DRINKING WATER QUALITY

QUARTERLY REPORT

January 1 – March 31, 2002

View from Bare Point Water Treatment Plant

TRANSPORTATION & WORKS

ENVIRONMENT DIVISION

RESPECTFULLY SUBMITTED BY:

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City of Thunder Bay: *Quarterly Water Quality Report*
For the Period of January 1 – March 31, 2002

What is the Quarterly Water Quality Report?

The City of Thunder Bay is pleased to present its *Water Quality Report*, issued at the end of each quarter, to provide consumers with information about our water supply operations and drinking water quality.

In compliance with provincial regulation 459/00, this quarterly report includes:

- A description of Thunder Bay's water supply system;
- treatment processes and quality assurance methods;
- process flow diagrams for each plant;
- compliance provisions;
- glossary of terms; and
- a summary of water analysis results for this quarter.

What's new in this quarter's report?

Updated information:

- New summary tables of water quality analysis for the period January 1 – March 31, 2002.
- Summary of Post Chlorination Trial in February and March 2002 on the Loch Lomond System.
- Annual radionuclide sampling results.

What are the provisions of Regulation 459/00?

Regulation 459/00, also known as Ontario's Drinking Water Protection Regulation, came into effect on August 26, 2000 to provide an enforceable standard focusing on the treatment and testing of drinking water supplies in Ontario. The regulation includes provisions for public access to information and notification of adverse test results.

How is the safety of our drinking water assured?

In Thunder Bay, we have a supply of surface water of very good quality… consistently delivered to us from two water treatment plant sources – Bare Point on Lake Superior and Loch Lomond on Mount McKay. Ministry of Environment Regulation 459/00 sets out a mandatory requirement for facilities using surface water as a source that requires chemically assisted filtration and disinfection or other treatment capable of providing water of equal or better quality. No water can be allowed to enter the distribution system unless it has been treated with chlorination or equivalent. Samples shall be taken and evaluated, at a frequency set by the Ministry, for a number of parameters as outlined in the Regulations. A summary table for any result in exceedance of parameters is provided at the end of this report.

Water quality is monitored at both plants 24 hours a day, seven days a week. Water treatment plants must meet strict provincial standards and regulations. Each plant operates under an Ontario Ministry of Environment Certificate of Approval. We are committed to quality and continuous improvement in accordance with Ontario's water quality standards.

We take the job of monitoring water quality very seriously. Each year, independent labs test more than 2,400 samples for potential contaminants. Our testing program meets, and in many areas, exceeds, regulatory requirements.

Today, City of Thunder Bay residents enjoy drinking water of excellent quality. We are committed to making sure we have a water system that will continue to meet our needs tomorrow and beyond.

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Are we in compliance with Regulation 459/00?

Enviro-Test Laboratories, an accredited, independent lab, provides all required drinking water testing. The Enviro-Test Lab is accredited to analyze all microbiological parameters, metals and general water quality parameters, while partner labs in Winnipeg and Edmonton are accredited for testing the volatile organics, pesticides and PCBs.

All operational staff at both Thunder Bay Water Treatment Plants have all required Water Treatment Plant Certification.

The City's drinking water testing/analysis program was carefully reviewed following enactment of the new water protection legislation in August 2000. We are required to take 112 samples per month from the distribution system for bacterial testing. We have exceeded this requirement for many years, averaging 180 samples per month, and continue to do so.

Quarterly testing for volatile organics (18 parameters), pesticides and PCBs (48 parameters), as well as testing for heavy metals, was implemented to meet legislated requirements. Previously, the majority of these parameters had been tested twice a year through the MOE Drinking Water Surveillance Program (DWSP). Our 1998/99 reports from the MOE DWSP data can be viewed on their website at **http://www.ene.gov.on.ca/envision/dwsp9899/dwsp.htm.**

The City of Thunder Bay's in-house lead monitoring program also exceeded provincial requirements, but is being maintained to monitor homes with lead service connections in older sections of the distribution system.

In total, the City monitors over 100 parameters in its drinking water on a regular basis. In this quarter, 3 additional parameters, ortho-phosphate benzo(a) and cyanide were analyzed as recommended in the First Engineers Report.

This report also includes the annual metal testing (12 additional parameters) as specified in the Certificate of Approval for the Plants.

Where does our water come from?

Residents of Thunder Bay have two surface water supply sources. The Bare Point Water Treatment Plant supplies most of Thunder Bay north of the Neebing River with water from Lake Superior. The Loch Lomond Microfiltration Plant supplies most residents south of the river with water from Loch Lomond.

Water from Bare Point and Loch Lomond is distributed to consumers through a network of 672 km of water mains and serves a total population of 109,016. *Source: Stats Canada, 18 March 2002.*

Bare Point Water Treatment Plant is located at the north limit of the City, having a current operational capacity of 15 million imperial gallons per day (68 million litres per day). The plant draws water from the world's largest body of fresh water - Lake Superior.

Treatment processes at the Bare Point Water Treatment Plant include raw water screening, pre-chlorination, chemically assisted coagulation-flocculation using alum and polymer, sand - anthracite filtration and post chlorine disinfection.

Bare Point's distribution system consists of four pressure zones, three pumping stations and three reservoirs. The attached flow diagram illustrates plant operations.

Loch Lomond Water Treatment Plant is located south of the city on Mount McKay. Loch Lomond supplies water to the south portion of Thunder Bay. This plant draws water from Loch Lomond, partially situated within the Fort William First Nation Reserve.

The new Loch Lomond temporary filtration system, built in 1998 has an operational

capacity of 6.25 million imperial gallons per day (28 million litres per day). Plant capacity varies seasonally between 6.25 – 8.4 million gallons (27 – 38.6 million litres) per day due to water temperature. Treatment processes include ultrafiltration membrane technology, the addition of sodium silicate for corrosion control and chlorine for disinfection.

The Loch Lomond distribution system consists of two pressure zones, one reservoir and two pumping stations. The pumping stations are available to pump Bare Point water into the Thunder Bay south distribution system during seasonal or high demand periods. A process flow diagram of Loch Lomond operations is attached.

Who is responsible for water treatment in Thunder Bay?

The City of Thunder Bay's Environment Division oversees the treatment and distribution of water to consumers. The Environment Division is made up of several sections. The Water Treatment Plants are responsible for the treatment, sampling and distribution of water. The Sewer & Water Section is responsible for the operation and maintenance of the water distribution system.

Our qualified staff at the Water Treatment Plants consists of:

- Supervisor (1)
- Chief Operators (2)
- Certified Operators (6)
- Certified Maintenance Relief Operators (2)
- Electrician (1)
- Controls Technician (1)
- Water Quality Technician (1)
- Leadhand Electrician (1)

We have a highly qualified team, certified by the Ontario Environmental Training Consortium. Staff are continually trained in accordance with provincial regulations. In addition, the new drinking water regulations require that all water treatment staff performing water testing complete an additional 36 hours of specialized training over three years.

Customer Service

Call 683-8141 to speak with our Qualified Customer Service staff about treated water produced in the plants, or water quality at your home or business. If you have concerns about water quality, a day and time will be arranged for a water sample to be taken with your convenience in mind. Samples are taken by a qualified operator, in test specific bottles. Our staff will deliver samples to the laboratory for analysis. Homeowners will be informed promptly of test results. If there is any need for concern, further investigation will be undertaken.

We welcome your comments on the Drinking Water Quality Quarterly Report. Let us know what you like about the report or if there is other information you would like to see included. See 'Where can I get further information?' at the end of this report for phone, address and e-mail contact details.

Tours of the Water Treatment Plant facilities can be arranged by calling Mr. Bernie Cook at 683-8141.

What is found in our source water?

Water taken directly from a surface water source is not suitable for human consumption as it contains impurities. Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of a contaminant does not necessarily indicate that water poses a health risk.

Parameters affecting the quality of water can be characterized as:

? microbiological – bacterial, algae and other living organisms;

- chemical – substances dissolved in water from manufactured or natural sources; or
- physical – materials that make the water appear cloudy.

Detailed descriptions of raw water characteristics can be found in the Ontario Drinking Water Standards. These are available on the Ministry of Environment web site at **www.ene.gov.on.ca** under "New Drinking Water Protection Regulation".

Definitions of water industry terms:

The following list defines terms and abbreviations used in this report.

