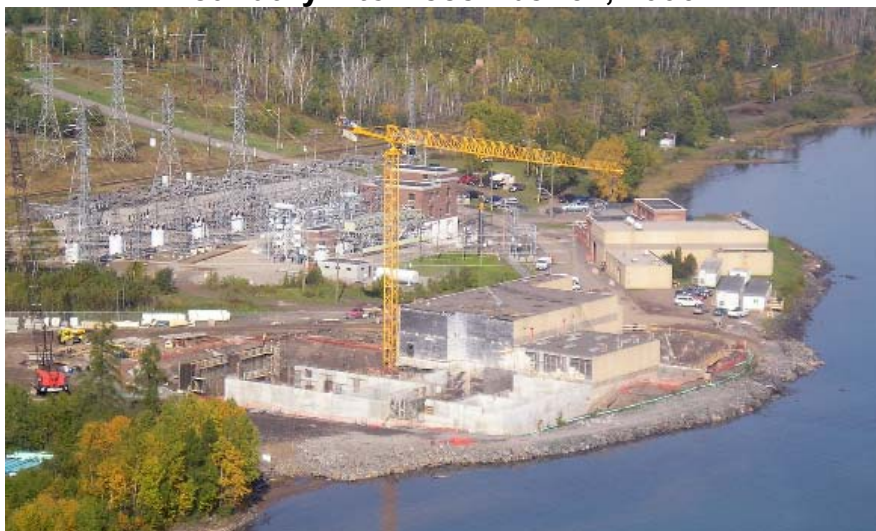




DRINKING WATER QUALITY ANNUAL REPORT

January 1 to December 31, 2006



Bare Point Water Treatment Plant Expansion Project

TRANSPORTATION & WORKS ENVIRONMENT DIVISION

RESPECTFULLY SUBMITTED BY:

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INTRODUCTION

This report will be prepared on an annual basis to satisfy the requirements of the Ontario Ministry of the Environment (MOE) and the Certificates of Approval (C. of A.) for both plants. As well, this report is intended to inform City elected representatives, the general public and to serve as a source of information on water quality and water supply operations within the City of Thunder Bay.

The Corporation of the City of Thunder Bay operated two water treatment plants in 2006. The water distribution network of the City 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. During peak demand periods, due to its limited capacity, the Loch Lomond Plant cannot meet the total demand from the southern portion of the City. At these times, additional water is pumped into the south system from the Bare Point supply through the James Street Pump Station.

The Bare Point Water Treatment Plant, located near the City limits, off Lakeshore Drive, has an operational capacity of 68 million litres per day (15 million gallons per day) and utilizes a chemically assisted direct filtration system. The plant draws water from Lake Superior, the world's largest body of fresh water. