Drinking Water Surveillance Program

METRO TORONTO (R.L. CLARK) WATER TREATMENT PLANT

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METRO TORONTO (R.L. CLARK) WATER TREATMENT PLANT

DRINKING WATER SURVEILLANCE PROGRAM

ANNUAL REPORT 1988

FEBRUARY 1990

EXECUTIVE SUMMARY

DRINKING WATER SURVEILLANCE PROGRAM

METRO TORONTO (R.L. CLARK) WATER TREATMENT PLANT
1988 ANNUAL REPORT

The Drinking Water Surveillance Program (DWSP) for Ontario is a monitoring program providing immediate, reliable, current information on drinking water quality. The DWSP officially began in April 1986 and is designed to eventually include all municipal supplies in Ontario. Currently, 52 plants are being monitored.

The Metro Toronto (R.L. Clark) Treatment Plant is a conventional treatment plant that treats water from Lake Ontario. The process consists of coagulation, flocculation, sedimentation, filtration, disinfection and fluoridation. This plant has a design capacity of 655 x 1000m3/day, and in conjunction with the R.C. Harris and Easterly plants, serves a population of approximately 2,333,000 people.

Water samples from the raw and treated sites and from one site in the distribution system were taken on a monthly basis. Parameters were divided into the following groups: Bacteriological, Inorganic and Physical (Laboratory Chemistry, Field Chemistry and Metals) and Organic (Chloroaromatics, Chlorophenols, Pesticides and PCB, Phenolics, Polynuclear Aromatic Hydrocarbons, Specific Pesticides and Volatiles). Specific Pesticides and Chlorophenols were analysed in June and November only.

A summary of results is shown in Table 1.

Inorganic and Physical parameters were all below any applicable health related ODWOs.

Of a total of approximately 110 Organic parameters tested for on a monthly basis, none exceeded health related guidelines.

During 1988 the DWSP sampling results indicated that the R.L. Clark Water Treatment Plant produced a good quality water at the plant and this quality was maintained in the distribution system.

DRINKING WATER SURVEILLANCE PROGRAM

METRO TORONTO (R. L. CLARK) WATER TREATMENT PLANT
1988 ANNUAL REPORT

INTRODUCTION

The Drinking Water Surveillance Program (DWSP) for Ontario is a monitoring program providing immediate, reliable, current information on drinking water quality. The DWSP officially began in April 1986 and is designed to eventually include all municipal supplies in Ontario. Currently, 52 plants are being monitored.

The DWSP was initiated at the R. L. Clark Water Treatment Plant in January of 1986. Annual reports were published for 1986 (ISBN 0-7729-2551-8) and 1987 (ISSN 0839-8976).

This report contains information and results for 1988.

PLANT DESCRIPTION

The Metro Toronto (R.L. Clark) Water Treatment Plant is a conventional treatment plant which treats water from Lake Ontario. The process consists of coagulation, flocculation, sedimentation, filtration, disinfection and fluoridation. Superchlorination is used for disinfection and for taste and odour control. Sulphur

Sample lines in the plant were flushed prior to sampling to ensure that the water obtained was indicative of its origin and not residual water standing in the sample line.

At the distribution system location two types of samples were obtained: a standing and a free flow. The standing sample consisted of water that had been in the household plumbing and service connection for a minimum of six hours. These samples are used to make an assessment of the amount by which the levels of inorganic compounds and metals may be changed on standing, due to leaching from (or deposition on), the plumbing system. The only analyses carried out on these samples therefore, are General Chemistry and Metals. The free flow sample represented fresh water from the distribution main that had been flowing at the sample tap for five minutes before being sampled.

Attempts were made to capture the same block of water at each sampling point by taking the retention time into consideration. The retention time was calculated by dividing the volume of water between the two sampling points by the sample day flow. For example, if it was determined that the retention time within the plant was five hours then there would be a five hour interval between the raw and treated sample. Similarly, if it was estimated that it took approximately one day for the water to travel from the plant to the distribution system site, this site would be sampled one day after the treated water from the plant.

FIGURE 1

DRINKING WATER SURVEILLANCE PROGRAM

SITE LOCATION MAP

R.L. CLARK WATER TREATMENT PLANT

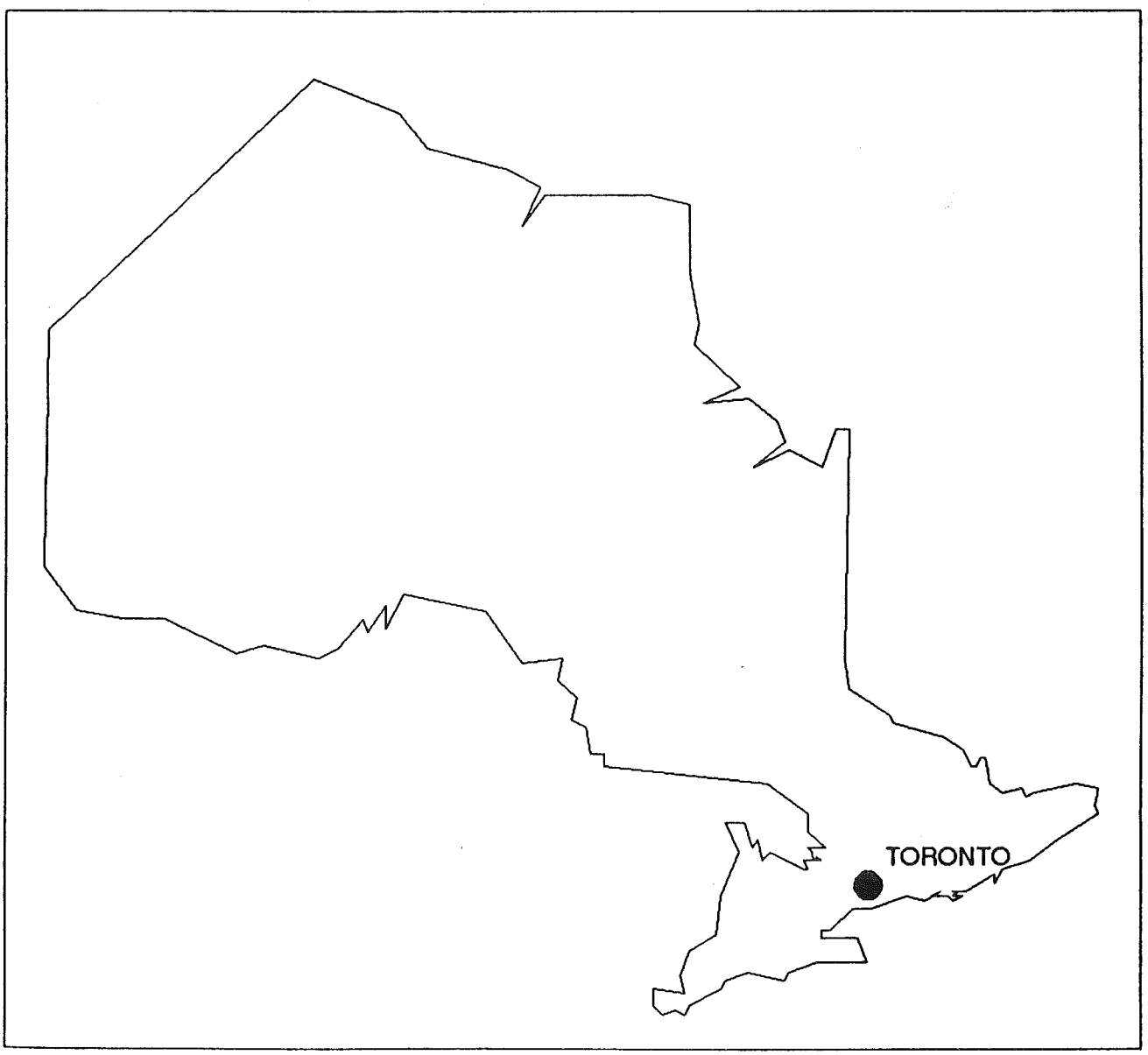

TABLE 2

DRINKING WATER SURVEILLANCE PROGRAM ANNUAL REPORT

GENERAL INFORMATION

METRO TORONTO (R.L. CLARK) WATER TREATMENT PLANT

LOCATION:	45 23RD STREET TORONTO, ONTARIO M8V 3M6 (416-392-2905)
SOURCE:	RAW WATER SOURCE - LAKE ONTARIO
RATED CAPACITY:	655 (1000 M3/DAY)
OPERATION:	MUNICIPAL
PLANT SUPERINTENDENT:	A. VUKOSAVLIJEVIC
MINISTRY REGION:	CENTRAL
DISTRICT OFFICER:	J. MILLS

MUNICIPALITY SERVED	POPULATION
CITY OF TORONTO	615,000
CITY OF ETOBICOKE	298,490
CITY OF NORTH YORK	556,308
CITY OF SCARBOROUGH	461,957
CITY OF YORK	133,856
BOROUGH OF EAST YORK	97,679
REGION OF YORK (SOUTH)	170,000

Table 4 is a summary break-down of the number of water samples analysed by parameter and by water type. The number of times that a positive or trace result was detected is also reported.

