canadian Council of Resource and Environment Ministers. **Canadian Water Quality Guidelines**

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Rothwell, A. *Water Management Officer*, Northern Affairs Program, Water Resources Division (Personal communication)

APPENDIX 1

LITERATURE SEARCH

LITERATURE SEARCHED

REPORTS

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Historical file: # 4782-M370

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File #1304 - 9 (Mayo Municipal Records)

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Mayo Municipal Files.

Northern Affairs Program - Water Resources Division, Whitehorse.
Mayo Municipal Files.

Table A-1. Callison Waste Metal Dump. Summary of Water Quality

Parameter	October/87			July/91			November/92			Guide-Lines
	East P-1	North P-2	West P-3	East P-1	North P-2	West P-3	East P-1	North P-2	West P-3	
Chloride	16.0	21.2	0.25	2.2	14	25	-	-	-	-
Sulphate	266	87.6	18.6	12.5	210	88.0	-	-	-	500
Aluminum	0.7	1.41	0.47	-	-	-	<0.005	0.017	0.023	-
Antimony	<0.005	<0.005	<0.005	-	-	-	<0.02	<0.02	<0.02	-
Arsenic	<0.02	<0.02	<0.02	-	-	-	<0.04	<0.04	<0.04	0.05
Barium	0.058	0.103	0.116	-	-	-	0.015	0.024	0.012	1.0
Beryllium	<0.0011	<0.0001	<0.001	-	-	-	<0.0002	<0.0002	<0.0002	-
Boron	0.007	<0.001	0.019	-	-	-	-	-	-	5.0
Cadmium	0.0011	0.0013	0.00010	-	-	-	0.0009	0.0024	<0.02	0.005
Calcium	101	36.1	32.4	8.06	44.2	28.4	54.1	23.3	7.65	-
Chromium	0.0099	0.0118	0.0025	-	-	-	<0.001	<0.001	<0.001	0.05
Cobalt	0.0017	0.0019	0.0006	-	-	-	0.005	0.003	<0.001	-
Copper	0.0083	0.0147	0.0028	-	-	-	0.01	0.01	0.012	1.0
Iron	33.6	44.1	12.5	-	-	-	7.34	15.5	4.99	0.3
Lead	<0.002	<0.002	<0.002	-	-	-	0.008	0.007	0.007	0.05
Lithium	<0.05	<0.05	<0.05	-	-	-	<0.05	<0.05	<0.05	-
Magnesium	38.4	25.1	18.5	9.34	25.9	19.3	30.1	19.2	8.9	-
Manganese	1.18	0.447	0.280	<0.001	0.447	0.110	0.631	0.25	0.067	0.05
Mercury	<0.005	<0.005	<0.005	-	-	-	-	-	-	0.001
Molybdenum	0.001	<0.001	0.011	-	-	-	<0.003	<0.003	<0.003	-
Nickel	0.0115	0.0182	0.0058	-	-	-	0.005	0.002	0.003	-
Phosphorus	<0.05	0.07	<0.05	0.20	<0.02	0.02	0.09	0.08	0.05	-
Potassium	3.6	2.3	7.6	5.85	3.84	2.22	2.98	2.08	5.29	-
Selenium	<0.005	<0.005	<0.005	-	-	-	<0.02	<0.02	<0.02	0.01
Silicon	1.2	2.58	1.18	-	-	-	<0.05	<0.05	<0.05	-
Silver	<0.002	<0.002	<0.002	-	-	-	-	-	-	0.05
Sodium	6.83	8.6	8.16	8.13	8.87	9.15	6.78	8.55	7.96	-
Strontium	0.336	0.168	0.256	-	-	-	0.20	0.118	0.08	-
Thorium	<0.005	<0.005	<0.005	-	-	-	<0.01	<0.01	<0.01	-
Titanium	0.024	<0.052	0.06	-	-	-	0.006	0.012	0.007	-
Uranium	<0.02	<0.02	<0.02	-	-	-	<0.02	<0.02	<0.02	0.02
Vanadium	<0.0002	<0.0002	<0.0002	-	-	-	0.026	0.016	0.008	-
Zinc	0.0095	0.0114	0.0114	-	-	-	0.01	0.009	0.01	5.0
Zirconium	<0.005	<0.005	<0.005	-	-	-	<0.001	<0.001	<0.001	-
	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l

APPENDIX 2

ORAL INTERVIEWS

Results of Oral Interviews

A. Rothwell (Int D-1)

"A. Rothwell is the Water Management Officer for Northern Affairs - Water Resources division in Dawson City from 1979 to the present. A site visit of the Callison dump was done September 2, 1994 with Mr. Rothwell".

Mr. Rothwell noted that the dump was operational when he arrived in Dawson in 1979 and appeared to be domestic landfill as well as a waste metal dump at that time but had no specifics on what was landfilled at the site.

Mr. Rothwell noted that from Water Resource's work in the area, mainly around the Bear Creek slough it appeared groundwater flows moved downslope away from the Klondike River channel which was elevated above the surrounding area. The groundwater table in the Callison waste metal dump was likely elevated (perched) over the non dredge surrounding area due to inversion of gravel and overburden in the dredged area. Bear Creek and Quigley Gulch flows percolated throughout the area as they channel along the roadway through dredge ponds and sloughs. These flows cross the highway in at least two locations before entering the Klondike River just upstream of the bridge.

R. Gillispie (Int D-2)

"R. Gillispie is a long time Dawson resident who is familiar with the Callison site from dump maintenance work done by his father."

Mr. Gillispie noted that the Callison dump consisted of two belly scraper trenches. Originally used for metal waste but later everyone in the area from Henderson Corner to Dawson deposited domestic waste. There was no attempt to separate metal and domestic materials.

Harry Campbell (Int D-3)

"H. Campbell is a long time Dawson resident whose company (Klondike Transport) performed maintenance work at the Callison dump on a few occasions."

Mr. Campbell noted there would have been no transformers dumped in Callison after YCGC closed down, all transmission lines and transformers were stripped of their copper and the carcasses left where they lay. Mr. Campbell does not remember ever seeing discarded pesticide containers at the Callison site but noted there is a possibility some were discarded there as domestic waste. Mr. Campbell does not remember any specific pesticide use operations except for mosquito control spraying and he was not involved in that.

Garry Gammie (Int D-4)

"G. Gammie has been a resident of Dawson for 28 years. Gammie Trucking operated gravel pit at the site prior to it becoming a dump.'

Mr. Gammie noted that gravel at the site was in small unfrozen seams limited in volume. Once the gravel was excavated, the site became a dump. Expansion of either the gravel or landfill operations was not practical once the gravel seams were finished as the area surrounding the site was frozen in permafrost.

Mr. Gammie noted that just about everything was deposited there as landfill but had never seen electrical transformers or pesticide containers at the site. Noted that the number of batteries dumped in the trenches might pose some problems.

George Nagano (Int D-5)

"G. Nagano has worked for the territorial highway department in Dawson since 1961 and is presently road foreman."

Mr. Nagano noted that the highway's department did periodic maintenance work on the Callison site. No herbicides were used by the highways department as the cost was prohibitive. Mr. Nagano recalls a once only spraying of herbicide on the airport runway in the mid 1970's but does not remember the brand of herbicide or application method, only that it worked well for brush control.

Al Close (Int M-6)

"A. Close was road foreman for the highways department on the Dempster Highway (1966-1974) and in Dawson (1974-1980)

Mr. Close was familiar with the Callison site as the highway department often did maintenance work at the municipalities request (burn and bury). Mr. Close recalls the site was originally used for metal (lots of car bodies) but later became a domestic dump for everyone in the valley. Mr. Close verified that the highways department did not use herbicides for brush control on right of ways.

John Gould (Int D-7)

"J. Gould is a long time Dawson resident and local historian. He was employed by Parks Canada at the Bear Creek site in the 1970's and 1980's."

Mr. Gould participated in the Bear Creek PCB cleanup after the site was purchased by Parks Canada in the late 1970's and is familiar with the types of transformers and capacitors used in the area. He does not recall ever seeing any of that equipment in the Callison dump.

Newt Webster (Int D-8)

"N. Webster has resided in Dawson City since the 1930's. From 1936 to 1967 her was superintendent for the North Fork power station"

Mr. Webster noted that oil used in transformers and other equipment by the power station was not "PCB oil" but of another type similar to what you would take for stomach problems. As the power station was closed and copper salvage of lines and transformers completed long before the Callison dump opened, it is very unlikely any of that material was deposited in the dump.

The herbicide 2, 4, 5 T was used on the North Fork water supply ditches to control weeds. the herbicide was applied with a hand sprayer by staff. Mr. Webster noted that it was effective on weeds and as a growth promoter for spruce. Mr. Webster was unaware of how the containers were disposed of but again it was unlikely they would have been deposited at Callison due to time frame.

Vern Parkin (Int D-9)

"V. Parkin work for YCGC on the Dawson area dredges in the early 1960's, then as a lineman for NCPC (1966-87) and later for YEC as Mayo/Faro/Dawson area superintendent (1987-1993).

Mr. Parkin remembers being up to his elbows in transformer oil on the YCGC dredges filtering water from the oil. The residue would have been dumped off the dredge as there was no "hazardous waste" connection to the oil in those days. It is unlikely the waste oil or residue would have even been trucked to a dump and due to the time frame, none of this material would have ended up in the Callison dump.

Later, as an employee of Yukon Electric, Mr. Parkin participated in the 1985-1990 territory wide PCB cleanup of the company facilities.

APPENDIX 3

LABORATORY ANALYSIS REPORT SHEETS

Quanta Trace Laboratories Inc.
#401-3700 Gilmore Way
Burnaby, B.C. V5G 4M1
Tel:(604)438-5226
Fax:(604)436-0565

ANALYSIS OF INDUSTRIAL SAMPLES

To: J. GIBSON & ASSOCIATES
Site 15, Comp 111, RR2
Whitehorse, Yukon *
Y1A 5W8

Attn: J. Gibson

Re: Dawson Waters

Workorder: 24194
Received : 08-Sep-94
Completed: 19-Sep-94

24194-1	water #1 Dawson
24194-2	water #2 "
24194-3	water #3 "
24194-4	water #4 "
24194-5	water #5 "
24194-6	water #6 "
24194-7	water #7 "

Please refer to Norwest Labs original report for PCB and organo-chlorine results and methodology.

 Analyst: _____

Norwest Labs

"We Solve Problems"

203 - 20771 Langley By-Pass
Langley, B.C. V3A 5E8
Phone (604) 530-4344
Fax: (604) 534-9996

WO (Lang.) : 9249
WO (Other) : 24194

PO # :
Date Rec'd. : 9-Sep-94
Date Comp. : 16-Sep-94

Client		Received From	
Name	: Quanta Trace Labs	Name	:
Address	: #401 - 3700 Gilmore Way Burnaby, B.C. CANADA V5G 4M1	Address	:
Phone	: (604) 438-5226	Phone	:
Fax	: (604) 436-0565	Fax	:
Attn.	: Janet Pel	Attn.	:
Project	: Dawson Water		

Organo-Chloride Pesticides in Water

Parameter	9249-1 1	9249-2 2	9249-3 3	Detection Limit
Pesticide				
Aldrin	N.D.	N.D.	N.D.	0.01
BHC (alpha isomer)	N.D.	N.D.	N.D.	0.01
4,4'-DDD	N.D.	N.D.	N.D.	0.01
4,4'-DDE	N.D.	N.D.	N.D.	0.01
2,4'-DDT	N.D.	N.D.	N.D.	0.01
4,4'-DDT	N.D.	N.D.	N.D.	0.02
Dieldrin	N.D.	N.D.	N.D.	0.01
Endosulfan I	N.D.	N.D.	N.D.	0.01
Endosulfan II	N.D.	N.D.	N.D.	0.01
Endrin	N.D.	N.D.	N.D.	0.01
Heptachlor	N.D.	N.D.	N.D.	0.01
Heptachlor epoxide	N.D.	N.D.	N.D.	0.01
Hexachlorobenzene	N.D.	N.D.	N.D.	0.01
Lindane	N.D.	N.D.	N.D.	0.01
Methoxychlor	N.D.	N.D.	0.58	0.03
Mirex	N.D.	N.D.	N.D.	0.01

Results are expressed in ppb (ug/L).
N.D. = Not Detectable (less than detection limit).
Trace = Present, but less than Limit of Quantitation.
---------- = Not Determined.

Certified by the CANADIAN ASSOCIATION OF ENVIRONMENTAL ANALYTICAL LABORATORIES (CAEAL)
for Pesticides and PCBs in water.

Norwest Labs

"We Solve Problems"

203 - 20771 Langley By-Pass
Langley, B.C. V3A 5E8
Phone (604) 530-4344
Fax: (604) 534-9996

WO (Lang.) : 9249
WO (Other) : 24194

PO # :
Date Rec'd. : 9-Sep-94
Date Comp. : 16-Sep-94

Organo-Chloride Pesticides in Water (cont.)

Parameter	9249-4 4	9249-5 5	9249-6 6	9249-7 7	Detection Limit
Pesticide					
Aldrin	N.D.	N.D.	N.D.	N.D.	0.01
BHC (alpha isomer)	N.D.	N.D.	N.D.	N.D.	0.01
4,4'-DDD	N.D.	N.D.	N.D.	N.D.	0.01
4,4'-DDE	N.D.	N.D.	N.D.	N.D.	0.01
2,4'-DDT	N.D.	N.D.	N.D.	N.D.	0.01
4,4'-DDT	N.D.	N.D.	N.D.	N.D.	0.02
Dieldrin	N.D.	N.D.	N.D.	N.D.	0.01
Endosulfan I	N.D.	N.D.	N.D.	N.D.	0.01
Endosulfan II	N.D.	N.D.	N.D.	N.D.	0.01
Endrin	N.D.	N.D.	N.D.	N.D.	0.01
Heptachlor	N.D.	N.D.	N.D.	N.D.	0.01
Heptachlor epoxide	N.D.	N.D.	N.D.	N.D.	0.01
Hexachlorobenzene	N.D.	N.D.	N.D.	N.D.	0.01
Lindane	N.D.	N.D.	N.D.	N.D.	0.01
Methoxychlor	N.D.	N.D.	N.D.	N.D.	0.03
Mirex	N.D.	N.D.	N.D.	N.D.	0.01

Results are expressed in ppb (ug/L).
N.D. = Not Detectable (less than detection limit).
Trace = Present, but less than Limit of Quantitation.
---------- = Not Determined.

Norwest Labs

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203 - 20771 Langley By-Pass
Langley, B.C. V3A 5E8
Phone (604) 530-4344
Fax: (604) 534-9996

WO (Lang.) : 9249
WO (Other) : 24194

PO # :
Date Rec'd. : 9-Sep-94
Date Comp. : 16-Sep-94

Organo-Chloride Pesticides in Water (cont.)

Definitions / Methods

Organo-Chloride Pesticides: This analysis is carried out in accordance with U. S. Environmental Protection Agency Method 8080 (#SW 846, 3rd Edition, Washington DC 20460) which involves extraction of the components with an organic solvent (EPA 3540) followed by analysis by capillary gas chromatography using an electron capture detector.

Comments

Quality Control Results

QA/QC		Analyst		
Compound	% Recovery	Analysis	Date	Analyst
lindane	94	O-C Scan	12-Sep-94	Cathy H
DDT	110			
endosulfan I	94			

Supervisor

Note: All samples will be disposed of after 30 days following analysis unless other arrangements are made.

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WO (Lang.) : 9249
WO (Other) : 24194

PO # :
Date Rec'd. : 9-Sep-94
Date Comp. : 16-Sep-94

Client		Received From	
Name	: Quanta Trace Labs	**Name**	:
Address	: #401 - 3700 Gilmore Way Burnaby, B.C. CANADA V5G 4M1	**Address**	:
Phone	: (604) 438-5226	**Phone**	:
Fax	: (604) 436-0565	**Fax**	:
Attn.	: Janet Pel	**Attn.**	:
Project	: Dawson Water		

Polychlorinated Biphenyls (PCBs) in Water

Parameter	9249-1 1	9249-2 2	9249-3 3	Detection Limit
Total PCBs	N.D.*	N.D.*	N.D.*	0.2

Parameter	9249-4 4	9249-5 5	9249-6 6	9249-7 7	Detection Limit
Total PCBs	N.D.*	N.D.*	N.D.*	N.D.*	0.2

Results are expressed in ppb (ug/L).
N.D. = Not Detectable (less than detection limit).
Trace = Present, but less than Limit of Quantitation.

* The chromatogram from this sample was compared to the chromatograms of Aroclors 1248, 1254, 1260 and 1268 at a level comparable to 0.2 ppb, but no match was found.

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WO (Lang.) : 9249
WO (Other) : 24194

PO # :
Date Rec'd. : 9-Sep-94
Date Comp. : 16-Sep-94

Polychlorinated Biphenyls (PCBs) in Water (cont.)

Definitions / Methods

Total PCBs: This analysis is carried out in accordance with U.S. Environmental Protection Agency Methods 3510/8080 (#SW 846, 3rd Edition, Washington DC) which involves extraction of the sample with methylene chloride then cleanup of the sample using a silica gel column followed by analysis by capillary gas chromatography using an electron capture detector.

Comments

Quality Control Results

Compound	% Recovery	Analysis	Date	Analyst
PCB Aroclor-1254	107	PCBs	12-Sep-94	Cathy H

Supervisor

Note: All samples will be disposed of after 30 days following analysis unless other arrangements are made.