



DRINKING WATER QUALITY QUARTERLY REPORT



Aerial View of Mount McKay

January 1 – March 31, 2003

TRANSPORTATION & WORKS ENVIRONMENT DIVISION

RESPECTFULLY SUBMITTED BY:

Ken McWhirter, Acting Manager, Environment Division
Don Kmill, Supervisor, Water Treatment Plants
Ross Chuchman, Chief Chemist, Environment Division



City of Thunder Bay: *Quarterly Water Quality Report*

For the Period January 1 – March 31, 2003

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?

New summary tables of water quality analysis for the period January 1 – March 31, 2003.

Update on post chlorination trial and the THM distribution system survey in the Loch Lomond system.

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. Ontario Ministry of Environment Regulation 459/00 sets out mandatory treatment requirements 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 chlorinated or undergone an equivalent disinfection. 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 of any result in exceedance of MAC or IMAC limits 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.

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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.

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, Edmonton and Southern Ontario are accredited for testing the volatile organics, pesticides and PCBs.

All operational staff at both Thunder Bay Water Treatment Plants have the 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 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. Ortho-phosphate, reactive silica and pH in the distribution system are now being reported as specified in the plant Certificates of Approval.

Where does our water come from?

Residents of Thunder Bay have two surface water supply sources. The water distribution network is divided into a number of pressure zones. Most of the time, the northern part of the city receives its water supply from the Bare Point Water Treatment Plant and the southern portion of the city receives its water from the Loch Lomond Treatment Plant. Due to its limited capacity, the Loch Lomond Plant cannot meet the total demand from the southern portion of the city during peak demand periods. At these times, additional water is pumped into the south system from the Bare Point supply through the James Street Pump Station.

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.

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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.

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 Loch Lomond temporary filtration system, built in 1998 has an operational capacity of 38,681 million litres per day (8.5 million gallons per day) in the summer when the temperature is 10 degrees Celsius (or above), and 27,276 million litres per day (6 million gallons per day) in winter when the water temperature is 3 degrees Celsius or above. Treatment processes include ultrafiltration membrane technology, the addition of sodium silicate for corrosion control and chlorine for disinfection.

The distribution system consists of pressure zones, reservoirs and pumping stations. Process flow diagrams of Loch Lomond and Bare Point are 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)
- Electricians (2)
- Water Quality Technician (1)
- Leadhand Electrician (1)

We have a highly qualified team, certified by the Ontario Environmental Training Consortium (www.oetc.on.ca). 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.

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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 – bacteria, algae, protozoa 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 “Regulation for Larger Waterworks O. Reg. 459/00”.

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 litre.* 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 = 1 mg).

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pg/L: *Picograms per litre.* This is equivalent to 10^{-12} grams of material in 1 litre of water.

Bq/L: *Becquerels per Litre.* A Becquerel is a unit of radioactivity which expresses the rate of disintegration of radioactive isotopes (radionuclides). One Becquerel is equal to 1 nuclear disintegration per second.

TEQ: *Toxic Equivalency.* This is used to express the concentration of dioxins and furans as one number, measured in picograms per Litre. In a drinking water sample, 17 different dioxins and furans are measured. They vary depending on the number of chlorine atoms attached and the positions of these atoms on the carbon ring of each molecule. The toxicity of each form has been given an equivalency rating to the most toxic form, 2,3,7,8 tetra-chlorodibenzodioxin (2,3,7,8-TCDD). The toxic equivalence of each of the 17 forms is added together to give the total TEQ value for that water sample.

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, bromodichloromethane, chlorodibromomethane 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.

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 292 times for Total Coliform, E. Coli and Fecal Coliform, and 75 times for HPC. The Loch Lomond Distribution System was tested 254 times for Total Coliform, E. Coli and Fecal Coliform, and 65 times for HPC. Out of these tests, the Bare Point Distribution System had no

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exceedances. The Loch Lomond Distribution System also had no exceedances during this quarter.

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). These parameters by themselves do not pose a health-related risk 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. The Loch Lomond distribution system had a low residual of 0.05 mg/L. The low residuals are kept to a minimum by the implementation of routine flushing targeting low residual areas. At Bare Point test results showed that the value did not fall below the guideline. The Bare Point Distribution system had a low residual of 0.32 mg/L and the Loch Lomond System had 0.05 mg/L.

The colour readings for Loch Lomond was 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 a colour reading as high as 5 TCUs and Loch Lomond as high as 12 TCUs. As previously stated, colour is not a health related parameter.

Volatile Organics

In this quarter, a total of 84 tests were done on volatile organic parameters. 46 of these were part of an additional THM survey done on the Loch Lomond distribution system. In this quarter the THM extremity value for the Loch Lomond system was 78.3 giving a running four quarter average of 99.1, below the MAC limit of 100 ug/L.

Post-Chlorination

In December 2002, the raw water chlorine dosage at Loch Lomond was reduced further, from a free chlorine value of 0.9 to 0.8 mg/L. Testing of THM levels was done throughout the Loch Lomond distribution system on January 8, February 1, February 15, and March 1st. These tests confirmed that the majority of that distribution system had THM values in the 60-80 ug/L range. Sections of the system near the James Street Pumping Station had THM levels as low as 9.9 ug/L as a result of the pump station directing Bare Point water into the Loch Lomond system. This has improved the running four-quarter extremity average from 107.8 ug/L in the last quarter to 99.1 in this quarter.

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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.

Dioxins and Furans were tested in both water supplies as part of the annual testing requirements of the plant Certificates of Approval. Both supplies gave low values, well below the 15 pg/L MAC limit. There have been major initiatives by environmental groups in the Great Lakes Basin to reduce air emissions of Dioxins and Furans from the burning of garbage, especially plastics in burn barrels. For more information on the dangers of burning garbage see www.ecosuperior.com/garbageburning.html

Inorganics & General Chemistry

58 tests were done on the Loch Lomond supply for 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 the test results on the health related parameters were well below the MAC limits.