Positive denotes that the result is greater than the statistical limit of detection established by the Ministry of the Environment (MOE) laboratory staff and is quantifiable. Trace (<T) denotes that the level measured is greater than the lowest value detectable by the method but lies so close to the detection limit that it cannot be confidently quantified.

Table 5 presents the results for parameters detected on at least one occasion.

Table 6 lists all parameters analysed in the DWSP.

Associated guidelines and detection limits are also supplied in Table 5 and 6. Parameters are listed alphabetically within each scan.

DISCUSSION

General

Water quality is judged by comparison with the Ontario Drinking Water Objectives (ODWOs) as defined in the 1984 publication (ISBN

Bacteriology

Positive results for the Bacteriology scan were present six times in the treated water and twelve times in the distribution system Site 1 water. In most cases the positive parameters were Standard Plate Count, Total Coliform and/or Total Coliform Background. The presence/absence (P.A.) test determined Coliform bacteria to be present within 48 hours in the August sample from distribution system Site 1.

Standard Plate Count results were all very low, indicating that good microbiological quality was being maintained in the distribution system.

Guidelines for bacteriological sampling and testing of a supply are developed to maintain a proper supervision of its bacteriological quality; the routine monitoring program usually requires the taking of multiple samples in a given system. Full interpretation of bacteriological quality cannot be made on the basis of single samples. Further, bacteriological limits were developed in acknowledgement that the presence of coliforms may be detected due to their non-uniform distribution throughout the distribution system and the fact that their enumeration is subject to considerable variation. For these reasons, the occasional finding of low numbers of coliform organisms is not unexpected. Routine bacteriological monitoring, as outlined in the ODWOs is

for potential sewage pollution and its detection.

As part of the treatment plant process, hydrofluosilicic acid is added to the treated water (Table 3). Where fluoridation is practiced, the Fluoride concentration recommended in the ODWO is 1.2 mg/L, plus or minus 0.2 mg/L. This level was maintained.

The ODWO recommend a hardness level of between 80 and 100 mg/L as calcium carbonate for domestic waters, to provide an acceptable balance between corrosion and incrustation. Water supplies with a hardness greater than 200 mg/L are considered poor and would possess a tendency to form scale deposits and result in excessive soap consumption. The hardness levels for the R.L. Clark water range from 127 to 145 mg/L.

Metals

The results reported for the Metals scan were below any health-related ODWOs.

Copper and Iron levels were lower in the treated water as compared to the raw water. This is a result of the treatment process. The addition of Alum as a coagulant to the raw water and the resulting coagulation/settling process has been shown to reduce the levels of most metals.

added in the treatment process.

Organic Parameters

Chloroaromatics

The results of the Chloroaromatics scan showed that no chloroaromatices were detected.

Chlorophenols

The results of the Chlorophenols scan showed that no Chlorophenols were detected.

Pesticides and PCB (Polychlorinated Biphenyl)

The results of the Pesticides and PCB scan showed that no PCBs were detected and that two pesticides were detected:

Alpha BHC

Lindane

There are several isomers of BHC (Benzene Hexachloride); gamma BHC is the active ingredient of the pesticide Lindane, while Alpha BHC is the predominant isomer found in surface waters from the Great Lakes Basin DWSP.

Alpha BHC was detected at trace levels, nine times in the raw water, nine times in the treated water and eight times in the distribution system Site 1 water.

other than Trihalomethanes(THMs), were detected:

- Benzene
- Toluene
- Ethylbenzene
- Meta & Para-Xylene
- Ortho-Xylene
- Styrene
- Methylene Chloride (Dichloromethane)
- Carbon Tetrachloride
- Tetrachloroethylene

Benzene was detected at trace levels, twice in the treated water sample.

Toluene was detected at trace levels, once in the raw water, four times in the treated water and twice in the distribution system Site 1 water. The detection of toluene at low, trace levels is a laboratory artifact derived from the analytical methodology. The purge-and-trap analytical technique depends on the purging of the volatile organics in the water sample with helium gas onto a Tenax trapping column. The volatile materials are subsequently thermally desorbed, separated and quantified. Tenax, a toluene-like polymeric material, tends to decompose sporadically upon heating into toluene and other aromatic componenets (ethylbenzene and xylene) giving instrument blanks in the order of 0.05 ug/L.

THMs are acknowledged to be produced during the water treatment process and will always occur in chlorinated surface waters. THMs in drinking water are comprised of Chloroform, Chlorodibromomethane and Dichlorobromomethane. Bromoform occurs occasionally. Results are reported for the individual compounds as well as for total THMs.

Chloroform, Chlorodibromomethane, Dichlorobromomethane and Total THMs were always detected in the treated waters. Chloroform was detected at trace levels, four times in the raw water. Bromoform was detected, at trace levels ten times in the treated water and nine times in the distribution system Site 1 water. All THM occurrences, ranging from 15.8 ug/L to 43.15 ug/L, were well below the ODWO of 350 ug/L for Total THMs.

THMs were not detected in the October treated water sample, the same sample did not have the added amount of fluoride, indicating that in fact for the volatile scan a raw water sample was substituted in error for a treated water, thus the 'NSS' not suitable sample remark.

Comparison with the results of analyses from the DWSP in 1986 and 1987 shows that the raw and treated water quality to present has remained consistent at the R. L. Clark Water Treatment Plant.

TABLE 3

DRINKING WATER SURVEILLANCE PROGRAM METRO TORONTO (R. L. CLARK WTP) SAMPLE DAY CONDITIO 1988

	SAMPLE DAY CONDITIONS		TREATMENT CHEMICAL DOSAGES (MG/L)					
			PRE-CHLORINATION	COAGULATION	POST-CHLORINATION	FLUORIDATION	DECHLORINATION	CHLORAMINATION
			CHLORINE	ALUM LIQUID	CHLORINE	HYDROFLUOSILICIC ACID	SULPHUR DIOXIDE	AMMONIUM ANHYDROUS
DATE	RETENTION TIME(HRS)	FLOW (1000 M3)						
JAN 19	7.5	484.0	01.51	03.02	00.60	01.01	00.39	.
FEB 16	7.5	424.0	00.79	03.02	02.52	01.01	01.70	.
MAR 21	7.4	485.0	00.79	05.05	02.52	01.01	01.20	00.20
APR 19	7.1	534.0	00.79	03.02	02.02	01.01	01.20	00.20
MAY 17	6.2	573.0	00.79	05.05	02.02	01.20	01.01	00.20
JUN 21	5.3	700.0	01.51	10.09	01.51	01.01	01.39	.
JUL 19	7.5	494.0	01.51	07.05	01.70	00.97	01.07	00.20
AUG 16	7.0	518.0	00.79	03.02	02.02	01.01	00.69	00.20
SEP 20	7.7	456.0	00.79	03.02	00.79	00.82	00.20	00.20
OCT 18	7.5	481.0	00.79	03.02	00.69	00.97	00.20	00.20
NOV 22	9.6	384.0	00.79	05.05	00.69	00.97	00.39	.
DEC 12	7.5	467.0	01.51	03.02	00.79	01.14	01.20	00.20