WTP: *Water Treatment Plant*.
MOE: The *Ontario Ministry of Environment* is the principal body regulating the quality of drinking water in Ontario.
MOH: The *Ontario Ministry of Health* immediately becomes involved when any health related water quality parameters are exceeded.
MAC: The *Maximum Acceptable Concentration*. This is a health-related drinking water standard established for contaminants that have known or suspected adverse health effects when above a certain concentration. The length of time the MAC can be exceeded without injury to health will depend on the nature and concentration of the parameter.
IMAC: The *Interim Maximum Acceptable Concentration*. This is a health-related Ontario Drinking Water Standard established for contaminants when there are insufficient toxicological data to establish a MAC with reasonable certainty, or when it is not practical to establish a MAC at the desired level.
AO: *Aesthetic objective*. This is a parameter limit set for aesthetic appeal of water, such as colour and taste.
OG: *Operational Guidelines*. These are plant guidelines setting parameters that need to be controlled to ensure optimum water treatment.
Parameter: *Parameters* are substances or characteristics that water is tested for.
PCB: Polychlorinated Biphenyl. This is a group of compounds which are among the most persistent pollutants in the global ecosystem. In the past, PCBs were marketed extensively for a wide variety of purposes but are no longer manufactured or used.
mg/L: *Milligrams per liter*. This is the standard measure of concentration of a parameter in water, sometimes also called parts per million (ppm).
ug/L: *Micrograms per litre*, also called parts per billion (ppb). This concentration is 1000 times more sensitive than mg/L (1000 ug = 1mg).
pg/L: *Picograms per litre*. This is equivalent to 10^{-12} grams.
THM: *Trihalomethanes*. Trihalomethanes are the most widely occurring synthetic organics found in chlorinated drinking water. The four most common detected trihalomethanes in drinking water are chloroform, bromodichloro-methane, chlorodibromo-methane and bromoform. The main source of trihalomethanes in drinking water is the result of the action of chlorine reacting with naturally occurring organic compounds present in the water.
ND: *Non-Detectable Limits*. This means that the results are below the laboratory detection limits. This is the bacteriological standard for water free of total coliform, fecal coliform or E. Coli.
PLC: *Programmable Logic Controller*. A PLC is used to control plant system operations by computer.

What do test results indicate for this quarter?

The City of Thunder Bay's Environment Division has taken all necessary measures to comply with the Drinking Water Protection Regulations and the Ontario Drinking Water Standards.

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Microbiological Results

Microbiological tests are considered the most important series of tests performed in drinking water analysis. They include Total Coliform bacteria, E. Coli bacteria, and Heterotroph bacteria, measured by Heterotrophic Plate Count (HPC). These bacteria are usually not harmful to human health, but instead serve as important indicators of possible contamination of the water supply. Sewage plants, farm livestock, septic systems and wildlife can cause contamination. The presence of microbial pathogens could lead to outbreaks of water borne disease.

It should be noted that microbiological testing will occasionally detect the presence of bacteria in isolated samples, typically due to the sensitive nature of the testing. These occurrences do not usually pose a threat to public health and are normally resolved by taking repeat samples to determine water quality. In contrast, it is situations of confirmed and persistent bacteria presence that are cause for concern and corrective actions.

During the first quarter, the Bare Point Distribution System was tested 284 times for Total Coliform, E. Coli and Fecal Coliform, and 72 times for HPC. As well, the Loch Lomond Distribution System was tested 286 times for Total Coliform, E. Coli and Fecal Coliform, and 71 times for HPC. Out of these tests, the Bare Point Distribution System had one positive result for total Coliform, and one elevated Heterotrophic Plate Count. The Loch Lomond Distribution System had one positive result Total Coliform and one positive for Pseudomonas Aeruginosa during this quarter. Pseudomonas Aeruginosa is another indicator bacteria routinely tested for in drinking water.

In each instance, Environment Division staff immediately notified the District Health Unit and the Ministry of the Environment as per Provincial Regulations. In addition to verbal notification, copies of the notification reports were faxed to each office.

Operational Parameters

Operational Parameters are key treatment parameters that are monitored both by the water treatment operators and by in-line continuous monitoring equipment (chlorine analyzers, turbidity meters etc.). These parameters are analyzed routinely, some daily and some on a monthly basis at the water treatment plants. Values for these parameters are set as Operational Guidelines (OG) and Aesthetic Objectives (AO). This is because these parameters by themselves do not pose any health-related risks to consumers.

In this quarter both plants were well below the guidelines for most of the parameters. However, two operational parameters were slightly exceeded on a few occasions. The first parameter being free chlorine in the distribution system. In both systems, test results showed that on occasion the value fell below the 0.2 mg/L guideline. The low residuals are being kept to a minimum by the implementation of routine flushing program targeting low residual areas. The Bare Point Distribution system had a low residual of 0.02mg/L and the Loch Lomond System had 0.08mg/L.

The colour readings for both Loch Lomond and Bare Point were elevated on limited occasions. According to the Ontario Drinking Water Standards, " The aesthetic objective for colour is 5 True Colour Units (TCU). Water can have a faint yellow/brown colour, which is often caused by organic materials created by the decay of vegetation. Sometimes the colour of water is impacted by iron or manganese compounds produced by processes occurring in natural sediments or in aquifers. The presence of organic materials are the main cause of disinfection by-products when water is treated with chlorine." Bare Point had colour readings as high as 6 TCUs and Loch Lomond as high as 20 TCUs. As previously stated, colour is not a health related parameter.

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Volatile Organics

One instance of benzo(a)pyrene was detected in the Bare Point Treated water. This was considered an anomaly as the raw water and two subsequent samples of the treated water showed no benzo(a)pyrene. The most likely cause of the anomaly was contamination of the sample bottle by exhaust from a diesel generator test that was being performed that morning. Diesel exhaust is a known source of benzo(a)pyrene.

In this quarter, a total of 46 tests were done on volatile organic parameters. Of these, 12 gave detectable results, all of which were forms of THMs. THM formation in the system extremities is still a concern with the running average in the extremity of the Loch Lomond system being 108.1 ug/L this quarter, above the limit of 100 ug/L

Post-Chlorination

Trihalomethanes form in treated water as a result of the chlorination process. In order to decrease the amount of THMs, a pilot test of a post-chlorination procedure was developed at the Loch Lomond Treatment Plant. Testing is on-going and has shown some promising results through February and March. The average for six extremity THM readings, taken since the start of the pilot test is 98.5 ug/L (ppb). Results ranged from a low of 90 to a high of 113 ug/L. The running THM average will however be higher, because the official quarterly value was the March 18th sample, which was 113ug/L (ppb). This quarterly sample had to be designated before results were known, and was unfortunately a high value. The high value may be due to factors such as flushing or seasonal variations in the raw water quality.

Pesticides & PCBs

A total of 96 tests were done in this quarter for various pesticides and PCBs. No detectable amounts of any of these materials were found in either water supply.

Inorganics & General Chemistry

68 tests were done on the Loch Lomond supply for various metals and general chemistry parameters. A similar number of tests were done on the Bare Point supply. These parameters provide the overall chemical characteristics or 'profile' of the water and can be used to set or change treatment process levels. All 24 test results on the four health related parameters; arsenic, lead, nitrate and nitrite, were well below the MAC limits.

Trihalomethanes (THMs)

Trihalomethanes are one group of disinfection by-products, which result from the use of chlorine to disinfect water and eliminate disease-causing micro ogranisms that may be present in raw water sources. The maximum limit for THMs in water is 100 micrograms per litre (ug/L) or parts per billion (ppb).
In December 1995, a report was released by the Great Lakes Basin Cancer Risk Assessment Study which linked long term use (over 35 years) of water containing elevated THM levels to an increased risk of bladder and colon cancer. THM levels that were below 50 ug/L were not a cause for concern.

It must be emphasized that the primary and over-riding public health concern is to provide water that is microbiologically safe. In fact, the use of chlorination is one of the most significant public health advances of the century.

Is lead a concern in our drinking water?

In Thunder Bay our source water supplies, both raw and treated, have lead levels below 2.0 ug/L. The Ontario Drinking Water Standard for lead is 10 ug/L, so we are well below the safe and allowable limit.

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Before the water reaches the tap, older soldered plumbing joints in buildings and some lead connections may leach lead into the water. Not all buildings have lead connections. Elevated lead levels have been detected in a small number of buildings where consumers have very lengthy lead service pipes connecting their home to the City's water system. Testing in these areas with copper services and shorter lead services show levels within the Provincial Standards.

Older lead water main connections and in-home use of lead solder can result in lead leaching into the water causing elevated levels. The longer the water is in contact with the lead, the greater will be the chance of lead contamination. For example, the first water that comes from the faucet after long periods of non-use may have unacceptable levels of lead in it.

The City of Thunder Bay recently completed a Corrosion Study in the Bare Point Distribution System that allowed us to determine which corrosion inhibitor would be most effective in our water supply. A variety of corrosion inhibitors can be added to the drinking water to retard corrosion and the contaminant release. A corrosion inhibitor is a substance that lowers the aggressiveness of the water and/or creates a protective coating on the inside of the distribution lines. Since the efficiency of a particular inhibitor is dependent on specific water chemistry, the treatment procedures (i.e. inhibitor type and application dosage) for given water system must be verified. Plans for the addition of the inhibitor will begin with the expansion of the Bare Point water treatment system. The Loch Lomond system has been treating water with sodium silicate for a few years to help reduce lead levels and minimize line corrosion.