Radionuclide Testing

Radionuclides are radioactive isotopes of common elements. Some occur naturally, but many are man-made. MAC ratings have been established for 78 natural and artificial radioisotopes with activity concentration units ranging from 4 to 7000 Bq/L. These MAC's take into account the type of radioactivity emitted, the intensity of the emissions and the retention time in human tissues. Both of our

water sources are tested annually using a radionuclide screening procedure, which checks for the presence of alpha particle emitters (gross alpha), beta particle emitters (gross beta) and high level emitters such as tritium. Both water sources were below detection limits for each of these three radioactivity parameters.

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 organisms 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 last 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. Before the water reaches the tap, older soldered plumbing joints in buildings and

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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 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 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.

Clean Personal Water Bottles Daily

A study conducted by scientists at the University of Calgary showed that significant levels of bacteria, including fecal coliform were found in water from students' refillable, personal water bottles. In this study, 76 samples of water were taken from students' water bottles that they had brought from home. Sixty five percent of the samples did not meet drinking water standards. Parents are warned

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to wash out water bottles daily to prevent the growth of potentially harmful bacteria.

Maintenance of Water Filters

Water filter systems require regular maintenance. Poor filter maintenance or failure to replace the filter cartridges as recommended by the manufacturer can cause filters to fail.

Should people at risk of infection take special precautions?

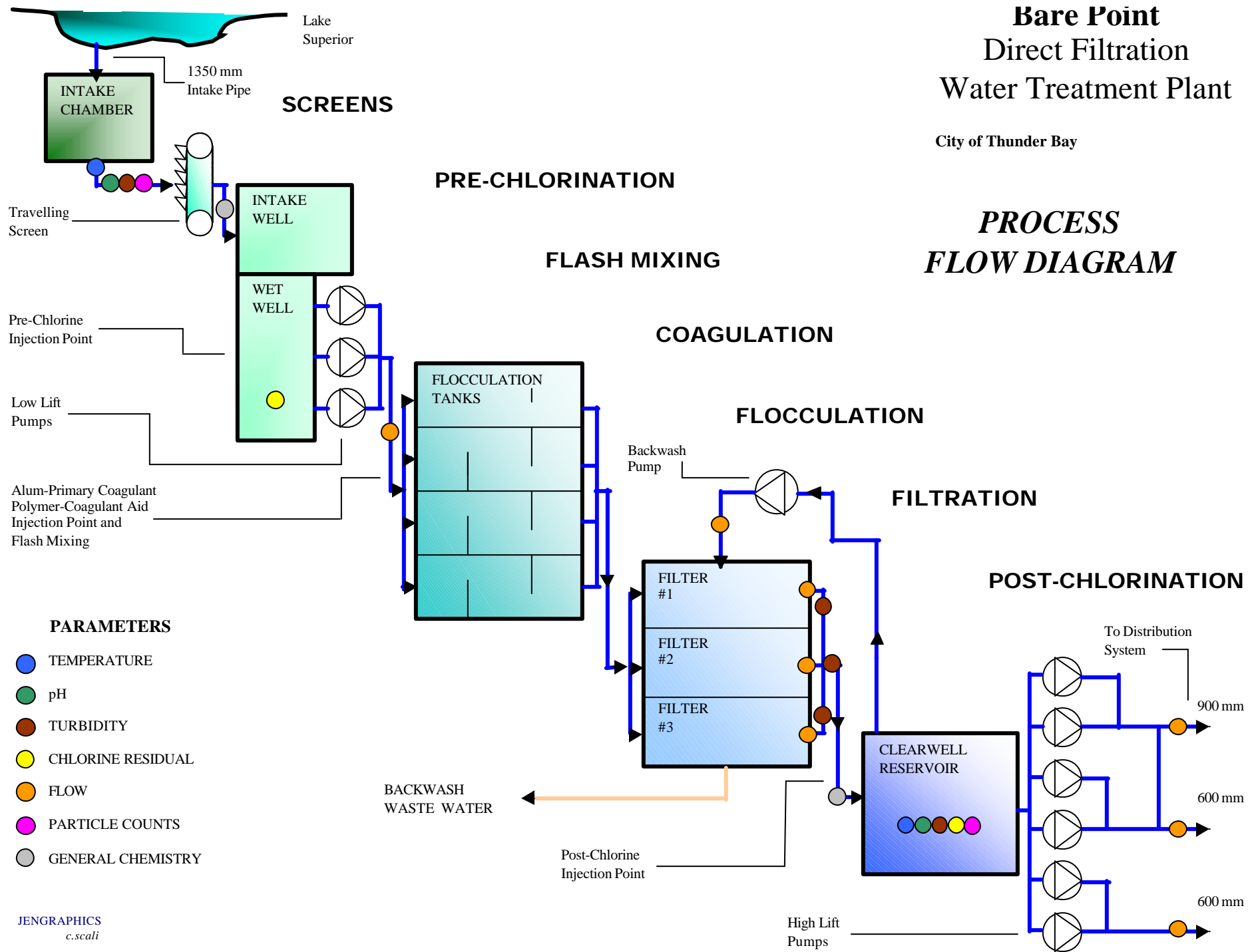
Immuno-compromised persons and those undergoing cancer therapy, such as chemotherapy; persons who have undergone organ transplants; people with HIV/AIDS or other immune system disorders can be more vulnerable to contaminants in drinking water. People at risk from infections should seek advice about drinking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

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/water 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