TABLE 4

DRINKING WATER SURVEILLANCE PROGRAM METRO TORONTO (R. L. CLARK WTP)

SUMMARY TABLE OF RESULTS (1988)

		RAW			TREATED			SITE 1		
SCAN	PARAMETER	TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE
CHEMISTRY (LAB)	CALCIUM	12	12	0	11	11	0	20	20	0
	CYANIDE	11	0	0	11	0	0	10	0	0
	CHLORIDE	12	12	0	11	11	0	20	20	0
	COLOUR	12	2	10	11	0	10	20	0	20
	CONDUCTIVITY	12	12	0	11	11	0	20	20	0
	FLUORIDE	12	12	0	11	11	0	20	20	0
	HARDNESS	12	12	0	11	11	0	20	20	0
	IONCAL	12	6	0	12	6	0	20	10	0
	LANGELIERS INDEX	12	12	0	10	10	0	20	20	0
	MAGNESIUM	12	12	0	11	11	0	20	20	0
	SODIUM	12	12	0	11	11	0	20	20	0
	AMMONIUM TOTAL	12	9	3	11	9	2	20	15	5
	NITRITE	12	9	3	11	3	8	20	8	12
	TOTAL NITRATES	12	12	0	11	11	0	20	20	0
	NITROGEN TOT KJELD	12	12	0	11	11	0	20	20	0
	PH	12	12	0	11	11	0	20	20	0
	PHOSPHORUS FIL REACT	12	6	6	11	1	10	.	.	.
	PHOSPHORUS TOTAL	12	8	4	11	2	8	.	.	.
	SULPHATE	6	6	0	5	5	0	10	10	0
	TURBIDITY	12	12	0	11	8	3	20	20	0
*TOTAL SCAN CHEMISTRY (LAB)		245	202	26	225	165	41	360	303	37
METALS	SILVER	12	0	4	11	0	6	20	0	16

*TOTAL GROUP INORGANIC & PHYSICAL	569	395	118	381	388	136	424	239	199	

TABLE 4

DRINKING WATER SURVEILLANCE PROGRAM METRO TORONTO (R. L. CLARK WTP)

SUMMARY TABLE OF RESULTS (1988)

		RAW			TREATED			SITE 1		
SCAN	PARAMETER	TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE
CHLOROAROMATICS	HEXACHLOROBUTADIENE	12	0	0	11	0	0	10	0	0
	123 TRICHLOROBENZENE	12	0	0	11	0	0	10	0	0
	1234 T-CHLOROBENZENE	12	0	0	11	0	0	10	0	0
	1235 T-CHLOROBENZENE	12	0	0	11	0	0	10	0	0
	124 TRICHLOROBENZENE	12	0	0	11	0	0	10	0	0
	1245 T-CHLOROBENZENE	12	0	0	11	0	0	10	0	0
	135 TRICHLOROBENZENE	12	0	0	11	0	0	10	0	0
	HCB	12	0	0	11	0	0	10	0	0
	HEXACHLOROETHANE	12	0	0	11	0	0	10	0	0
	OCTACHLOROSTYRENE	12	0	0	11	0	0	10	0	0
	PENTACHLOROBENZENE	12	0	0	11	0	0	10	0	0
	236 TRICHLOROTOLUENE	12	0	0	11	0	0	10	0	0
	245 TRICHLOROTOLUENE	12	0	0	11	0	0	10	0	0
	26A TRICHLOROTOLUENE	12	0	0	11	0	0	10	0	0
*TOTAL SCAN CHLOROAROMATICS		168	0	0	154	0	0	140	0	0
CHLOROPHENOLS	234 TRICHLOROPHENOL	2	0	0	2	0	0	.	.	.
	2345 T-CHLOROPHENOL	2	0	0	2	0	0	.	.	.
	2356 T-CHLOROPHENOL	2	0	0	2	0	0	.	.	.
	245-TRICHLOROPHENOL	2	0	0	2	0	0	.	.	.
	246-TRICHLOROPHENOL	2	0	0	2	0	0	.	.	.
	PENTACHLOROPHENOL	2	0	0	2	0	0	.	.	.
*TOTAL SCAN CHLOROPHENOLS		12	0	0	12	0	0	0	0	0

TABLE 4

DRINKING WATER SURVEILLANCE PROGRAM METRO TORONTO (R. L. CLARK WTP)

SUMMARY TABLE OF RESULTS (1988)

		RAW			TREATED			SITE 1		
SCAN	PARAMETER	TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE
PESTICIDES & PCB	BETA BHC	12	0	0	11	0	0	10	0	0
	LINDANE	12	0	3	11	0	4	10	0	4
	ALPHA CHLORDANE	12	0	0	11	0	0	10	0	0
	GAMMA CHLORDANE	12	0	0	11	0	0	10	0	0
	DIELDRIN	12	0	0	11	0	0	10	0	0
	METHOXYCHLOR	12	0	0	11	0	0	10	0	0
	ENDOSULFAN 1	12	0	0	11	0	0	10	0	0
	ENDOSULFAN II	12	0	0	11	0	0	10	0	0
	ENDRIN	12	0	0	11	0	0	10	0	0
	ENDOSULFAN SULPHATE	12	0	0	11	0	0	10	0	0
	HEPTACHLOR EPOXIDE	12	0	0	11	0	0	10	0	0
	HEPTACHLOR	12	0	0	11	0	0	10	0	0
	MIREX	12	0	0	11	0	0	10	0	0
	OXYCHLORDANE	12	0	0	11	0	0	10	0	0
	OPDDT	12	0	0	11	0	0	10	0	0
	PCB	12	0	0	11	0	0	10	0	0
	DDD	12	0	0	11	0	0	10	0	0
	PPDDE	12	0	0	11	0	0	10	0	0
	PPDDT	12	0	0	11	0	0	10	0	0
	AMETRINE	12	0	0	11	0	0	10	0	0
	ATRAZINE	12	0	0	11	0	0	10	0	0
	ATRATONE	12	0	0	11	0	0	10	0	0
	CYANAZINE	12	0	0	11	0	0	10	0	0
	DES ETHYL ATRAZINE	6	0	0	5	0	0	5	0	0
	DES ETHYL SIMAZINE	6	0	0	5	0	0	5	0	0

TABLE 4

DRINKING WATER SURVEILLANCE PROGRAM METRO TORONTO (R. L. CLARK WTP)

SUMMARY TABLE OF RESULTS (1988)

SCAN	PARAMETER	RAW			TREATED			SITE 1		
		TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE
SPECIFIC PESTICIDES	DICHLOROVOS	2	0	0	2	0	0	.	.	.
	CHLORPYRIFOS	2	0	0	2	0	0	.	.	.
	ETHION	2	0	0	2	0	0	.	.	.
	AZINPHOS-METHYL	0	0	0	0	0	0	.	.	.
	MALATHION	2	0	0	2	0	0	.	.	.
	MEVINPHOS	2	0	0	2	0	0	.	.	.
	METHYL PARATHION	2	0	0	2	0	0	.	.	.
	METHYLTRITHION	2	0	0	2	0	0	.	.	.
	PARATHION	2	0	0	2	0	0	.	.	.
	PHORATE	2	0	0	2	0	0	.	.	.
	RELDAN	2	0	0	2	0	0	.	.	.
	RONNEL	2	0	0	2	0	0	.	.	.
	AMINOCARB	0	0	0	0	0	0	.	.	.
	BENONYL	2	0	0	2	0	0	.	.	.
	BUX	2	0	0	2	0	0	.	.	.
	CARBOFURAN	2	0	0	2	0	0	.	.	.
	CICP	2	0	0	2	0	0	.	.	.
	DIALLATE	2	0	0	2	0	0	.	.	.
	EPTAM	2	0	0	2	0	0	.	.	.
	IPC	2	0	0	2	0	0	.	.	.
	PROPOXUR	2	0	0	2	0	0	.	.	.
	CARBARYL	2	0	0	2	0	0	.	.	.
	BUTYLATE	2	0	0	2	0	0	.	.	.
*TOTAL SCAN SPECIFIC PESTICIDES		56	0	0	56	0	0	0	0	0