Precautions you can take in your home.

The following precautions taken in your home will minimize the risk of lead intake:

- Flush your toilet before you run drinking water if your water has not been used for long periods during the day or night.
- Run the cold water for a minute or two after periods of non-use. Letting the water run will usually remove any water affected by lead. This water can be saved for other uses such as watering your plants.
- Use cold water for cooking. Hot water can initiate the leaching of lead more quickly than cold water.

If you believe that the water in your home has high lead levels and would like to have the water tested, contact the Water Quality Technician at the Bare Point Water Treatment Plant to arrange a time to collect water sample.

Is bottled water better for you?

Consumers should be aware that the production of bottled water is not regulated to the same degree as water treated in a Water Treatment Facility.

Should people at risk of infection take special precautions?

Immuno-compromised persons and those undergoing cancer therapy, such as chemotherapy; persons who have undergone organ transplants; people with HIV/AIDS or other immune system disorders can be more vulnerable to contaminants in drinking water. People at risk from infections should seek advice about drinking water from their health care providers.

Please note changes to tables:

The format of the test result tables was revised in response to suggestions of the *Canadian Environmental Defence Fund*. The attached tables are formatted to summarize exceedances only. Tables include test results, ranges and actions taken to resolve exceedances which occurred during the quarter January 1 to March 31, 2002.

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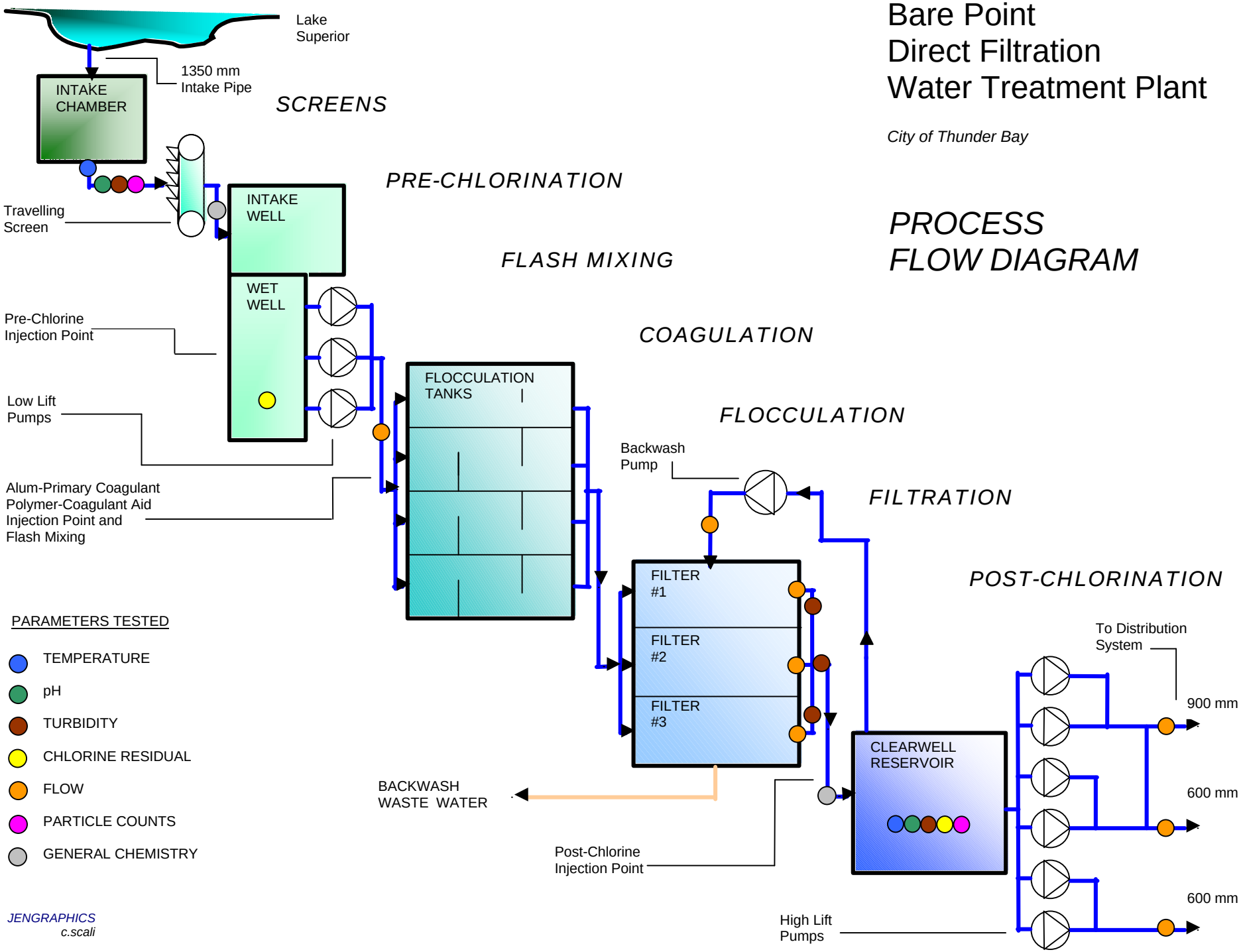
A complete listing of test results for all parameters in this quarter is available on our web page at www.city.thunder-bay.on.ca, or by contacting the Bare Point Water Treatment Plant at 684-8141.

Bare Point
Direct Filtration
Water Treatment Plant

City of Thunder Bay

PROCESS FLOW DIAGRAM



JENGRAPHICS
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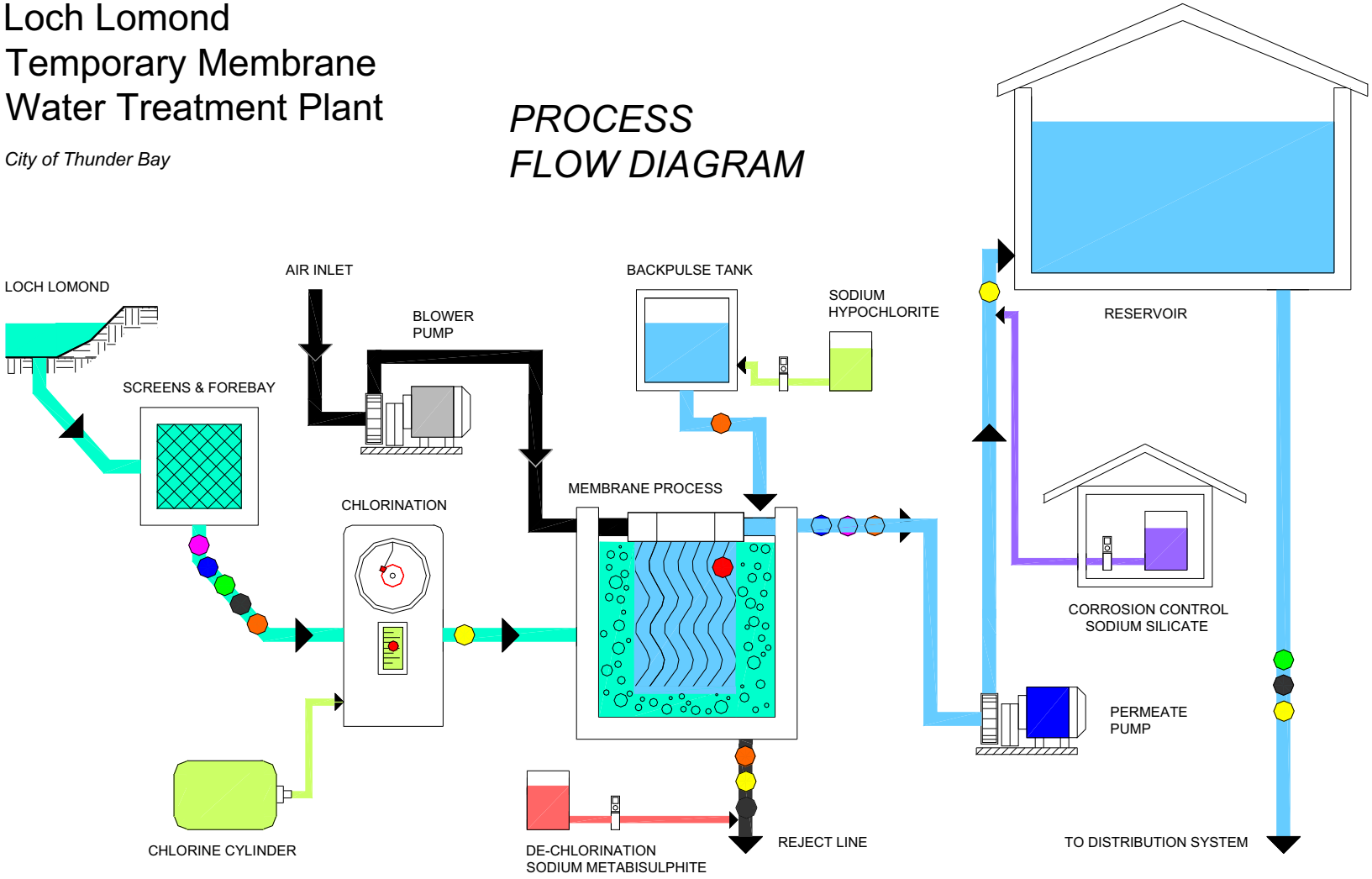
Loch Lomond Temporary Membrane Water Treatment Plant

City of Thunder Bay

PROCESS FLOW DIAGRAM



Our Notifications to the MOE

Bare Point Distribution System

I.D. & Location #	Date Received	Type of Exceedance	Corrective Action Taken	Date Action Taken	Results	Follow Up Action
A1- 01 DSN84	24-Jan	Heterotrophic Plate Count	Area flushed, resampled 3 locations, 2 consecutive days	Jan. 24 & Jan. 25	All results OK	None Required
A1- 04 DSN62	15-Mar	Total Coliform	Area flushed, resampled 3 locations, 2 consecutive days	Mar. 15 & Mar. 16	All results OK	None Required
Bare Point Treated Water	24-Jan	Benzo(a)-Pyrene	Resampled and retested two times	Feb. 7 & Mar. 5	Resamples all OK	None Required

Above are the adverse water sample results for the Bare Point Distribution System this quarter. The Environment Division staff worked quickly to flush and resample the two areas with positive bacterial results and in each case, the resamples were negative. This ensures high water quality for all consumers. The benzo(a)pyrene result was traced to sample contamination from diesel generator fumes.

Loch Lomond Distribution System

I.D. & Location #	Date Received	Type of Exceedance	Corrective Action Taken	Date Action Taken	Results	Follow Up Action
A1 - 02 DSS34	10-Feb	Pseudomonas Aeruginosa	Area flushed, resampled 3 locations, 2 consecutive days	Feb. 10 & Feb. 11	All results OK	None Required
A1 - 03 DSS73	17-Feb	Total Coliform	Area flushed, resampled 3 locations, 2 consecutive days	Feb. 17 & Feb. 18	All results OK	None Required
Loch System Extremity	Four-quarter avg.	High THM Average (108.1 ug/L)	Post-chlorination pilot program at Loch Lomond	Jan. 30 & Mar. 5	Average of 98.5 ug/L in initial trial	Pilot testing is ongoing

Above are the adverse water sample results for the Loch Lomond Distribution System this quarter. The Environment Division staff worked quickly to flush and resample the two areas with positive bacterial results and in each case, the resamples were negative. This ensures high water quality for all consumers. Further pilot testing of the post-chlorination procedure will continue at the Loch Lomond plant to study its effect on THM formation at the system extremity.

Where can I get further information?

GIVE US A CALL
TRANSPORTATION & WORKS

Phone: 684-2195 (daytime)
684-3117 (after hours)*
* 4:30 pm to 8 am & holidays.
Or e-mail us at **rchuchman@city.thunder-bay.on.ca**

Bare Point Water Treatment Plant
R.R.#13
171 Bare Point Road,
Thunder Bay, ON, P7B 5E4
Phone: 683-8141 (24 hours)
Supervisor: Don W. Kmill
MOE Waterworks No. 220000273
MOE Certificate of Approval
No. 7-0748-90-006

Loch Lomond Water Treatment Plant
R.R.#4
151 Reservoir Road, Thunder Bay, ON,
P7C 4Z2
Phone: 622-0944 or
683-8141 (24 hours)
Supervisor: Don W. Kmill
MOE Waterworks No. 220000282
MOE Certificate of Approval
No. 7-0706-98-006

Additional Contacts:

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kmcwhirter@city.thunder-bay.on.ca

Ross Chuchman, Chief Chemist
Environment Division
Phone: 687-3537
Fax: 345-1909
E-mail:
rchuchman@city.thunder-bay.on.ca

Publications

If you wish to obtain one of the publications below, submit the title of the publication you wish to receive by email to **kwalkinshaw@city.thunder-bay.on.ca**
Or call at 684-2195.

Water Efficiency Publications

- *Homeowner's Guide Water Conservation Program*, City of Thunder Bay Environment Division.

- *Thunder Bay Water Saver's Guide*, City of Thunder Bay Environment Division.

- *Household Guide to Water Efficiency*, Canadian Mortgage and Housing Corporation, 2000

General Publications

Available on loan from:
Environment Division,
85 Front Street, Thunder Bay. 684-3150

- *Water Treatment Plants & Distribution Systems Annual Report* , City of Thunder Bay, Environment Division

- *A Consumer's Guide to Drinking Water: Where It Comes From, How It's Made Safe & What to do if Something Goes Wrong*, ©2000, American Water Works Association

- *A Consumer's Guide to Water Conservation: Dozens of Ways to Save Water, The Environment, and a Lot of Money*, ©1993 American Water Works Association.

Information for Children

Available on loan from:
Environment Division,
85 Front Street, Thunder Bay. 684-3150

- *Splash Activity Book*, Copyright ©1990 American Water Works Association (workbook suitable for young children)

- *The Story of Drinking Water*, ã 1992 American Water Works Association

- *Teacher's Guide to The Story of Drinking Water*, Metric Edition, ©1992 American Water Works Association

- *Water Can be Fun! How to Create a Successful Science Fair: Featuring 34 Water-Related Project Ideas to Share With Students*, ©1991 American Water Works Association

Water Information Available Online. Check out these links:

- Drinking Water Protection Regulation
http://www.ene.gov.on.ca/envision/WaterReg/WaterReg.htm

- Water Treatment Plants
http://www.city.thunder-bay.on.ca/water/theplants.html

- Questions & Answers about Drinking Water Quality
http://www.city.thunder-bay.on.ca/water/Q&A.html

- Blue Thumb Web Site:
http://www.awwa.org/bluethumb.htm

- Water Conservation Tips:
http://www.city.thunder-bay.on.ca/water/tips.html

- Health Canada Drinking Water Information:
http://www.hc-sc.gc.ca/ehp/ehd/bch/water_quality/publications.htm

Videos

- Quality Behind the Tap
City of Thunder Bay, 1998

BARE POINT DISTRIBUTION SYSTEM: ROUTINE BACTERIOLOGICAL SAMPLES

Microbiological Parameters	MAC/ IMAC	# of Samples	# Detect Results	Sampling Date	Range	Exceedance	Typical Source of Parameter
Total Coliform	ND	284	1	01/01/02 – 31/03/02	Present	Yes (1)	Naturally present in environment
Fecal Coliform	ND	284	0	01/01/02 – 31/03/02	Absent	No	Animal / human fecal waste
E. Coli	ND	284	0	01/01/02 – 31/03/02	Absent	No	Animal / human fecal waste
Deterioration Indicators	--	284	0	01/01/02 – 31/03/02	Absent	No	
Heterotrophic Plate Count	500	72	34	01/01/02 – 31/03/02	0 - >2400	Yes (1)	General bacterial population

LOCH LOMOND DISTRIBUTION SYSTEM: ROUTINE BACTERIOLOGICAL SAMPLES

Microbiological Parameters	MAC/ IMAC	# of Samples	# Detect Results	Sampling Date	Range	Exceedance (#)	Typical Source of Parameter
Total Coliform	ND	286	1	01/01/02 – 31/03/02	Present	Yes (1)	Naturally present in environment
Fecal Coliform	ND	286	0	01/01/02 – 31/03/02	Absent	No	Animal / human fecal waste
E. Coli	ND	286	0	01/01/02 – 31/03/02	Absent	No	Animal / human fecal waste
Deterioration Indicators	--	286	1	01/01/02 – 31/03/02	Present	Yes (1)	
Heterotrophic Plate Count	500	71	38	01/01/02 – 31/03/02	0 – 40	No	Indicator of deteriorating water quality if over 500