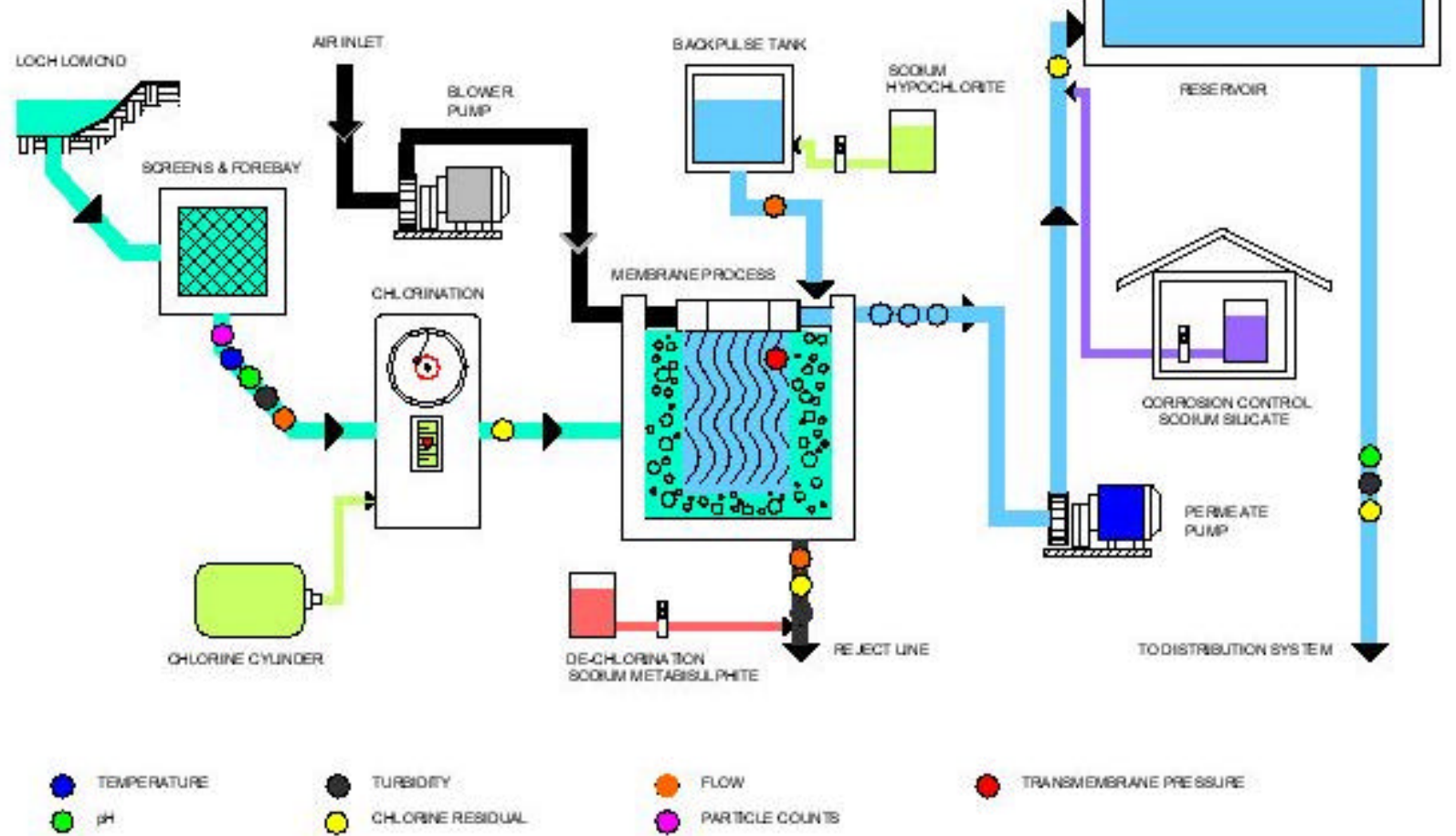


JENGRAPHICS
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Loch Lomond Temporary Membrane Water Treatment Plant

City of Thunder Bay

PROCESS FLOW DIAGRAM



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. 9385-575KF8

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. 7206-575KCX

Additional Contacts:

Ken McWhirter, Acting Manager

Environment Division

Phone: 684-2836

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E-mail:

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 your request by email to kwalkinshaw@city.thunder-bay.on.ca Or call (807) 474-4810.

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,
410 Mountdale Avenue, Thunder Bay.
(807) 474-4810

 *Thunder Bay's Future Water Supply Facilities Dual Source Supply Design Report*, Water Advisory Committee, October 2002.

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

 *Drinking Water Quality Quarterly Reports*, 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,
410 Mountdale Avenue, Thunder Bay.
(807) 474-4810

↳ *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>

↳ Thunder Bay's Future Water Supply Reports for review, including Addendum No. 3 to Class Environmental Assessment, February, 2003
<http://www.city.thunder-bay.on.ca/water>