TABLE 4

DRINKING WATER SURVEILLANCE PROGRAM METRO TORONTO (R. L. CLARK WTP)

SUMMARY TABLE OF RESULTS (1988)

SCAN	PARAMETER	RAW			TREATED			SITE 1		
		TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE
VOLATILES	1,3 DICHLOROBENZENE	10	0	0	10	0	0	9	0	0
	1,2 DICHLOROBENZENE	10	0	0	10	0	0	9	0	0
	TRIFLUOROCHLOROTOLUE	4	0	0	5	0	0	4	0	0
	ETHLYENE DIBROMIDE	10	0	0	10	0	0	9	0	0
	TOTL TRIHALOMETHANES	10	0	0	10	10	0	9	9	0
*TOTAL SCAN VOLATILES		287	0	11	286	41	32	258	38	15
*TOTAL GROUP ORGANIC		1135	5	29	1068	42	54	728	38	27
TOTAL		1748	443	145	1671	414	190	1696	705	226

KEY TO TABLE 5 and 6

A ONTARIO DRINKING WATER OBJECTIVES (ODWO)
1. Maximum Acceptable Concentration (MAC)
1+. MAC for Total Trihalomethanes
1*. MAC for Bacteriological Analyses
Poor water quality is indicated when :
- total coliform counts > 0 < 5
- P/A Bottle Test is present after 48 hours
- Aeromonas organisms are detected in more than 25% of samples in a single submission or in successive submissions from the same sampling site
- Pseudomonas Aeruginosa, Staphylococcus Aureus and members of the Fecal Streptococcus group should not be detected in any sample
- Standard Plate Count should not exceed 500 organisms per ml at 35 ^{0}C within 48 hours

2. Interim Maximum Acceptable Concentration (IMAC)
3. Maximum Desirable Concentration (MDC)
4. Aesthetic or Recommended Operational Guideline
- hardness levels between 80 and 100 mg/L as calcium carbonate are considered to provide an acceptable balance between corrosion and incrustation, water supplies with a hardness >200 mg/L are considered poor and those in excess of 500 mg/L are unacceptable.

B HEALTH & WELFARE CANADA (H&W)
1. Maximum Acceptable Concentration (MAC)
2. Proposed MAC
3. Interim MAC
4. Aesthetic Objective (AO) (for xylenes, the AO is a total)

C WORLD HEALTH ORGANIZATION (WHO)
1. Guideline Value (GV)
2. Tentative GV
3. Aesthetic GV

D US ENVIRONMENTAL PROTECTION AGENCY (EPA)
1. Maximum Contaminant Level (MCL)
2. Suggested No-Adverse Effect Level (SNAEL)
3. Lifetime Health Advisory
4. EPA Ambient Water Quality Criteria

F EUROPEAN ECONOMIC COMMUNITY (EEC)
1. Health Related Guideline Level
2. Aesthetic Guideline Level
3. Maximum Admissable Concentration (MADC)

G CALIFORNIA STATE DEPARTMENT OF HEALTH-GUIDELINE VALUE

H USSR MAXIMUM PERMISSIBLE CONCENTRATION

I NEW YORK STATE AMBIENT WATER GUIDELINE

N/A NONE AVAILABLE

INTERPRETATION OF DATA

The interpretation of analytical results that are obtained from measurements near the limit of detection of the measurement process is subject to greater uncertainty than those at higher concentrations. The principle areas of concern relate to whether the substance has actually been detected, whether it has been properly identified, and whether it is an artifact of the measurement process. In other words, false positives can be caused by the instrumentation or the test procedures used, when in fact these compounds are not present in the sample.

There are several methods to treat data from such measurements:
1. Exclude the low-level data because of this uncertainty factor. However, studies of long-term environmental trends and modelling may be adversely affected by exclusion of such data.
2. Qualify these data so the user is aware of the greater uncertainty associated with their use.

For the Drinking Water Surveillance Program, measurements near the limit of detection of the measurement process are reported qualified by the code "<T". Results quantified by "W" indicate a zero measurement. These results are reported for purposes of modelling and long-term trend analysis and no significance should be attributed to a single determination of a substance below "T" (a single determination may well be a false positive). Repeat analysis or additional data are needed before it can be stated with certainty that the substance in question was truly present. On the other hand, it is less likely that repeated detection of a substance at or near the limit of detection at a specific location is solely due to an artifact in the measurement system, and more likely represents a true positive. However the average of such data is still only an estimate of the amount of substance present subject to the possible biases of the method used.

LABORATORY RESULTS, REMARK DESCRIPTIONS

.	No Sample Taken
BDL	Below Minimum Measurable Amount
<T	Greater Than Detection Limit But Not Confident (SEE INTERPRETATION OF RESULTS ABOVE)
>	Results Are Greater Than The Upper Limit
<=>	Approximate Result
!AW	No Data: Analysis Withdrawn
!CR	No Data: Could Not Confirm By Reanalysis
!CS	No Data: Contamination Suspected
!IL	No Data: Sample Incorrectly Labelled
!IS	No Data: Insufficient Sample
!LA	No Data: Laboratory Accident

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM METRO TORONTO (R. L. CLARK WTP) 1988

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM	
	RAW	TREATED	SITE 1	
			STANDING	FREE FLOW
BACTERIOLOGICAL				
AEROMONAS SP (0=ABSENT)			DET'N LIMIT = N/A	GUIDELINE = 0 (A1)
APR	.	.	.	0
AUG	.	.	.	0
E. COLI P/A (0=ABSENT)			DET'N LIMIT = N/A	GUIDELINE = N/A
APR	.	.	.	0
AUG	.	.	.	0
FECAL COLIFORM MF (CT/100ML)			DET'N LIMIT = 0	GUIDELINE = 0 (A1)
JAN	4	.	.	.
FEB	11	.	.	.
MAR	1	.	.	.
APR	3	.	.	.
MAY	0	.	.	.
JUN	1	.	.	.
JUL	14	.	.	.
AUG	8	.	.	.
SEP	2 T48	.	.	.
OCT	7 T48	.	.	.
NOV	12 T24	.	.	.
DEC	2 T24	.	.	.
FECAL COLIFORM (0=ABSENT)			DET'N LIMIT = N/A	GUIDELINE = 0 (A1)
APR	.	.	.	0
AUG	.	.	.	0
STANDRD PLATE CNT MF (CT/ML)			DET'N LIMIT = 0	GUIDELINE = 500/ML (A1)
JAN	29	0	.	3
FEB	101	0	.	2
MAR	112	9	.	14
APR	380	0	.	2
MAY	210	0	.	.
JUN	83	0	.	2
JUL	2400 >	18	.	15
AUG	56	1	.	7
SEP	.	2 <=>	.	34 T24
OCT	.	NSS	.	2 <=>
NOV	.	6 <=>	.	3 <=>
DEC	.	3 <=>	.	.

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM METRO TORONTO (R. L. CLARK WTP) 1988

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM	
	RAW	TREATED	SITE 1	
			STANDING	FREE FLOW
SEP	830 A3C	1 T48	.	0 T24
OCT	2400 >	2400 >	.	0 T24
NOV	580 A3C	0 T24	.	0 T06
DEC	42 T24	0 T24	.	.