BARE POINT SYSTEM: OPERATIONAL PARAMETERS

Parameters related to Microbiological Quality	**Units**	**AO/OG**	**# of Samples**	**# Detectable Results**	**Sampling Date**	**Range** (mg/L unless stated)	**Typical Source of Parameter**
Turbidity	NTU	1	Continuous	Continuous	01/01/02 – 31/03/02	0.04 – 0.12	**Suspended material in water**
Free Chlorine at Plant	mg/L	0.8 – 4.0	Continuous	Continuous	01/01/02 – 31/03/02	0.91 - 1.15	**Disinfectant added**
Free Chlorine in System	mg/L	0.2 – 4.0	287	287	01/01/02 – 31/03/02	0.02 – 0.88	**Disinfectant added**
pH	No units	6.5-8.5	270	270	01/01/02 – 31/03/02	6.89 – 7.29	**Measure of water acidity** (7.00 = neutral)
Copper	mg/L	1.0	3	0	01/01/02 – 31/03/02	<0.07	
Iron	mg/L	0.30	3	0	01/01/02 – 31/03/02	0.00	
Alkalinity	mg/L	30-500	3	3	01/01/02 – 31/03/02	49.80–50.40	
Conductivity	uS/cm		3	3	01/01/02 – 31/03/02	106.0-107.0	
Hardness	mg/L	80-100	3	3	01/01/02 – 31/03/02	50.20–54.20	
Aluminum	mg/L	0.10	168	168	01/01/02 – 31/03/02	0.013 – 0.062	Erosion of natural deposits, Residues from coagulant use
Colour	TCU	5	160	160	01/01/02 – 31/03/02	0.5 – 6.0	Tannins and lignins from natural decay

AO – Aesthetic Objective
OG – Operational Guideline

LOCH LOMOND SYSTEM: OPERATIONAL PARAMETERS

Parameters related to Microbiological Quality	Units	AO/OG	# of Samples	# Detectable Results	Sampling Date	Range (mg/L unless stated)	Typical Source of Parameter
Turbidity	NTU	1	Continuous	Continuous	01/01/02 – 31/03/02	0.01 – 0.06	Suspended material in water
Free Chlorine at Plant	mg/L	1.1 – 4.0	Continuous	Continuous	01/01/02 – 31/03/02	1.38 – 2.16	Disinfectant added
Free Chlorine in System	mg/L	0.2 – 4.0	287	287	01/01/02 – 31/03/02	0.08 – 1.55	Disinfectant added
pH	No units	6.5-8.5	Continuous	Continuous	01/01/02 – 31/03/02	7.7 – 8.2	Measure of water acidity (7.00 = neutral)
Copper	mg/L	1.0	3	0	01/01/02 – 31/03/02	<0.07	
Iron	mg/L	0.30	3	0	01/01/02 – 31/03/02	0.00	
Alkalinity	mg/L	30-500	3	3	01/01/02 – 31/03/02	20.8 – 23.4	
Conductivity	uS/cm		3	3	01/01/02 – 31/03/02	67.0 – 70.0	
Hardness	mg/L	80-100	3	3	01/01/02 – 31/03/02	24.1 – 24.8	
Colour	TCU	5	166	166	01/01/02 – 31/03/02	2.0 – 20.0	Tannins and lignins from natural decay

AO – Aesthetic Objective
OG – Operational Guideline

Bare Point Water Treatment Plant - Volatile Organics Tests

Source Water	Parameter	MAC/ IMAC (ug/L)	# of Samples	# of Detectable Results	Date(s) dd/mm/yyyy	Range (ug/L)	Exceedance	Source of Parameter
Bare Point Treated	Vinyl Chloride	2	1	0	07/02/2002	<0.2	NO	
	1,1-Dichloroethylene	14	1	0	07/02/2002	<1	NO	
	Dichloromethane	50	1	0	07/02/2002	<1	NO	
	Chloroform	Note 1	1	1	07/02/2002	11	NO	Type of trihalomethane (THM)
	Carbon Tetrachloride	5	1	0	07/02/2002	<0.5	NO	
	Benzene	5	1	0	07/02/2002	<0.5	NO	
	1,2-Dichloroethane	5	1	0	07/02/2002	<0.5	NO	
	Bromodichloromethane	Note 1	1	1	07/02/2002	1	NO	Type of trihalomethane (THM)
	Toluene	24 **	1	0	07/02/2002	<1		
	Trichloroethylene	50	1	0	07/02/2002	<1	NO	
	Tetrachloroethylene	30	1	0	07/02/2002	<1	NO	
	Dibromochloromethane	Note 1	1	0	07/02/2002	<1	NO	Type of trihalomethane (THM)
	Monochlorobenzene	80	1	0	07/02/2002	<1	NO	
	Ethylbenzene	2.4**	1	0	07/02/2002	<1		
	m,p-Xylene	300*	1	0	07/02/2002	<1		
	o-Xylene	300*	1	0	07/02/2002	<1		
	Bromoform	Note 1	1	0	07/02/2002	<1	NO	Type of trihalomethane (THM)
	1,4-Dichlorobenzene	5	1	0	07/02/2002	<0.5	NO	
	1,2-Dichlorobenzene	200	1	0	07/02/2002	<1	NO	
Bare Point Distr. System	Total THM's – System Extremity (2)	100	4	4	05/04/01-07/02/02	20.5(2)	NO	Disinfection by-products (total)

**** NOTE 1 – Total of all trihalomethanes (chlroform & bromochloromethanes) should not exceed THM standard of 100 ug/L**

(2) - THMs in the distribution system are based on a running annual average of four quarterly samples at point of max. residence (extremity)

**** - Aesthetic Objective(AO). Exceedance column does not apply to these.**

*** - 300 ug/L is AO for total Xylenes < - Means less than the specified method detection limit**

Bare Point Water Treatment Plant – Pesticides & PCB Tests

Source Water	Parameter	MAC/ IMAC (ug/L)	# of Samples	# of Detectable Results	Date(s) dd/mm/yyyy	Range (ug/L)	Exceedance	Source of Parameter
Bare Point Treated Water	Alachlor	5	1	0	07/02/2002	<0.1	NO	Insecticide, herbicide and fungicide residues
	Atrazine + N-dealkylated metabolites	5	1	0	07/02/2002	<0.2	NO	
	Azinphos-methyl	20	1	0	07/02/2002	<0.1	NO	
	Chlorpyrifos	90	1	0	07/02/2002	<0.1	NO	
	Cyanazine	10	1	0	07/02/2002	<0.1	NO	
	Diazinon	20	1	0	07/02/2002	<0.1	NO	
	Diclofop-methyl	9	1	0	07/02/2002	<0.1	NO	
	Dimethoate	20	1	0	07/02/2002	<0.1	NO	
	Dinoseb	10	1	0	07/02/2002	<0.2	NO	
	Malathion	190	1	0	07/02/2002	<0.1	NO	
	Metribuzin	80	1	0	07/02/2002	<0.1	NO	

Bare Point – Pesticides & PCB Tests (cont.)								
Source Water	**Parameter**	**MAC/ IMAC (ug/L)**	**# of Samples**	**# of Detectable Results**	**Date(s) dd/mm/yyyy**	**Range (ug/L)**	**Exceedance**	**Source of Parameter**
Bare Point Treated Water (cont.)	Parathion	50	1	0	07/02/2002	<0.1	NO	Insecticide, herbicide and fungicide residues
	Phorate	2	1	0	07/02/2002	<0.1	NO	
	Prometryne	1	1	0	07/02/2002	<0.1	NO	
	Simazine	10	1	0	07/02/2002	<0.1	NO	
	Terbufos	1	1	0	07/02/2002	<0.1	NO	
	Triallate	230	1	0	07/02/2002	<0.1	NO	
	Trifluralin	45	1	0	07/02/2002	<0.1	NO	
	P,p'-DDD	30**	1	0	07/02/2002	<0.1	NO	
	P,p'-DDE	30**	1	0	07/02/2002	<0.1	NO	
	P,p'-DDT	30**	1	0	07/02/2002	<0.1	NO	
	Aldrin	0.7*	1	0	07/02/2002	<0.02	NO	
	Dieldrin	0.7*	1	0	07/02/2002	<0.02	NO	
	Heptachlor	3[+]	1	0	07/02/2002	<0.1	NO	
	Heptachlor Epoxide	3[+]	1	0	07/02/2002	<0.1	NO	
	Lindane (Total)	4	1	0	07/02/2002	<0.1	NO	
	Methoxychlor	900	1	0	07/02/2002	<0.1	NO	
	Metolachlor	50	1	0	07/02/2002	<0.1	NO	
	Chlordane	7	1	0	07/02/2002	<0.1	NO	
	Bromoxynil	5	1	0	07/02/2002	<0.2	NO	
	Dicamba	120	1	0	07/02/2002	<0.2	NO	
	2,4-Dichlorophenol	900	1	0	07/02/2002	<0.5	NO	
	2,4-D	100	1	0	07/02/2002	<0.2	NO	
	Pentachlorophenol	60	1	0	07/02/2002	<0.5	NO	
	Picloram	190	1	0	07/02/2002	<0.2	NO	
	2,3,4,6-Tetrachlorophenol	100	1	0	07/02/2002	<0.5	NO	
	2,4,6-Trichlorophenol	5	1	0	07/02/2002	<0.5	NO	
	2,4,5-T	280	1	0	07/02/2002	<0.2	NO	
	Glyphosate	280	1	0	07/02/2002	<28	NO	
	Diquat	70	1	0	07/02/2002	<7	NO	
	Paraquat	10	1	0	07/02/2002	<1	NO	
	Aldicarb	9	1	0	07/02/2002	<0.9	NO	
	Bendiocarb	40	1	0	07/02/2002	<0.1	NO	
	Carbaryl	90	1	0	07/02/2002	<0.1	NO	
	Carbofuran	90	1	0	07/02/2002	<0.1	NO	
	Diuron	150	1	0	07/02/2002	<15	NO	
	Temephos	280	1	0	07/02/2002	<0.1	NO	
	PCB's	3	1	0	07/02/2002	<0.06	NO	Electrical insulating oil
	Dioxins and Furans	15 pg/L Total TEQ	1	1	24/01/2002	0.5 pg/L	NO	Insecticide and bleaching by-products, garbage burning by-products

< - Means less than the specified method detection limit

BARE POINT WATER TREATMENT PLANT - INORGANIC & GENERAL CHEMISTRY PARAMETERS

Source Water	Parameter	MAC/ IMAC	# of Samples	# Detectable Results	Dates dd/mm/yyyy	Range (mg/L)	Exceedance	Source of Parameter
Bare Point Raw Water	Aluminum	0.1**	1	1	07/02/2002	0.02		Natural sources at low levels
	Arsenic	0.025	1	0	07/02/2002	<0.001	NO	Natural source at low levels
	Calcium		1	1	07/02/2002	13.8		Common mineral constituent
	Copper	1.0**	1	1	07/02/2002	0.001		Corrosion of plumbing system, erosion of natural deposits
	Iron	0.3**	1	0	07/02/2002	<0.05		Erosion of natural deposits, corrosion of cast iron mains
	Manganese	0.05**	1	1	07/02/2002	0.002		Erosion of natural mineral deposits
	Lead	0.01	1	0	07/02/2002	<0.001	NO	Leaching from plumbing and service connections
	Sodium	200**	1	1	07/02/2002	1.93		Natural mineral constituent
	Zinc	5**	1	0	07/02/2002	<0.002		Natural sources, corrosion of plumbing
	Alkalinity	500**	1	1	07/02/2002	44		Natural sources, mostly dissolved carbonate
	Ammonia		1	0	07/02/2002	<0.05		Natural sources at low levels
	Chloride	250**	1	1	07/02/2002	2.0		Natural sources at low levels
	Conductivity (us/cm)		1	1	07/02/2002	105		Natural dissolved material in water
	Dissolved Organic Carbon	5**	1	1	07/02/2002	3		Organic matter leached into surface water from vegetation
	Hardness	100**	1	1	07/02/2002	47		Natural dissolved minerals (Ca, Mg)
	Nitrate	10	1	1	07/02/2002	0.35	NO	Natural sources at low levels, Fertilizer, septic runoff at high levels
	Nitrite	10^{+}	1	0	07/02/2002	<0.02	NO	
	Sulphate	500**	1	1	07/02/2002	4.6		Natural mineral sources
	Total Kjeldahl Nitrogen TKN		1	1	07/02/2002	0.30		Organic matter leached from vegetation
	Benzo(a)pyrene	.00001	1	0	24/01/2002	<.00001	NO	Incomplete combustion, diesel exhaust
	Cyanide	0.2	1	0	24/01/2002	<0.002	NO	Industrial processes
	Total Phenolics		1	1	07/02/2002	0.006		Decomposition of wood
Bare Point Treated Water	Aluminum	0.1**	1	1	07/02/2002	0.37		Natural sources at low levels
	Arsenic	0.025	1	0	07/02/2002	<0.001	NO	Natural source at low levels
	Calcium		1	1	07/02/2002	13.8		Common mineral constituent
	Copper	1.0**	1	1	07/02/2002	0.002		Corrosion of plumbing systems
	Iron	0.3**	1	0	07/02/2002	<0.05		Erosion of natural deposits, corrosion of cast iron mains
	Manganese	0.05**	1	1	07/02/2002	0.001		Erosion of natural mineral deposits
	Lead	0.01	1	0	07/02/2002	<0.001	NO	Leaching from plumbing and service connections
	Sodium	200**	1	1	07/02/2002	1.94		Natural mineral constituent
	Zinc	5**	1	0	07/02/2002	<0.002		Natural sources, corrosion of plumbing
	Alkalinity	500**	1	1	07/02/2002	42		Natural sources, mostly dissolved carbonate
	Ammonia		1	0	07/02/2002	<0.05		Natural sources at low levels

Bare Point – Inorganic & General Chemistry Parameters (cont.)								
Source Water	**Parameter**	**MAC/ IMAC**	**# of Samples**	**# Detectable Results**	**Dates** dd/mm/yyyy	**Range (mg/L)**	**Exceedance**	**Source of Parameter**
Bare Point Treated Water (cont.)	Chloride	250**	1	1	07/02/2002	2.9		Natural sources at low levels
	Conductivity		1	1	07/02/2002	107		Natural dissolved material in water
	Dissolved Organic Carbon (DOC)	5**	1	1	07/02/2002	2		Organic matter leached into surface water from vegetation
	Benzo(a)pyrene	.00001	1	0	24/01/2002	.00036	YES	Incomplete combustion, diesel exhaust
	Barium	1.0	1	0	24/01/2002	<0.01	NO	Common constituent of sedimentary rock
	Boron	5.0	1	0	24/01/2002	<0.05	NO	Borates, borax detergents
	Cadmium	0.005	1	0	24/01/2002	<0.001	NO	Electroplating, NiCad batteries
	Chromium	0.05	1	0	24/01/2002	<0.005	NO	Electroplating, old yellow paints
	Mercury	0.001	1	0	24/01/2002	<0.0001	NO	Metal refining, coal combustion, natural deposits
	Selenium	0.01	1	0	24/01/2002	<0.005	NO	Natural deposits
	Uranium	0.10	1	0	24/01/2002	<0.01	NO	Natural deposits, nuclear processing
	Cyanide	0.2	1	0	24/01/2002	<0.002	NO	Industrial processes
	Fluoride	1.5	1	1	24/01/2002	0.05	NO	Natural deposits, water fluoridation
	Methane, dissolved	3 L/m^{3**}	1	0	24/01/2002	<0.005		Anaerobic conditions in groundwater
	Sulphide	0.05**	1	0	24/01/2002	<0.003		Anaerobic conditions in groundwater
	Total Dissolved Solids	500**	1	1	24/01/2002	80		Dissolved minerals in water
	Hardness	100**	1	1	07/02/2002	47		Natural dissolved minerals (Ca, Mg)
	Nitrate	10	1	1	07/02/2002	0.36	NO	Natural sources at low levels, Fertilizer, septic runoff at high levels
	Nitrite	10^{+}	1	0	07/02/2002	<0.02	NO	
	Silica, reactive		1	1	07/02/2002	2.5		Natural mineral leaching in oxygen-poor conditions, usually low in surface water
	Orthophosphate		1	0	07/02/2002	<.04		Bacterial action in ground water
	Sulphate	500**	1	1	07/02/2002	6.6		Natural mineral sources
	Total Kjeldahl Nitrogen (TKN)		1	1	07/02/2002	0.34		Organic matter leached into surface water from vegetation

Bare Point – Inorganic & General Chemistry Parameters (cont.)								
Source Water	**Parameter**	**MAC/ IMAC**	**# of Samples**	**# Detectable Results**	**Dates** dd/mm/yyyyy	**Range (mg/L)**	**Exceedance**	**Source of Parameter**
Bare Point Distribution System Water	Aluminum	0.1**	1	1	07/02/2002	0.03		Natural sources at low levels
	Arsenic	0.025	1	0	07/02/2002	<0.001	NO	Natural source at low levels
	Calcium		1	1	07/02/2002	13.9		Common mineral constituent
	Copper	1.0**	1	1	07/02/2002	0.003		Corrosion of plumbing system, erosion of natural deposits
	Iron	0.3**	1	0	07/02/2002	<0.05		Erosion of natural deposits, corrosion of cast iron mains
	Manganese	0.05**	1	0	07/02/2002	<0.001		Erosion of natural mineral deposits
	Lead	0.01	1	0	07/02/2002	<0.001	NO	Leaching from plumbing and service connections
	Sodium	200**	1	1	07/02/2002	1.93		
	Zinc	5**	1	1	07/02/2002	<0.002		Natural sources, corrosion of plumbing
	Alkalinity	500**	1	1	07/02/2002	41		Natural dissolved carbonate minerals
	Ammonia		1	0	07/02/2002	<0.05		Natural sources at low levels
	Chloride	250**	1	1	07/02/2002	2.8		Natural sources at low levels
	Conductivity (uS/cm)		1	1	07/02/2002	108		Natural dissolved material in water
	Dissolved Organic Carbon	5**	1	1	07/02/2002	2		Organic matter leached into surface water from vegetation
	Hardness	100**	1	1	07/02/2002	48		Natural dissolved minerals (Ca, Mg)
	Nitrate	10	1	1	07/02/2002	0.35	NO	Natural sources at low levels, Fertilizer, septic runoff at high levels
	Nitrite	10^{+}	1	0	07/02/2002	<0.02	NO	
	Sulphate	500**	1	1	07/02/2002	6.7		Natural mineral sources
	Total Kjeldahl Nitrogen (TKN)		1	1	07/02/2002	0.21		Organic matter leached into surface water from vegetation