↳ 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	292	0	01/01/2003 – 31/03/2003	Absent	No	Naturally present in environment
Fecal Coliform	ND	292	0	01/01/2003 – 31/03/2003	Absent	No	Animal / human fecal waste
E. Coli	ND	292	0	01/01/2003 – 31/03/2003	Absent	No	Animal / human fecal waste
Deterioration Indicators	--	292	0	01/01/2003 – 31/03/2003	Absent	No	
Heterotrophic Plate Count	500	75	22	01/01/2003 – 31/03/2003	1- 77	No	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	254	0	01/01/2003 – 31/03/2003	Absent	No	Naturally present in environment
Fecal Coliform	ND	254	0	01/01/2003 – 31/03/2003	Absent	No	Animal / human fecal waste
E. Coli	ND	254	0	01/01/2003 – 31/03/2003	Absent	No	Animal / human fecal waste
Deterioration Indicators	--	254	0	01/01/2003 – 31/03/2003	Absent	No	
Heterotrophic Plate Count	500	65	26	01/01/2003 – 31/03/2003	1-20	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	01/01/03 – 31/03/03	0.06 - 0.09	Suspended material in water
Free Chlorine at Plant	mg/L	0.8 – 4.0	Continuous	Continuous	01/01/03 – 31/03/03	1.15 – 1.31	Disinfectant added
Free Chlorine in System	mg/L	0.2 – 4.0	292	292	01/01/03 – 31/03/03	0.32 – 1.12	Disinfectant added
pH	No units	6.5-8.5	Continuous	Continuous	01/01/03 – 31/03/03	6.81 – 7.26	Measure of water acidity (7.00 = neutral)
Alkalinity	mg/L	30-500	3	3	01/01/03 – 31/03/03	43.5 – 45.0	Dissolved carbonate minerals
Conductivity	uS/cm		3	3	01/01/03 – 31/03/03	95 – 104	Dissolved and ionized minerals
Hardness	mg/L	80-100	3	3	01/01/03 – 31/03/03	45.0 – 48.5	Dissolved mineral salts, mainly calcium, magnesium in water
Aluminum	mg/L	0.10	38	38	01/01/03 – 31/03/03	0.010 – 0.029	Erosion of natural deposits, Residues from coagulant use
Colour	TCU	5	39	39	01/01/03 – 31/03/03	0.5 – 5	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	01/01/03 – 31/01/03	0.01 – 0.01	Suspended material in water
Free Chlorine at Plant	mg/L	1.1 – 4.0	Continuous	Continuous	01/01/03 – 31/01/03	1.56 – 2.29	Disinfectant added
Free Chlorine in System	mg/L	0.2 – 4.0	254	254	01/01/03 – 31/01/03	0.05 – 1.42	Disinfectant added
pH	No units	6.5-8.5	Continuous	Continuous	01/01/03 – 31/01/03	7.63 - 8.23	Measure of water acidity (7.00 = neutral)
Alkalinity	mg/L	30-500	3	3	01/01/03 – 31/01/03	18.50 – 21	Dissolved carbonate minerals
Conductivity	uS/cm		3	3	01/01/03 – 31/01/03	62 – 70	Dissolved and ionized minerals
Hardness	mg/L	80-100	3	3	01/01/03 – 31/01/03	21 – 24	Dissolved mineral salts, mainly calcium, magnesium in water
Colour	TCU	5	27	27	01/01/03 – 31/01/03	1 – 12	Tannins and lignins from natural decay

AO – Aesthetic Objective
OG – Operational Guideline

Bare Point Water Treatment Plant - Volatile Organics Tests, First Quarter, 2003

Source Water	Parameter	MAC/IMAC (ug/L)	# of Samples	# of Detectable Results	Date d/m/y	Range (ug/L)	Exceedance	Source of Parameter
Bare Point Treated	Vinyl Chloride	2	1	0	05/02/2003	<0.2	NO	
	1,1-Dichloroethylene	14	1	0	05/02/2003	<1	NO	
	Dichloromethane	50	1	0	05/02/2003	<1	NO	
	Chloroform	Note 1	1	1	05/02/2003	5.5	NO	Type of trihalomethane (THM)
	Carbon Tetrachloride	5	1	0	05/02/2003	<0.5	NO	
	Benzene	5	1	0	05/02/2003	<0.5	NO	
	1,2-Dichloroethane	5	1	0	05/02/2003	<0.5	NO	
	Bromodichloromethane	Note 1	1	1	05/02/2003	1.0	NO	Type of trihalomethane (THM)
	Toluene	24 **	1	0	05/02/2003	<1		
	Trichloroethylene	50	1	0	05/02/2003	<1	NO	
	Tetrachloroethylene	30	1	0	05/02/2003	<1	NO	
	Dibromochloromethane	Note 1	1	0	05/02/2003	<1	NO	Type of trihalomethane (THM)
	Monochlorobenzene	80	1	0	05/02/2003	<1	NO	
	Ethylbenzene	2.4**	1	0	05/02/2003	<1		
	m,p-Xylene	300*	1	0	05/02/2003	<1		
	o-Xylene	300*	1	0	05/02/2003	<1		
	Bromoform	Note 1	1	0	05/02/2003	<1	NO	Type of trihalomethane (THM)
	1,4-Dichlorobenzene	5	1	0	05/02/2003	<0.5	NO	
1,2-Dichlorobenzene	200	1	0	05/02/2003	<1	NO		
Bare Point Distr. System	Total THM's – System Extremity (2)	100	4	4	10/05/02-05/02/03	18.8 (2)	NO	Disinfection by-products (total)

** NOTE 1 – Total of all trihalomethanes (chloroform & 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 d/m/y	Range (ug/L)	Exceedance	Source of Parameter
Bare Point Treated Water	Alachlor	5	1	0	05/02/2003	<0.1	NO	Insecticide, herbicide and fungicide residues
	Atrazine + N-dealkylated metabolites	5	1	0	05/02/2003	<0.2	NO	
	Azinphos-methyl	20	1	0	05/02/2003	<0.1	NO	
	Chlorpyrifos	90	1	0	05/02/2003	<0.1	NO	
	Cyanazine	10	1	0	05/02/2003	<0.1	NO	
	Diazinon	20	1	0	05/02/2003	<0.1	NO	
	Diclofop-methyl	9	1	0	05/02/2003	<0.1	NO	
	Dimethoate	20	1	0	05/02/2003	<0.1	NO	
	Dinoseb	10	1	0	05/02/2003	<0.2	NO	
	Malathion	190	1	0	05/02/2003	<0.1	NO	
Metribuzin	80	1	0	05/02/2003	<0.1	NO		