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM METRO TORONTO (R. L. CLARK WTP) 1988

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM	
	RAW	TREATED	SITE 1	
			STANDING	FREE FLOW
FLD PH (DMSNLESS)			DET'N LIMIT = N/A	GUIDELINE = 6.5-8.5(A4)
JAN	8.200	7.400	7.690	7.600
FEB	8.300	7.200	7.600	7.500
MAR	8.400	7.400	7.500	7.500
APR	8.200	7.600	.	.
MAY	8.300	7.500	.	.
JUN	8.200	7.400	7.480	7.280
JUL	8.400	7.500	7.620	7.390
AUG	8.100	7.600	7.700	7.400
SEP	8.100	7.300	7.720	7.520
OCT	8.200	7.400	7.630	7.530
NOV	8.400	7.400	7.560	7.430
DEC	8.200	7.400	.	.
FLD TEMPERATURE (DEG.C)			DET'N LIMIT = N/A	GUIDELINE = 15 (A1)
JAN	3.000	4.000	14.000	7.000
FEB	2.000	2.500	.	.
MAR	2.000	3.500	12.000	5.000
APR	5.000	5.000	.	.
MAY	7.300	7.500	.	.
JUN	7.300	7.000	16.000	10.000
JUL	10.000	10.000	18.000	12.000
AUG	11.000	12.000	19.500	14.000
SEP	8.000	8.000	20.100	14.000
OCT	9.000	9.000	16.000	12.000
NOV	6.000	6.000	14.000	9.000
DEC	4.000	6.000	.	.
FLD TURBIDITY (FTU)			DET'N LIMIT = N/A	GUIDELINE = 1.0 (A1)
JAN	.900	.090	.260	.190
FEB	2.000	.120	.140	.140
MAR	3.000	.170	.250	.190
APR	.800	.180	.	.
MAY	1.100	.180	.	.
JUN	1.100	.120	.260	.170
JUL	.700	.150	.270	.240
AUG	.600	.120	.280	.270
SEP	.600	.120	.150	.180
OCT	.700	.100	.190	.200
NOV	.900	.100	.120	.110
DEC	.600	.070	.	.

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM METRO TORONTO (R. L. CLARK WTP) 1988

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM	
	RAW	TREATED	SITE 1	
			STANDING	FREE FLOW
COLOUR (TCU)		DET'N LIMIT = .5		GUIDELINE = 5.0 (A3)
JAN	1.000 <T	BDL	1.500 <T	1.000 <T
FEB	2.000 <T	1.000 <T	1.500 <T	1.000 <T
MAR	3.000	.500 <T	1.000 <T	1.000 <T
APR	2.000 <T	1.000 <T	1.500 <T	1.000 <T
MAY	2.000 <T	.500 <T	.	.
JUN	2.000 <T	.500 <T	1.000 <T	.500 <T
JUL	2.500	.500 <T	1.000 <T	1.000 <T
AUG	1.500 <T	.500 <T	1.000 <T	1.000 <T
SEP	1.500 <T	.500 <T	1.500 <T	1.000 <T
OCT	2.000 <T	NSS	1.500 <T	1.500 <T
NOV	1.500 <T	.500 <T	.500 <T	1.000 <T
DEC	1.500 <T	.500 <T	.	.
CONDUCTIVITY (UMHO/CM)		DET'N LIMIT = 1		GUIDELINE = 400 (F2)
JAN	327	337	337	339
FEB	336	356	347	345
MAR	341	345	342	339
APR	335	345	344	351
MAY	339	349	.	.
JUN	336	343	341	339
JUL	331	338	337	335
AUG	328	330	334	332
SEP	329	333	331	330
OCT	326	NSS	331	330
NOV	331	336	337	338
DEC	326	331	.	.
FLUORIDE (MG/L)		DET'N LIMIT = .01		GUIDELINE = 2.400 (A1)
JAN	.100	1.260	1.220	1.180
FEB	.140	1.120	1.160	1.100
MAR	.130	1.140	1.120	1.120
APR	.120	1.300	1.260	1.240
MAY	.130	1.330	.	.
JUN	.130	1.230	1.240	1.240
JUL	.130	1.080	1.140	1.130
AUG	.130	1.080	1.100	1.140
SEP	.140	1.140	1.100	1.040
OCT	.120	NSS	1.100	1.080
NOV	.120	1.140	1.140	1.100
DEC	.120	1.080	.	.
HARDNESS (MG/L)		DET'N LIMIT = .500		GUIDELINE = 80-100 (A4)

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM METRO TORONTO (R. L. CLARK WTP) 1988

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM	
	RAW	TREATED	SITE 1	
			STANDING	FREE FLOW
FEB	8.400	8.200	8.300	8.200
MAR	8.600	8.500	8.600	8.600
APR	8.500	8.500	8.300	7.900
MAY	8.200	8.200	.	.
JUN	8.000	8.100	8.100	8.100
JUL	8.100	8.400	8.500	8.100
AUG	8.500	8.700	8.600	8.600
SEP	8.600	8.500	8.800	8.400
OCT	8.300	NSS	7.900	8.200
NOV	8.800	8.800	8.700	8.700
DEC	8.800	8.600	.	.
SODIUM (MG/L)		DET'N LIMIT = .200		GUIDELINE = 200 (C3)
JAN	12.600	12.800	12.600	13.000
FEB	13.400	15.200	13.600	14.000
MAR	14.800	14.400	13.800	13.600
APR	13.200	13.200	13.600	14.400
MAY	13.400	13.200	.	.
JUN	11.600	11.600	11.600	11.400
JUL	12.000	12.000	12.200	12.200
AUG	12.000	11.800	12.000	12.200
SEP	12.200	12.200	12.200	12.000
OCT	12.400	NSS	12.000	12.200
NOV	12.400	11.800	11.800	11.200
DEC	12.000	12.000	.	.
AMMONIUM TOTAL (MG/L)		DET'N LIMIT = 0.002		GUIDELINE = .05 (F2)
JAN	.008 <T	.010	.012	.004 <T
FEB	.054	.008 <T	.008 <T	.008 <T
MAR	.054	.118	.120	.126
APR	.044	.112	.084	.094
MAY	.032	.076	.	.
JUN	.052	.012	.014	.010
JUL	.068	.088	.098	.098
AUG	.028	.080	.114	.118
SEP	.014	.084	.036	.014
OCT	.010	NSS	.118	.108
NOV	.006 <T	.008 <T	.008 <T	.006 <T
DEC	.008 <T	.126	.	.
NITRITE (MG/L)		DET'N LIMIT = 0.001		GUIDELINE = 1.000 (A1)
JAN	.002 <T	.001 <T	.001 <T	.001 <T

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM METRO TORONTO (R. L. CLARK WTP) 1988

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM	
	RAW	TREATED	SITE 1	
			STANDING	FREE FLOW
FEB	8.130	7.830	7.950	7.920
MAR	8.270	8.110	8.170	8.040
APR	8.360	8.280	8.280	8.260
MAY	8.210	8.020	.	.
JUN	8.330	8.060	8.280	8.230
JUL	8.260	7.950	8.100	8.060
AUG	8.030	7.690	7.970	7.890
SEP	8.160	7.990	8.170	8.120
OCT	8.270	NSS	8.230	8.230
NOV	8.210	7.900	8.030	7.940
DEC	8.330	8.210	.	.
PHOSPHORUS FIL REACT (MG/L)		DET'N LIMIT = .0005		GUIDELINE = N/A
JAN	.004	.002 <T	.	.
FEB	.005	.001 <T	.	.
MAR	.002	.002 <T	.	.
APR	.003	.001 <T	.	.
MAY	.001 <T	.001 <T	.	.
JUN	.003	.001 <T	.	.
JUL	.001 <T	.001 <T	.	.
AUG	.000 <T	.001 <T	.	.
SEP	.001 <T	.001 <T	.	.
OCT	.000 <T	NSS	.	.
NOV	.005	.005	.	.
DEC	.001 <T	.001 <T	.	.
PHOSPHORUS TOTAL (MG/L)		DET'N LIMIT = .002		GUIDELINE = .40 (F2)
JAN	.011	.003	.	.
FEB	.017	.008 <T	.	.
MAR	.016	.006 <T	.	.
APR	.011	.003 <T	.	.
MAY	.012	.007 <T	.	.
JUN	.015	.002 <T	.	.
JUL	.018	.004 <T	.	.
AUG	.031	.028	.	.
SEP	.004 <T	BDL	.	.
OCT	.008 <T	NSS	.	.
NOV	.009 <T	.005 <T	.	.
DEC	.009 <T	.002 <T	.	.
SULPHATE (MG/L)		DET'N LIMIT = .200		GUIDELINE = 500. (A3)
JUL	28.000	32.900	32.900	32.800

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM METRO TORONTO (R. L. CLARK WTP) 1988

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM	
	RAW	TREATED	SITE 1	
			STANDING	FREE FLOW
METALS				
SILVER (UG/L)		DET'N LIMIT = .020		GUIDELINE = 50. (A1)
JAN	.030 <T	.020 <T	.030 <T	.020 <T
FEB	.050 <T	.040 <T	.160 <T	.050 <T
MAR	BDL	.100 <T	.100 <T	.030 <T
APR	BDL	BDL	.130 <T	.040 <T
MAY	BDL	BDL	.	.
JUN	BDL	BDL	.060 <T	BDL
JUL	.030 <T	BDL	.500 <T	.140 <T
AUG	BDL	BDL	.030 <T	BDL
SEP	BDL	.040 <T	.040 <T	BDL
OCT	BDL	NSS	.040 <T	BDL
NOV	.030 <T	.060 <T	.140 <T	.150 <T
DEC	BDL	.040 <T	.	.
ALUMINUM (UG/L)		DET'N LIMIT = .050		GUIDELINE = 100.(A4)
JAN	17.400	62.640	55.680	51.040
FEB	35.960	58.000	49.880	55.680
MAR	42.920	70.760	58.000	54.520
APR	16.240	127.600	111.360	116.000
MAY	22.040	114.840	.	.
JUN	24.360	58.000	70.760	54.520
JUL	11.484	90.480	84.680	104.400
AUG	5.916	81.200	71.920	70.760
SEP	6.496	83.520	77.720	82.360
OCT	15.080	NSS	78.880	75.400
NOV	30.160	75.400	64.960	66.120
DEC	15.080	60.320	.	.
ARSENIC (UG/L)		DET'N LIMIT = 0.050		GUIDELINE = 50.0 (A1)
JAN	.870 <T	.920 <T	.930 <T	.840 <T
FEB	.730 <T	.820 <T	.710 <T	.810 <T
MAR	.620 <T	.450 <T	.240 <T	.140 <T
APR	.920 <T	.880 <T	1.100	.840 <T
MAY	1.100	1.100	.	.
JUN	.560 <T	.520 <T	.360 <T	.320 <T
JUL	.980 <T	.790 <T	.800 <T	.900 <T
AUG	1.100	1.200	.840 <T	.900 <T
SEP	1.200	1.300	1.400	1.200
OCT	1.100	NSS	.980 <T	1.000 <T
NOV	1.100	.830 <T	.760 <T	.930 <T
DEC	.950 <T	.620 <T	.	.
BARIUM (UG/L)		DET'N LIMIT = 0.020		GUIDELINE = 1000. (A1)

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM METRO TORONTO (R. L. CLARK WTP) 1988

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM	
	RAW	TREATED	SITE 1	
			STANDING	FREE FLOW
FEB	BDL	BDL	.110 <T	.090 <T
MAR	BDL	.050 <T	.130 <T	BDL
APR	BDL	BDL	BDL	BDL
MAY	BDL	BDL	.	.
JUN	.060 <T	BDL	BDL	BDL
JUL	BDL	BDL	BDL	BDL
AUG	BDL	BDL	BDL	BDL
SEP	BDL	BDL	BDL	BDL
OCT	BDL	NSS	.070 <T	BDL
NOV	.060 <T	BDL	BDL	BDL
DEC	BDL	BDL	.	.
COBALT (UG/L)		DET'N LIMIT = 0.020		GUIDELINE = 1000 (H)
JAN	.330 <T	.370 <T	.320 <T	.290 <T
FEB	.100 <T	.110 <T	.070 <T	.070 <T
MAR	.210 <T	.130 <T	.180 <T	.170 <T
APR	.090 <T	.070 <T	.110 <T	.080 <T
MAY	.120 <T	.100 <T	.	.
JUN	.100 <T	.060 <T	.040 <T	.050 <T
JUL	.160 <T	.180 <T	.170 <T	.220 <T
AUG	.070 <T	.050 <T	.100 <T	.050 <T
SEP	.120 <T	.150 <T	.240 <T	.170 <T
OCT	.160 <T	NSS	.150 <T	.180 <T
NOV	.110 <T	.050 <T	.050 <T	.060 <T
DEC	.100 <T	.090 <T	.	.
CHROMIUM (UG/L)		DET'N LIMIT = 0.100		GUIDELINE = 50. (A1)
JAN	.440 <T	.590 <T	.510 <T	.440 <T
FEB	.740 <T	.670 <T	.590 <T	.610 <T
MAR	.790 <T	.550 <T	.750 <T	.520 <T
APR	.900 <T	.790 <T	.520 <T	.530 <T
MAY	1.700	3.500	.	.
JUN	1.600	4.100	.910 <T	.800 <T
JUL	.400 <T	.390 <T	.400 <T	.490 <T
AUG	3.500	3.600	2.000	3.300
SEP	4.700	1.100	3.900	3.900
OCT	6.000	NSS	5.100	5.800
NOV	7.000	1.100	4.900	15.000
DEC	4.900	1.100	.	.
COPPER (UG/L)		DET'N LIMIT = .100		GUIDELINE = 1000 (A3)
JAN	11.000	3.100	6.400	4.500
FEB	9.200	3.700	40.000	6.300

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM METRO TORONTO (R. L. CLARK WTP) 1988

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM	
	RAW	TREATED	SITE 1	
			STANDING	FREE FLOW
APR	2.500	.890	4.100	2.900
MAY	2.900	.760	.	.
JUN	3.700	.420 <T	1.400	.960
JUL	2.700	.290 <T	1.300	.750
AUG	1.300	.420 <T	1.600	1.600
SEP	1.800	.530	1.900	1.600
OCT	2.000	NSS	1.800	2.000
NOV	3.100	.410 <T	.710	.800
DEC	2.500	.240 <T	.	.
MOLYBDENUM (UG/L)		DET'N LIMIT = 0.020		GUIDELINE = 500 (H)
JAN	1.100	1.100	1.200	1.200
FEB	1.200	1.200	1.300	1.200
MAR	1.200	1.300	1.200	1.200
APR	1.200	1.100	1.300	1.200
MAY	1.300	1.300	.	.
JUN	1.300	1.300	1.300	1.300
JUL	1.300	1.300	1.200	1.300
AUG	1.200	1.200	1.100	1.100
SEP	1.100	1.200	1.300	1.300
OCT	1.200	NSS	1.200	1.300
NOV	1.300	1.300	1.300	1.200
DEC	1.100	1.200	.	.
NICKEL (UG/L)		DET'N LIMIT = 0.100		GUIDELINE = 50. (F3)
JAN	3.900	4.400	4.400	4.300
FEB	.920 <T	.720 <T	1.900	1.000 <T
MAR	2.700	1.300 <T	2.000	1.400
APR	1.500	1.400 <T	2.400	1.500
MAY	.880 <T	.640 <T	.	.
JUN	.290 <T	.200 <T	.540 <T	BDL
JUL	.280 <T	.470 <T	2.400	.630 <T
AUG	BDL	.130 <T	1.500 <T	BDL
SEP	1.300 <T	1.200 <T	4.200	1.300 <T
OCT	1.100 <T	NSS	1.200 <T	1.200 <T
NOV	.350 <T	.710 <T	1.300 <T	.120 <T
DEC	1.400 <T	1.400 <T	.	.
LEAD (UG/L)		DET'N LIMIT = 0.050		GUIDELINE = 50. (A1)
JAN	.190 <T	.090 <T	.900	.170 <T
FEB	.420	.100 <T	.890	.190 <T
MAR	.390	.110 <T	1.200	.170 <T
APR	.150 <T	.030 <T	1.000	.160 <T

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM METRO TORONTO (R. L. CLARK WTP) 1988