****** **-Aesthetic Objectives (AO). Exceedance column does not apply to these.**

+ **-Nitrite plus Nitrate MAC is 10 mg/L** **<** **- Means less than the specified method detection limit**

Loch Lomond Water Treatment Plant - Volatile Organics Tests

Source Water	Parameter	MAC/ IMAC (ug/L)	# of Samples	# of Detectable Results	Date(s) dd/mm/yyyy	Range (ug/L)	Exceedance	Source of Parameter
Loch Lomond Treated	Vinyl Chloride	2	1	0	07/02/2002	<0.2	NO	
	1,1-Dichloroethylene	14	1	0	07/02/2002	<1	NO	
	Dichloromethane	50	1	0	07/02/2002	<1	NO	
	Chloroform	Note 1	1	1	07/02/2002	55	NO	Type of trihalomethane (THM)
	Carbon Tetrachloride	5	1	0	07/02/2002	<0.5	NO	
	Benzene	5	1	0	07/02/2002	<0.5	NO	
	1,2-Dichloroethane	5	1	0	07/02/2002	<0.5	NO	
	Bromodichloromethane	Note 1	1	1	07/02/2002	2	NO	Type of trihalomethane (THM)
	Toluene	24 **	1	0	07/02/2002	<1		
	Trichloroethylene	50	1	0	07/02/2002	<1	NO	
	Tetrachloroethylene	30	1	0	07/02/2002	<1	NO	
	Dibromochloromethane	Note 1	1	0	07/02/2002	<1	NO	Type of trihalomethane (THM)
	Monochlorobenzene	80	1	0	07/02/2002	<1	NO	
	Ethylbenzene	2.4**	1	0	07/02/2002	<1		
	m,p-Xylene	300*	1	0	07/02/2002	<1		
	o-Xylene	300*	1	0	07/02/2002	<1		
	Bromoform	Note 1	1	0	07/02/2002	<1	NO	Type of trihalomethane (THM)
	1,4-Dichlorobenzene	5	1	0	07/02/2002	<0.5	NO	
	1,2-Dichlorobenzene	200	1	0	07/02/2002	<1	NO	
Loch Lomond Distribution System	Total THM's – System Extremity (2)	100	4	4	05/04/01-18/03/02	108.1	YES	Disinfection by-products (total)

**** NOTE 1 – Total of all trihalomethanes (chlroform & bromochloromethanes) should not exceed THM standard of 100 ug/L**

(2) - THMs in the distribution system are based on a running annual average of four quarterly samples at point of max. residence (extremity)

**** - Aesthetic Objective(AO). Exceedance column does not apply to these.**

*** - 300 ug/L is AO for total Xylenes < - Means less than the specified method detection limit**

Loch Lomond Water Treatment Plant – Pesticides & PCB Tests

Source Water	Parameter	MAC/ IMAC (ug/L)	# of Samples	# of Detectable Results	Date(s) dd/mm/yyyy	Range (ug/L)	Exceedance	Source of Parameter
Loch Lomond Treated Water	Alachlor	5	1	0	07/02/2002	<0.1	NO	Insecticide, herbicide and fungicide residues
	Atrazine + N-dealkylated metabolites	5	1	0	07/02/2002	<0.2	NO	
	Azinphos-methyl	20	1	0	07/02/2002	<0.1	NO	
	Chlorpyrifos	90	1	0	07/02/2002	<0.1	NO	
	Cyanazine	10	1	0	07/02/2002	<0.1	NO	
	Diazinon	20	1	0	07/02/2002	<0.1	NO	
	Diclofop-methyl	9	1	0	07/02/2002	<0.1	NO	
	Dimethoate	20	1	0	07/02/2002	<0.1	NO	
	Dinoseb	10	1	0	07/02/2002	<0.2	NO	
	Malathion	190	1	0	07/02/2002	<0.1	NO	
	Metribuzin	80	1	0	07/02/2002	<0.1	NO	

Loch Lomond – Pesticides & PCB Tests (cont.)								
Source Water	**Parameter**	**MAC/ IMAC (ug/L)**	**# of Samples**	**# of Detectable Results**	**Date(s) dd/mm/yyyy**	**Range (ug/L)**	**Exceedance**	**Source of Parameter**
Loch Lomond Treated Water (cont.)	Parathion	50	1	0	07/02/2002	<0.1	NO	Insecticide, herbicide and fungicide residues
	Phorate	2	1	0	07/02/2002	<0.1	NO	
	Prometryne	1	1	0	07/02/2002	<0.1	NO	
	Simazine	10	1	0	07/02/2002	<0.1	NO	
	Terbufos	1	1	0	07/02/2002	<0.1	NO	
	Triallate	230	1	0	07/02/2002	<0.1	NO	
	Trifluralin	45	1	0	07/02/2002	<0.1	NO	
	P,p'-DDD	30**	1	0	07/02/2002	<0.1	NO	
	P,p'-DDE	30**	1	0	07/02/2002	<0.1	NO	
	P,p'-DDT	30**	1	0	07/02/2002	<0.1	NO	
	Aldrin	0.7*	1	0	07/02/2002	<0.02	NO	
	Dieldrin	0.7*	1	0	07/02/2002	<0.02	NO	
	Heptachlor	3+	1	0	07/02/2002	<0.1	NO	
	Heptachlor Epoxide	3+	1	0	07/02/2002	<0.1	NO	
	Lindane (Total)	4	1	0	07/02/2002	<0.1	NO	
	Methoxychlor	900	1	0	07/02/2002	<0.1	NO	
	Metolachlor	50	1	0	07/02/2002	<0.1	NO	
	Chlordane	7	1	0	07/02/2002	<0.1	NO	
	Bromoxynil	5	1	0	07/02/2002	<0.2	NO	
	Dicamba	120	1	0	07/02/2002	<0.2	NO	
	2,4-Dichlorophenol	900	1	0	07/02/2002	<0.5	NO	
	2,4-D	100	1	0	07/02/2002	<0.2	NO	
	Pentachlorophenol	60	1	0	07/02/2002	<0.5	NO	
	Picloram	190	1	0	07/02/2002	<0.2	NO	
	2,3,4,6-Tetrachlorophenol	100	1	0	07/02/2002	<0.5	NO	
	2,4,6-Trichlorophenol	5	1	0	07/02/2002	<0.5	NO	
	2,4,5-T	280	1	0	07/02/2002	<0.2	NO	
	Glyphosate	280	1	0	07/02/2002	<28	NO	
	Diquat	70	1	0	07/02/2002	<7	NO	
	Paraquat	10	1	0	07/02/2002	<1	NO	
	Aldicarb	9	1	0	07/02/2002	<0.9	NO	
	Bendiocarb	40	1	0	07/02/2002	<0.1	NO	
	Carbaryl	90	1	0	07/02/2002	<0.1	NO	
	Carbofuran	90	1	0	07/02/2002	<0.1	NO	
	Diuron	150	1	0	07/02/2002	<15	NO	
	Temephos	280	1	0	07/02/2002	<0.1	NO	
	PCB's	3	1	0	07/02/2002	<0.06	NO	Electrical insulating oil
	Dioxins and Furans	15 pg/L Total TEQ	1	1	24/01/2002	0.5	NO	Insecticide and bleaching by-products, garbage burning by-products