Bare Point – Pesticides & PCB Tests (cont.)								
Source Water	Parameter	MAC/ IMAC (ug/L)	# of Samples	# of Detectable Results	Date d/m/y	Range (ug/L)	Exceedance	Source of Parameter
Bare Point Treated Water (cont.)	Parathion	50	1	0	05/02/2003	<0.1	NO	Insecticide, herbicide and fungicide residues
	Phorate	2	1	0	05/02/2003	<0.1	NO	
	Prometryne	1	1	0	05/02/2003	<0.1	NO	
	Simazine	10	1	0	05/02/2003	<0.1	NO	
	Terbufos	1	1	0	05/02/2003	<0.1	NO	
	Triallate	230	1	0	05/02/2003	<0.1	NO	
	Trifluralin	45	1	0	05/02/2003	<0.1	NO	
	P,p'-DDD	30**	1	0	05/02/2003	<0.1	NO	
	P,p'-DDE	30**	1	0	05/02/2003	<0.1	NO	
	P,p'-DDT	30**	1	0	05/02/2003	<0.1	NO	
	Aldrin	0.7*	1	0	05/02/2003	<0.02	NO	
	Dieldrin	0.7*	1	0	05/02/2003	<0.02	NO	
	Heptachlor	3 ⁺	1	0	05/02/2003	<0.1	NO	
	Heptachlor Epoxide	3 ⁺	1	0	05/02/2003	<0.1	NO	
	Lindane (Total)	4	1	0	05/02/2003	<0.1	NO	
	Methoxychlor	900	1	0	05/02/2003	<0.1	NO	
	Metolachlor	50	1	0	05/02/2003	<0.1	NO	
	Chlordane	7	1	0	05/02/2003	<0.1	NO	
	Bromoxynil	5	1	0	05/02/2003	<0.2	NO	
	Dicamba	120	1	0	05/02/2003	<0.2	NO	
	2,4-Dichlorophenol	900	1	0	05/02/2003	<0.5	NO	
	2,4-D	100	1	0	05/02/2003	<0.2	NO	
	Pentachlorophenol	60	1	0	05/02/2003	<0.5	NO	
	Picloram	190	1	0	05/02/2003	<0.2	NO	
	2,3,4,6-Tetrachlorophenol	100	1	0	05/02/2003	<0.5	NO	
	2,4,6-Trichlorophenol	5	1	0	05/02/2003	<0.5	NO	
	2,4,5-T	280	1	0	05/02/2003	<0.2	NO	
	Glyphosate	280	1	0	05/02/2003	<28	NO	
	Diquat	70	1	0	05/02/2003	<7	NO	
	Paraquat	10	1	0	05/02/2003	<1	NO	
	Aldicarb	9	1	0	05/02/2003	<0.9	NO	
	Bendiocarb	40	1	0	05/02/2003	<0.1	NO	
	Carbaryl	90	1	0	05/02/2003	<0.1	NO	
Carbofuran	90	1	0	05/02/2003	<0.1	NO		
Diuron	150	1	0	05/02/2003	<15	NO		
Temephos	280	1	0	05/02/2003	<0.1	NO		
PCB's	3	1	0	05/02/2003	<0.06	NO	Electrical insulating oil	
Dioxins and Furans	15 pg/L Total TEQ	1	1	05/02/2003	3.6 pg/L TEQ	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 d/m/y	Range (mg/L)	Exceedance	Source of Parameter
Bare Point Raw Water	Calcium		1	1	05/02/2003	14.7		Common mineral constituent
	Sodium	200**	1	1	05/02/2003	1.63		Natural mineral constituent
	Alkalinity	500**	1	1	05/02/2003	45		Natural sources, mostly dissolved carbonate
	Chloride	250**	1	1	05/02/2003	1.8		Natural sources at low levels
	Conductivity (us/cm)		1	1	05/02/2003	107		Natural dissolved material in water
	Dissolved Organic Carbon	5**	1	1	05/02/2003	2		Organic matter leached into surface water from vegetation
	Hardness	100**	1	1	05/02/2003	49		Natural dissolved minerals (Ca, Mg)
	Nitrate	10	1	1	05/02/2003	0.36	NO	Natural sources at low levels, Fertilizer, septic runoff at high levels
	Nitrite	10 ⁺	1	0	05/02/2003	<0.02	NO	Natural sources in oxygen-poor water
	Cyanide	0.2	1	0	05/02/2003	<0.002	NO	Industrial processes
Total Phenolics		1	0	05/02/2003	<0.002		Decomposition of wood	
Bare Point Treated Water	Aluminum	0.1**	1	1	05/02/2003	0.37		Natural sources at low levels
	Arsenic	0.025	1	0	05/02/2003	<0.001	NO	Natural source at low levels
	Calcium		1	1	05/02/2003	15.0		Common mineral constituent
	Copper	1.0**	1	0	05/02/2003	<0.001		Corrosion of plumbing systems
	Iron	0.3**	1	0	05/02/2003	<0.05		Erosion of natural deposits, corrosion of cast iron mains
	Manganese	0.05**	1	0	05/02/2003	<0.001		Erosion of natural mineral deposits
	Lead	0.01	1	0	05/02/2003	<0.001	NO	Leaching from plumbing and service connections
	Alkalinity	500**	1	1	05/02/2003	42		Natural sources, mostly dissolved carbonate

Bare Point – Inorganic & General Chemistry Parameters (cont.)

Source Water	Parameter	MAC/ IMAC	# of Samples	# Detectable Results	Dates d/m/y	Range (mg/L)	Exceedance	Source of Parameter
Bare Point Treated Water (cont.)	Chloride	250**	1	1	05/02/2003	2.1		Natural sources at low levels
	Conductivity		1	1	05/02/2003	109		Natural dissolved material in water
	Dissolved Organic Carbon (DOC)	5**	1	1	05/02/2003	1		Organic matter leached into surface water from vegetation
	Benzo(a)pyrene	.00001	1	0	05/02/2003	<0.00001	NO	Incomplete combustion, diesel exhaust
	Barium	1.0	1	0	05/02/2003	<0.01	NO	Common constituent of sedimentary rock
	Boron	5.0	1	0	05/02/2003	<0.05	NO	Borates, borax detergents
	Cadmium	0.005	1	0	05/02/2003	<0.0001	NO	Electroplating, NiCad batteries
	Chromium	0.05	1	0	05/02/2003	<0.001	NO	Electroplating, old yellow paints
	Mercury	0.001	1	0	05/02/2003	<0.0001	NO	Metal refining, coal combustion, natural deposits
	Selenium	0.01	1	0	05/02/2003	<0.005	NO	Natural deposits
	Uranium	0.10	1	0	05/02/2003	<0.005	NO	Natural deposits, nuclear processing
	Cyanide	0.2	1	0	05/02/2003	<0.002	NO	Industrial processes
	Fluoride	1.5	1	1	05/02/2003	0.31	NO	Natural deposits, water fluoridation
	Magnesium		1	1	05/02/2003	3.04		Dissolved minerals in water
	Hardness	100**	1	1	05/02/2003	50		Natural dissolved minerals (Ca, Mg)
	Nitrate	10	1	1	05/02/2003	0.44	NO	Natural sources at low levels, Fertilizer, septic runoff at high levels
	Nitrite	10 ⁺	1	0	05/02/2003	<0.02	NO	Natural sources in oxygen-poor water
Silica, reactive		1	1	05/02/2003	2.4		Natural mineral leaching in oxygen-poor conditions, usually low in surface water	
Orthophosphate		1	0	05/02/2003	<.04		Bacterial action in ground water	

Bare Point – Inorganic & General Chemistry Parameters (cont.)

Source Water	Parameter	MAC/ IMAC	# of Samples	# Detectable Results	Dates d/m/y	Range (mg/L)	Exceedance	Source of Parameter
Bare Point Distribution System Water	pH		1	1	05/02/2003	7.4		Measure of acidity (7.0 = neutral)
	Arsenic	0.025	1	0	05/02/2003	<0.001	NO	Natural source at low levels
	Barium	1.0	1	0	05/02/2003	<0.01	NO	Common constituent of sedimentary rock
	Boron	5.0	1	0	05/02/2003	<0.05	NO	Borates, borax detergents
	Cadmium	0.005	1	0	05/02/2003	<0.0001	NO	Electroplating, NiCad batteries
	Calcium		1	1	05/02/2003	14.9		Erosion of natural mineral deposits
	Chromium	0.05	1	0	05/02/2003	<0.001	NO	Electroplating, old yellow paints
	Copper	1.0**	1	0	05/02/2003	<0.001		Corrosion of plumbing system, erosion of natural deposits
	Iron	0.3**	1	0	05/02/2003	<0.05		Erosion of natural deposits, corrosion of cast iron mains
	Manganese	0.05**	1	0	05/02/2003	<0.001		Erosion of natural mineral deposits
	Mercury	0.0001	1	0	05/02/2003	<0.0001	NO	Metal refining, coal combustion, natural deposits
	Lead	0.01	1	0	05/02/2003	<0.001	NO	Leaching from plumbing and service connections
	Sodium	200**	1	1	05/02/2003	1.66		Natural deposits
	Zinc	5**	1	0	05/02/2003	<0.002		Natural sources, corrosion of plumbing
	Selenium	0.01	1	0	05/02/2003	<0.005	NO	Natural deposits
	Uranium	0.10	1	0	05/02/2003	<0.005	NO	Natural deposits, nuclear processing
	Alkalinity	500**	1	1	05/02/2003	42		Natural dissolved carbonate minerals
	Conductivity (uS/cm)		1	1	05/02/2003	110		Natural dissolved material in water
	Dissolved Organic Carbon	5**	1	1	05/02/2003	2		Organic matter leached into surface water from vegetation
	Hardness	100**	1	1	05/02/2003	50		Natural dissolved minerals (Ca, Mg)
Nitrate	10	1	1	05/02/2003	0.43	NO	Natural sources at low levels, Fertilizer, septic runoff at high levels	
Nitrite	10 ⁺	1	0	05/02/2003	<0.02	NO	Natural sources in oxygen-poor water	
Chloride	250**	1	1	05/02/2003	2.6		Natural sources at low levels	

** -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, First Quarter, 2003

Source Water	Parameter	MAC/ IMAC (ug/L)	# of Samples	# of Detectable Results	Date d/m/y	Range (ug/L)	Exceedance	Source of Parameter
Loch Lomond Treated	Vinyl Chloride	2	1	0	13/02/2003	<0.2	NO	
	1,1-Dichloroethylene	14	1	0	13/02/2003	<1	NO	
	Dichloromethane	50	1	0	13/02/2003	<1	NO	
	Chloroform	Note 1	1	1	13/02/2003	51	NO	Type of trihalomethane (THM)
	Carbon Tetrachloride	5	1	0	13/02/2003	<0.5	NO	
	Benzene	5	1	0	13/02/2003	<0.5	NO	
	1,2-Dichloroethane	5	1	0	13/02/2003	<0.5	NO	
	Bromodichloromethane	Note 1	1	1	13/02/2003	1.3	NO	Type of trihalomethane (THM)
	Toluene	24 **	1	0	13/02/2003	<1		
	Trichloroethylene	50	1	0	13/02/2003	<1	NO	
	Tetrachloroethylene	30	1	0	13/02/2003	<1	NO	
	Dibromochloromethane	Note 1	1	0	13/02/2003	<1	NO	Type of trihalomethane (THM)
	Monochlorobenzene	80	1	0	13/02/2003	<1	NO	
	Ethylbenzene	2.4**	1	0	13/02/2003	<1		
	m,p-Xylene	300*	1	0	13/02/2003	<1		
	o-Xylene	300*	1	0	13/02/2003	<1		
	Bromoform	Note 1	1	0	13/02/2003	<1	NO	Type of trihalomethane (THM)
	1,4-Dichlorobenzene	5	1	0	13/02/2003	<0.5	NO	
1,2-Dichlorobenzene	200	1	0	13/02/2003	<1	NO		
Loch Lomond Dist. System	Total THM's – System Extremity (2)	100	4	4	25/06/02-13/02/03	99.1	NO	Disinfection by-products (total)

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

(3) - 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 d/m/y	Range (ug/L)	Exceedance	Source of Parameter
Loch Lomond Treated Water	Alachlor	5	1	0	13/02/2003	<0.1	NO	Insecticide, herbicide and fungicide residues
	Atrazine + N-dealkylated metabolites	5	1	0	13/02/2003	<0.2	NO	
	Azinphos-methyl	20	1	0	13/02/2003	<0.1	NO	
	Chlorpyrifos	90	1	0	13/02/2003	<0.1	NO	
	Cyanazine	10	1	0	13/02/2003	<0.1	NO	
	Diazinon	20	1	0	13/02/2003	<0.1	NO	
	Diclofop-methyl	9	1	0	13/02/2003	<0.1	NO	
	Dimethoate	20	1	0	13/02/2003	<0.1	NO	
	Dinoseb	10	1	0	13/02/2003	<0.2	NO	
	Malathion	190	1	0	13/02/2003	<0.1	NO	
	Metribuzin	80	1	0	13/02/2003	<0.1	NO	

Loch Lomond – Pesticides & PCB Tests (cont.)								
Source Water	Parameter	MAC/ IMAC ug/L)	# of Samples	Detectable Results	Date(s) d/m/y	Range (ug/L)	Exceedance	Source of Parameter
	Parathion	50	1	0	13/02/2003	<0.1	NO	Insecticide, herbicide and fungicide residues
	Phorate	2	1	0	13/02/2003	<0.1	NO	
	Prometryne	1	1	0	13/02/2003	<0.1	NO	
	Simazine	10	1	0	13/02/2003	<0.1	NO	
	Terbufos	1	1	0	13/02/2003	<0.1	NO	
	Triallate	230	1	0	13/02/2003	<0.1	NO	
	Trifluralin	45	1	0	13/02/2003	<0.1	NO	
	P,p'-DDD	30**	1	0	13/02/2003	<0.1	NO	
	P,p'-DDE	30**	1	0	13/02/2003	<0.1	NO	
	P,p'-DDT	30**	1	0	13/02/2003	<0.1	NO	
	Aldrin	0.7*	1	0	13/02/2003	<0.02	NO	
	Dieldrin	0.7*	1	0	13/02/2003	<0.02	NO	
	Heptachlor	3 ⁺	1	0	13/02/2003	<0.1	NO	
	Heptachlor Epoxide	3 ⁺	1	0	13/02/2003	<0.1	NO	
	Lindane (Total)	4	1	0	13/02/2003	<0.1	NO	
	Methoxychlor	900	1	0	13/02/2003	<0.1	NO	
	Metolachlor	50	1	0	13/02/2003	<0.1	NO	
	Chlordane	7	1	0	13/02/2003	<0.1	NO	
	Bromoxynil	5	1	0	13/02/2003	<0.2	NO	
	Dicamba	120	1	0	13/02/2003	<0.2	NO	
	2,4-Dichlorophenol	900	1	0	13/02/2003	<0.5	NO	
	2,4-D	100	1	0	13/02/2003	<0.2	NO	
	Pentachlorophenol	60	1	0	13/02/2003	<0.5	NO	
	Picloram	190	1	0	13/02/2003	<0.2	NO	
	2,3,4,6-Tetrachlorophenol	100	1	0	13/02/2003	<0.5	NO	
	2,4,6-Trichlorophenol	5	1	0	13/02/2003	<0.5	NO	
	2,4,5-T	280	1	0	13/02/2003	<0.2	NO	
	Glyphosate	280	1	0	13/02/2003	<28	NO	
	Diquat	70	1	0	13/02/2003	<7	NO	
	Paraquat	10	1	0	13/02/2003	<1	NO	
	Aldicarb	9	1	0	13/02/2003	<0.9	NO	
	Bendiocarb	40	1	0	13/02/2003	<0.1	NO	
	Carbaryl	90	1	0	13/02/2003	<0.1	NO	
	Carbofuran	90	1	0	13/02/2003	<0.1	NO	
	Diuron	150	1	0	13/02/2003	<15	NO	
	Temephos	280	1	0	13/02/2003	<0.1	NO	
	PCB's	3	1	0	13/02/2003	<0.06	NO	Electrical insulating oil
	Dioxins and Furans	15 pg/L Total TEQ	1	1	13/02/2003	1.3 pg/L TEQ	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 d/m/y	Range (mg/L)	Exceedance	Source of Parameter
Loch Lomond Raw Water	Calcium		1	1	13/02/2003	6.8		Common mineral constituent
	Sodium	200**	1	1	13/02/2003	1.33		Natural mineral constituent
	Alkalinity	500**	1	1	13/02/2003	24		Natural sources, mostly dissolved carbonate
	Chloride	250**	1	1	13/02/2003	0.7		Natural sources at low levels
	Conductivity (us/cm)		1	1	13/02/2003	72		Natural dissolved material in water
	Dissolved Organic Carbon	5**	1	1	13/02/2003	4		Organic matter leached into surface water from vegetation
	Hardness	100**	1	1	13/02/2003	28		Natural dissolved minerals (Ca, Mg)
	Nitrate	10	1	1	13/02/2003	0.08	NO	Natural sources at low levels, Fertilizer, septic runoff at high levels
	Nitrite	10 ⁺	1	0	13/02/2003	<0.02	NO	Natural sources in oxygen-poor water
	Cyanide	0.2	1	0	13/02/2003	<0.002	NO	Industrial processes
Total Phenolics		1	0	13/02/2003	<0.002		Decomposition of wood	
Loch Lomond Treated Water	Arsenic	0.025	1	0	13/02/2003	<0.001	NO	Natural source at low levels
	Calcium		1	1	13/02/2003	6.6		Common mineral constituent
	Copper	1.0**	1	1	13/02/2003	0.002		Corrosion of plumbing systems
	Iron	0.3**	1	0	13/02/2003	<0.05		Erosion of natural deposits, corrosion of cast iron mains
	Manganese	0.05**	1	0	13/02/2003	<0.001		Erosion of natural mineral deposits
	Lead	0.01	1	0	13/02/2003	<0.001	NO	Leaching from plumbing and service connections
	Sodium	200**	1	1	13/02/2003	3.22		Natural mineral constituent
	Alkalinity	500**	1	1	13/02/2003	23		Natural sources, mostly dissolved carbonate

Loch Lomond – Inorganic & General Chemistry Parameters (cont.)

Source Water	Parameter	MAC/ IMAC	# of Samples	# Detectable Results	Dates d/m/y	Range (mg/L)	Exceedance	Source of Parameter
Loch Lomond Treated Water (cont.)	Chloride	250**	1	1	13/02/2003	2.9		Natural sources at low levels
	Conductivity		1	1	13/02/2003	70		Natural dissolved material in water
	Dissolved Organic Carbon (DOC)	5**	1	1	13/02/2003	4		Organic matter leached into surface water from vegetation
	Benzo(a)pyrene	.00001	1	0	13/02/2003	<0.00001	NO	Incomplete combustion, diesel exhaust
	Barium	1.0	1	0	13/02/2003	<0.01	NO	Common constituent of sedimentary rock
	Boron	5.0	1	1	13/02/2003	0.12	NO	Borates, borax detergents
	Cadmium	0.005	1	0	13/02/2003	<0.0001	NO	Electroplating, NiCad batteries
	Chromium	0.05	1	0	13/02/2003	<0.001	NO	Electroplating, old yellow paints
	Mercury	0.001	1	0	13/02/2003	<0.0001	NO	Metal refining, coal combustion, natural deposits
	Selenium	0.01	1	0	13/02/2003	<0.005	NO	Natural deposits
	Uranium	0.10	1	0	13/02/2003	<0.005	NO	Natural deposits, nuclear processing
	Cyanide	0.2	1	0	13/02/2003	<0.002	NO	Industrial processes
	Fluoride	1.5	1	1	13/02/2003	0.35	NO	Natural deposits, water fluoridation
	Hardness	100**	1	1	13/02/2003	28		Natural dissolved minerals (Ca, Mg)
	Nitrate	10	1	1	13/02/2003	0.08	NO	Natural sources at low levels, Fertilizer, septic runoff at high levels
	Nitrite	10 ⁺	1	0	13/02/2003	<0.02	NO	Natural sources in oxygen-poor water
	Orthophosphate		1	1	13/02/2003	0.09		Bacterial action in ground water

Loch Lomond – Inorganic & General Chemistry Parameters (cont.)

Source Water	Parameter	MAC/ IMAC	# of Samples	# Detectable Results	Dates d/m/y	Range (mg/L)	Exceedance	Source of Parameter
Loch Lomond Distribution System Water	pH		1	1	13/02/2003	7.2		Measure of acidity (7.0 = neutral)
	Arsenic	0.025	1	0	13/02/2003	<0.001	NO	Natural source at low levels
	Barium	1.0	1	0	13/02/2003	<0.01	NO	Common constituent of sedimentary rock
	Boron	5.0	1	1	13/02/2003	0.07	NO	Natural borates, borax detergent
	Cadmium	0.005	1	0	13/02/2003	<0.0001	NO	Electroplating, NiCad Batteries
	Calcium		1	1	13/02/2003	7.1		Common mineral constituent
	Chromium	0.05	1	0	13/02/2003	<0.001	NO	Electroplating, old yellow paints
	Copper	1.0**	1	1	13/02/2003	0.042		Corrosion of plumbing system, erosion of natural deposits
	Iron	0.3**	1	1	13/02/2003	0.14		Erosion of natural deposits, corrosion of cast iron mains
	Manganese	0.05**	1	1	13/02/2003	0.001		Erosion of natural mineral deposits
	Mercury	0.001	1	0	13/02/2003	<0.0001	NO	Metal refining, coal combustion, natural deposits
	Lead	0.01	1	0	13/02/2003	<0.001	NO	Leaching from plumbing and service connections
	Selenium		1	0	13/02/2003	<0.005	NO	Natural deposits
	Sodium	200**	1	1	13/02/2003	3.30		Natural deposits
	Uranium	0.10	1	0	13/02/2003	<0.005	NO	Natural deposits, nuclear processing
	Alkalinity	500**	1	1	13/02/2003	23		Natural dissolved carbonate minerals
	Chloride	250**	1	1	13/02/2003	2.7		Natural sources at low levels
	Conductivity (uS/cm)		1	1	13/02/2003	62		Natural dissolved material in water
	Dissolved Organic Carbon	5**	1	1	13/02/2003	4		Organic matter leached into surface water from vegetation
	Hardness	100**	1	1	13/02/2003	28		Natural dissolved minerals (Ca, Mg)
Nitrate	10	1	1	13/02/2003	0.08	NO	Natural sources at low levels, Fertilizer, septic runoff at high levels	
Nitrite	10 ⁺	1	0	13/02/2003	<0.02	NO	Natural sources in oxygen-poor water	

** -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, 2003

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	0	13/02/2003	<0.1	NO	Natural background radiation, discharge of radioactive materials
	Gross Beta	0.5 Bq/L	1	0	13/02/2003	<0.1	NO	
	Tritium	7000 Bq/L	1	0	13/02/2003	<1000	NO	

Bare Point Water Treatment Plant - Radionuclide Tests, 2003

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	0	05/02/2003	<0.1	NO	Natural background radiation, discharge of radioactive materials
	Gross Beta	0.5 Bq/L	1	0	05/02/2003	<0.1	NO	
	Tritium	7000 Bq/L	1	0	05/02/2003	<1000	NO	