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM	
	RAW	TREATED	SITE 1	
			STANDING	FREE FLOW
JUN	200.000	190.000	190.000	200.000
JUL	170.000	170.000	170.000	180.000
AUG	160.000	160.000	170.000	160.000
SEP	190.000	190.000	190.000	190.000
OCT	180.000	NSS	170.000	190.000
NOV	180.000	180.000	180.000	180.000
DEC	170.000	170.000	.	.
TITANIUM (UG/L)			DET'N LIMIT = .050	GUIDELINE = N/A
JAN	3.400	3.700	3.300	3.000
FEB	6.100	5.700	5.000	5.200
MAR	3.500	4.100	3.600	3.500
APR	3.300	3.400	2.400	2.700
MAY	4.700	4.100	.	.
JUN	4.500	4.700	4.300	4.300
JUL	1.500 <T	1.500 <T	1.500 <T	1.800 <T
AUG	3.200	3.100	3.500	3.500
SEP	5.100	5.300	5.200	5.200
OCT	3.800	NSS	3.300	3.100
NOV	5.700	4.700	4.900	4.700
DEC	3.800	3.300	.	.
THALLIUM (UG/L)			DET'N LIMIT = .010	GUIDELINE = 13. (D4)
JAN	.030 <T	.020 <T	.010 <T	.010 <T
FEB	.030 <T	.010 <T	.020 <T	.020 <T
MAR	.040 <T	.020 <T	.020 <T	.010 <T
APR	BDL	BDL	BDL	.020 <T
MAY	BDL	BDL	.	.
JUN	BDL	BDL	BDL	BDL
JUL	BDL	BDL	BDL	BDL
AUG	BDL	BDL	BDL	BDL
SEP	BDL	BDL	BDL	BDL
OCT	BDL	NSS	BDL	BDL
NOV	BDL	BDL	BDL	BDL
DEC	BDL	BDL	.	.
URANIUM (UG/L)			DET'N LIMIT = .020	GUIDELINE = 20. (A2)
JAN	.380	.400	.390	.350
FEB	.460	.430	.440	.390
MAR	.400	.370	.360	.340
APR	.360	.320	.460	.400
MAY	.350	.380	.	.
JUN	.360	.270	.280	.290

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM METRO TORONTO (R. L. CLARK WTP) 1988

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM	
	RAW	TREATED	SITE 1	
			STANDING	FREE FLOW
PESTICIDES & PCB				
ALPHA BHC (NG/L)		DET'N LIMIT = 1.000		GUIDELINE = 700 (G)
JAN	2.000 <T	3.000 <T	.	3.000 <T
FEB	BDL	BDL	.	BDL
MAR	2.000 <T	2.000 <T	.	2.000 <T
APR	3.000 <T	3.000 <T	.	3.000 <T
MAY	1.000 <T	2.000 <T	.	.
JUN	3.000 <T	3.000 <T	.	BDL
JUL	2.000 <T	2.000 <T	.	2.000 <T
AUG	1.000 <T	2.000 <T	.	2.000 <T
SEP	2.000 <T	3.000 <T	.	2.000 <T
OCT	BDL	NSS	.	2.000 <T
NOV	1.000 <T	2.000 <T	.	2.000 <T
DEC	BDL	BDL	.	.
LINDANE (NG/L)		DET'N LIMIT = 1.000		GUIDELINE = 4000 (A1)
JAN	BDL	BDL	.	2.000 <T
FEB	BDL	BDL	.	BDL
MAR	BDL	1.000 <T	.	1.000 <T
APR	1.000 <T	1.000 <T	.	1.000 <T
MAY	BDL	BDL	.	.
JUN	BDL	BDL	.	BDL
JUL	BDL	BDL	.	BDL
AUG	BDL	BDL	.	BDL
SEP	1.000 <T	1.000 <T	.	BDL
OCT	BDL	NSS	.	BDL
NOV	1.000 <T	1.000 <T	.	1.000 <T
DEC	BDL	BDL	.	.

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM METRO TORONTO (R. L. CLARK WTP) 1988

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM	
	RAW	TREATED	SITE 1	
			STANDING	FREE FLOW
VOLATILES				
BENZENE (UG/L)		DET'N LIMIT = .050		GUIDELINE = 5.0 (B1)
JAN	!SM	.100 <T	.	BDL
MAR	BDL	.050 <T	.	BDL
APR	BDL	BDL	.	BDL
MAY	BDL	BDL	.	.
JUN	BDL	BDL	.	BDL
JUL	BDL	BDL	.	BDL
AUG	BDL	BDL	.	BDL
SEP	BDL	BDL	.	BDL
OCT	BDL	NSS	.	BDL
NOV	BDL	BDL	.	BDL
DEC	BDL	BDL	.	.
TOLUENE (UG/L)		DET'N LIMIT = .050		GUIDELINE = 24.0 (B4)
JAN	!SM	.150 UCS	.	.100 UCS
MAR	BDL	BDL	.	BDL
APR	BDL	.050 UCS	.	.050 UCS
MAY	BDL	BDL	.	.
JUN	.050 <T	.100 <T	.	BDL
JUL	BDL	BDL	.	BDL
AUG	BDL	BDL	.	BDL
SEP	BDL	BDL	.	BDL
OCT	BDL	NSS	.	BDL
NOV	BDL	BDL	.	BDL
DEC	BDL	.100 <T	.	.
ETHYLBENZENE (UG/L)		DET'N LIMIT = .050		GUIDELINE = 2.4 (B4)
JAN	!SM	.050 <T	.	BDL
MAR	BDL	.050 <T	.	BDL
APR	BDL	.050 <T	.	BDL
MAY	.100 <T	.100 <T	.	.
JUN	.050 <T	.050 <T	.	.100 <T
JUL	BDL	.050 <T	.	BDL
AUG	.100 <T	.100 <T	.	.050 <T
SEP	BDL	.050 <T	.	.050 <T
OCT	BDL	NSS	.	BDL
NOV	BDL	.050 <T	.	BDL
DEC	BDL	.100 <T	.	.
P-XYLENE (UG/L)		DET'N LIMIT = .100		GUIDELINE = 300 (B4)
JAN	!SM	BDL	.	BDL

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM METRO TORONTO (R. L. CLARK WTP) 1988

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM	
	RAW	TREATED	SITE 1	
			STANDING	FREE FLOW
METHYLENE CHLORIDE (UG/L)		DET'N LIMIT = .500		GUIDELINE = 1750 (D3)
JAN	!SM	BDL	.	2.000 <T
MAR	BDL	BDL	.	BDL
APR	BDL	BDL	.	BDL
MAY	BDL	BDL	.	.
JUN	BDL	BDL	.	BDL
JUL	BDL	BDL	.	BDL
AUG	BDL	BDL	.	BDL
SEP	BDL	BDL	.	BDL
OCT	BDL	NSS	.	BDL
NOV	BDL	BDL	.	BDL
DEC	BDL	BDL	.	.
CHLOROFORM (UG/L)		DET'N LIMIT = .100		GUIDELINE = 350 (A1+)
JAN	!SM	17.500	.	8.800
MAR	BDL	9.900	.	7.300
APR	BDL	6.200	.	7.900
MAY	BDL	BDL	.	.
JUN	BDL	9.400	.	9.300
JUL	BDL	7.900	.	7.700
AUG	.300 <T	8.200	.	6.600
SEP	.300 <T	7.200	.	9.200
OCT	BDL	NSS	.	5.800
NOV	.100 <T	11.700	.	11.200
DEC	.100 <T	6.100	.	.
CARBON TETRACHLORIDE (UG/L)		DET'N LIMIT = .200		GUIDELINE = 5.0 (D1)
JAN	!SM	BDL	.	BDL
MAR	BDL	BDL	.	BDL
APR	BDL	BDL	.	BDL
MAY	BDL	BDL	.	.
JUN	BDL	.600 <T	.	.200 <T
JUL	BDL	BDL	.	BDL
AUG	BDL	BDL	.	BDL
SEP	BDL	BDL	.	BDL
OCT	BDL	NSS	.	BDL
NOV	BDL	BDL	.	BDL
DEC	BDL	1.200 <T	.	.
DICHLOROBROMOMETHANE (UG/L)		DET'N LIMIT = .050		GUIDELINE = 350 (A1+)
JAN	!SM	13.850	.	7.900
MAR	BDL	8.300	.	6.700

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM METRO TORONTO (R. L. CLARK WTP) 1988

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM	
	RAW	TREATED	SITE 1	
			STANDING	FREE FLOW
JUL	BDL	.600 <T	.	.400 <T
AUG	BDL	.600 <T	.	.600 <T
SEP	BDL	.800 <T	.	.800 <T
OCT	BDL	NSS	.	.600 <T
NOV	BDL	1.000 <T	.	1.000 <T
DEC	BDL	.600 <T	.	.
TOTL TRIHALOMETHANES (UG/L)		DET'N LIMIT = .500		GUIDELINE = 350 (A1)
JAN	!SM	43.150	.	23.100
MAR	BDL	25.000	.	20.800
APR	BDL	16.400	.	19.100
MAY	BDL	15.800	.	.
JUN	BDL	23.000	.	22.650
JUL	BDL	19.450	.	18.700
AUG	BDL	20.600	.	19.300
SEP	BDL	22.650	.	27.200
OCT	BDL	NSS	.	17.000
NOV	BDL	29.500	.	27.200
DEC	BDL	18.900	.	.