< - Means less than the specified method detection limit

Loch Lomond Water Treatment Plant - Inorganic & General Chemistry Parameters

Source Water	Parameter	MAC/ IMAC	# of Samples	# Detectable Results	Dates dd/mm/yyyy	Range (mg/L)	Exceedance	Source of Parameter
Loch Lomond Raw Water	Aluminum	0.1**	1	0	07/02/2002	<0.01		Natural sources at low levels
	Arsenic	0.025	1	0	07/02/2002	<0.001	NO	Natural source at low levels
	Calcium		1	1	07/02/2002	6.2		Common mineral constituent
	Copper	1.0**	1	1	07/02/2002	0.002		Corrosion of plumbing system, erosion of natural deposits
	Iron	0.3**	1	0	07/02/2002	<0.05		Erosion of natural deposits, corrosion of cast iron mains
	Manganese	0.05**	1	1	07/02/2002	0.002		Erosion of natural mineral deposits
	Lead	0.01	1	0	07/02/2002	<0.001	NO	Leaching from plumbing and service connections
	Sodium	200**	1	1	07/02/2002	1.23		Natural mineral constituent
	Zinc	5**	1	0	07/02/2002	<0.002		Natural sources, corrosion of plumbing
	Alkalinity	500**	1	1	07/02/2002	22		Natural sources, mostly dissolved carbonate
	Ammonia		1	0	07/02/2002	<0.05		Natural sources at low levels
	Chloride	250**	1	1	07/02/2002	0.8		Natural sources at low levels
	Conductivity (us/cm)		1	1	07/02/2002	59.7		Natural dissolved material in water
	Dissolved Organic Carbon	5**	1	1	07/02/2002	6		Organic matter leached into surface water from vegetation
	Hardness	100**	1	1	07/02/2002	26		Natural dissolved minerals (Ca, Mg)
	Nitrate	10	1	1	07/02/2002	0.09	NO	Natural sources at low levels, Fertilizer, septic runoff at high levels
	Nitrite	10^{+}	1	0	07/02/2002	<0.02	NO	
	Sulphate	500**	1	1	07/02/2002	5.6		Natural mineral sources
	Total Kjeldahl Nitrogen TKN		1	1	07/02/2002	0.60		Organic matter leached from vegetation
	Benzo(a)pyrene	.00001	1	0	24/01/2002	<.00001	NO	Incomplete combustion, diesel exhaust
	Cyanide	0.2	1	0	24/01/2002	<0.002	NO	Industrial processes
	Total Phenolics		1	0	07/02/2002	<0.001		Decomposition of wood
Loch Lomond Treated Water	Aluminum	0.1**	1	0	07/02/2002	<0.01		Natural sources at low levels
	Arsenic	0.025	1	0	07/02/2002	<0.001	NO	Natural source at low levels
	Calcium		1	1	07/02/2002	6.0		Common mineral constituent
	Copper	1.0**	1	1	07/02/2002	0.001		Corrosion of plumbing systems
	Iron	0.3**	1	0	07/02/2002	<0.05		Erosion of natural deposits, corrosion of cast iron mains
	Manganese	0.05**	1	1	07/02/2002	0.001		Erosion of natural mineral deposits
	Lead	0.01	1	0	07/02/2002	<0.001	NO	Leaching from plumbing and service connections
	Sodium	200**	1	1	07/02/2002	3.26		Natural mineral constituent
	Zinc	5**	1	0	07/02/2002	<0.002		Natural sources, corrosion of plumbing
	Alkalinity	500**	1	1	07/02/2002	22		Natural sources, mostly dissolved carbonate
	Ammonia		1	0	07/02/2002	<0.05		Natural sources at low levels

Loch Lomond – Inorganic & General Chemistry Parameters (cont.)								
Source Water	**Parameter**	**MAC/ IMAC**	**# of Samples**	**# Detectable Results**	**Dates** dd/mm/yyyy	**Range (mg/L)**	**Exceedance**	**Source of Parameter**
Loch Lomond Treated Water (cont.)	Chloride	250**	1	1	07/02/2002	3.0		Natural sources at low levels
	Conductivity		1	1	07/02/2002	68		Natural dissolved material in water
	Dissolved Organic Carbon (DOC)	5**	1	1	07/02/2002	5		Organic matter leached into surface water from vegetation
	Benzo(a)pyrene	.00001	1	0	24/01/2002	<0.00001	NO	Incomplete combustion, diesel exhaust
	Barium	1.0	1	0	24/01/2002	<0.01	NO	Common constituent of sedimentary rock
	Boron	5.0	1	0	24/01/2002	<0.05	NO	Borates, borax detergents
	Cadmium	0.005	1	0	24/01/2002	<0.001	NO	Electroplating, NiCad batteries
	Chromium	0.05	1	0	24/01/2002	<0.005	NO	Electroplating, old yellow paints
	Mercury	0.001	1	0	24/01/2002	<0.0001	NO	Metal refining, coal combustion, natural deposits
	Selenium	0.01	1	0	24/01/2002	<0.005	NO	Natural deposits
	Uranium	0.10	1	0	24/01/2002	<0.01	NO	Natural deposits, nuclear processing
	Cyanide	0.2	1	0	24/01/2002	<0.002	NO	Industrial processes
	Fluoride	1.5	1	1	24/01/2002	0.04	NO	Natural deposits, water fluoridation
	Methane, dissolved	3 L/m^{3**}	1	0	24/01/2002	<0.005		Anaerobic conditions in groundwater
	Sulphide	0.05**	1	0	24/01/2002	<0.003		Anaerobic conditions in groundwater
	Total Dissolved Solids	500**	1	1	24/01/2002	60		Dissolved minerals in water
	Hardness	100**	1	1	07/02/2002	26		Natural dissolved minerals (Ca, Mg)
	Nitrate	10	1	1	07/02/2002	0.09	NO	Natural sources at low levels, Fertilizer, septic runoff at high levels
	Nitrite	10^{+}	1	0	07/02/2002	<0.02	NO	
	Silica, reactive		1	1	07/02/2002	2.5		Natural mineral leaching in oxygen-poor conditions, usually low in surface water
	Orthophosphate		1	0	07/02/2002	<.04		Bacterial action in ground water
	Sulphate	500**	1	1	07/02/2002	5.4		Natural mineral sources
	Total Kjeldahl Nitrogen (TKN)		1	1	07/02/2002	0.36		Organic matter leached into surface water from vegetation

Loch Lomond – Inorganic & General Chemistry Parameters (cont.)								
Source Water	**Parameter**	**MAC/ IMAC**	**# of Samples**	**# Detectable Results**	**Dates** dd/mm/yyyyy	**Range (mg/L)**	**Exceedance**	**Source of Parameter**
Loch Lomond Distribution System Water	Aluminum	0.1**	1	0	07/02/2002	<0.01		Natural sources at low levels
	Arsenic	0.025	1	0	07/02/2002	<0.001	NO	Natural source at low levels
	Calcium		1	1	07/02/2002	6.0		Common mineral constituent
	Copper	1.0**	1	1	07/02/2002	0.012		Corrosion of plumbing system, erosion of natural deposits
	Iron	0.3**	1	0	07/02/2002	<0.05		Erosion of natural deposits, corrosion of cast iron mains
	Manganese	0.05**	1	0	07/02/2002	<0.001		Erosion of natural mineral deposits
	Lead	0.01	1	0	07/02/2002	<0.001	NO	Leaching from plumbing and service connections
	Sodium	200**	1	1	07/02/2002	3.10		
	Zinc	5**	1	1	07/02/2002	<0.002		Natural sources, corrosion of plumbing
	Alkalinity	500**	1	1	07/02/2002	22		Natural dissolved carbonate minerals
	Ammonia		1	0	07/02/2002	<0.05		Natural sources at low levels
	Chloride	250**	1	1	07/02/2002	3.1		Natural sources at low levels
	Conductivity (uS/cm)		1	1	07/02/2002	68		Natural dissolved material in water
	Dissolved Organic Carbon	5**	1	1	07/02/2002	5		Organic matter leached into surface water from vegetation
	Hardness	100**	1	1	07/02/2002	26		Natural dissolved minerals (Ca, Mg)
	Nitrate	10	1	1	07/02/2002	0.09	NO	Natural sources at low levels, Fertilizer, septic runoff at high levels
	Nitrite	10+	1	0	07/02/2002	<0.02	NO	
	Sulphate	500**	1	1	07/02/2002	5.4		Natural mineral sources
	Total Kjeldahl Nitrogen (TKN)		1	1	07/02/2002	0.48		Organic matter leached into surface water from vegetation

****** **-Aesthetic Objectives (AO). Exceedance column does not apply to these.**

+ -Nitrite plus Nitrate MAC is 10 mg/L < - Means less than the specified method detection limit

Loch Lomond Water Treatment Plant - Radionuclide Tests

Source Water	Parameter	MAC/ IMAC	# of Samples	# of Detectable Results	Date(s)	Range (Bq/L)	Exceedance	Source of Parameter
Loch Lomond Raw	Gross Alpha	0.1 Bq/L	1	1	28/01/2002	0.05	NO	Natural background radiation, discharge of radioactive materials
	Gross Beta	0.5 Bq/L	1	1	28/01/2002	0.11	NO	
	Tritium	7000 Bq/L	1	0	28/01/2002	<11	NO	

Bare Point Water Treatment Plant - Radionuclide Tests

Source Water	Parameter	MAC/ IMAC	# of Samples	# of Detectable Results	Date(s)	Range (mg/L)	Exceedance	Source of Parameter
Bare Point Treated	Gross Alpha	0.1 Bq/L	1	1	28/01/2002	0.04	NO	Natural background radiation, discharge of radioactive materials
	Gross Beta	0.5 Bq/L	1	1	28/01/2002	0.09	NO	
	Tritiurm	7000 Bq/L	1	0	28/01/2002	<11	NO	