Table 6

SCAN/PARAMETER	UNIT	DETECTION LIMIT	GUIDELINE
BACTERIOLOGICAL			
STANDARD PLATE COUNT MEMBRANE FILTRATION	CT/ML	0	500/ML(A1)
P/A BOTTLE		0	0 (A1*)
TOTAL COLIFORM MEMBRANE FILTRATION	CT/100ML	0	5/100mL(A1)
TOTAL COLIFORM BACKGROUND MF	CT/100ML	0	N/A
CHLOROAROMATICS			
HEXACHLOROBUTADIENE	NG/L	1.000	450. (D4)
1,2,3-TRICHLOROBENZENE	NG/L	5.000	10000 (I)
1,2,3,4-TETRACHLOROBENZENE	NG/L	1.000	10000 (I)
1,2,3,5-TETRACHLOROBENZENE	NG/L	1.000	10000 (I)
1,2,4-TRICHLOROBENZENE	NG/L	5.000	10000 (I)
1,2,4,5-TETRACHLOROBENZENE	NG/L	1.000	38000 (D4)
1,3,5-TRICHLOROBENZENE	NG/L	5.000	10000 (D4)
HEXACHLOROBENZENE	NG/L	1.0	10. (C1)
HEXACHLOROETHANE	NG/L	1.000	1900. (D4)
OCTACHLOROSTYRENE	NG/L	1.000	N/A
PENTACHLOROBENZENE	NG/L	1.000	74000 (D4)
2,3,6-TRICHLOROTOLUENE	NG/L	5.000	N/A
2,4,5-TRICHLOROTOLUENE	NG/L	5.000	N/A
2,6,A-TRICHLOROTOLUENE	NG/L	5.000	N/A
CHLOROPHENOLS			
2,3,4-TRICHLOROPHENOL	NG/L	50.	N/A
2,3,4,5-TETRACHLOROPHENOL	NG/L	50.	N/A
2,3,5,6-TETRACHLOROPHENOL	NG/L	50.	N/A
2,4,5-TRICHLOROPHENOL	NG/L	50.	2600000 (D4)
2,4,6-TRICHLOROPHENOL	NG/L	50.	5000. (B1)
PENTACHLOROPHENOL	NG/L	50.	60000. (B1)
CHEMISTRY (FLD)			
FIELD COMBINED CHLORINE RESIDUAL	MG/L	N/A	N/A
FIELD FREE CHLORINE RESIDUAL	MG/L	N/A	N/A
FIELD TOTAL CHLORINE RESIDUAL	MG/L	N/A	N/A
FIELD PH	DMSNLESS	N/A	6.5-8.5(A4)
FIELD TEMPERATURE	^{o}C	N/A	<15 ^{o}C(A1)
FIELD TURBIDITY	FTU	N/A	1.0 (A1)
CHEMISTRY (LAB)			
ALKALINITY	MG/L	.200	30-500(A4)
CALCIUM	MG/L	.100	100. (F2)
CYANIDE	MG/L	.001	.20(A1)
CHLORIDE	MG/L	.200	250. (A3)
COLOUR	TCU	.5	5.0 (A3)
CONDUCTIVITY	UMHO/CM	1.	400. (F2)
FLUORIDE	MG/L	.01	2.4 (A1)
HARDNESS	MG/L	.50	80-100(A4)
MAGNESIUM	MG/L	.05	30. (F2)

SCAN/PARAMETER	UNIT	DETECTION LIMIT	GUIDELINE	
HEPTACHLOR	NG/L	1.0	3000.	(A1)
METOLACHLOR	NG/L	500.	50000.	(B3)
MIREX	NG/L	5.0	N/A	
OXYCHLORDANE	NG/L	2.0	N/A	
O,P-DDT	NG/L	5.0	30000.	(A1)
PCB	NG/L	20.0	3000.	(A2)
O,P-DDD	NG/L	5.0	N/A	
PPDDE	NG/L	1.0	30000.	(A1)
PPDDT	NG/L	5.0	30000.	(A1)
ATRATONE	NG/L	50.	N/A	
ALACHLOR	NG/L	500.	35000.	(D2)
PROMETONE	NG/L	50.	52500.	(D3)
PROPAZINE	NG/L	50.	16000.	(D2)
PROMETRYNE	NG/L	50.	1000.	(B3)
SENCOR (METRIBUZIN)	NG/L	100.	80000.	(B2)
SIMAZINE	NG/L	50.	10000.	(B3)
POLYAROMATIC HYDROCARBONS				
PHENANTHRENE	NG/L	10.0	N/A	
ANTHRACENE	NG/L	1.0	N/A	
FLUORANTHENE	NG/L	20.0	42000.	(D4)
PYRENE	NG/L	20.0	N/A	
BENZO(A)ANTHRACENE	NG/L	20.0	N/A	
CHRYSENE	NG/L	50.0	N/A	
DIMETHYL BENZO(A)ANTHRACENE	NG/L	5.0	N/A	
BENZO(E)PYRENE	NG/L	50.0	N/A	
BENZO(B)FLUORANTHENE	NG/L	10.0	N/A	
PERYLENE	NG/L	10.0	N/A	
BENZO(K)FLUORANTHENE	NG/L	1.0	N/A	
BENZO(A)PYRENE	NG/L	5.0	10.	(B1)
BENZO(G,H,I)PERYLENE	NG/L	20.0	N/A	
DIBENZO(A,H)ANTHRACENE	NG/L	10.0	N/A	
INDENO(1,2,3-C,D)PYRENE	NG/L	20.0	N/A	
BENZO(B)CHRYSENE	NG/L	2.0	N/A	
CORONENE	NG/L	10.0	N/A	
SPECIFIC PESTICIDES				
TOXAPHENE	NG/L	N/A	5000.	(A1)
2,4,5-TRICHLOROBUTYRIC ACID (2,4,5-T)	NG/L	50.	280000.	(B1)
2,4-DICHLOROBUTYRIC ACID (2,4-D)	NG/L	100.	100000.	(A1)
2,4-DICHLORORPHENOXYBUTYRIC ACID	NG/L	200.	18000.	(B3)
2,4-D PROPIONIC ACID	NG/L	100.	N/A	
DICAMBA	NG/L	100.	87000.	(B3)
PICHLORAM	NG/L	100.	2450000.	(D3)
SILVEX (2,4,5-TP)	NG/L	50.	10000.	(A1)
DIAZINON	NG/L	20.	14000.	(A1)
DICHLOROVOS	NG/L	20.	N/A	
DURSBAN	NG/L	20.	N/A	
ETHION	NG/L	20.	35000.	(G)
GUTHION	NG/L	N/A	N/A	
MALATHION	NG/L	20.	160000.	(G)
MEVINPHOS	NG/L	20.	N/A	
METHYL PARATHION	NG/L	50.	7000.	(B3)
METHYLTRITHION	NG/L	20.	N/A	
PARATHION	NG/L	20.	35000.	(B1)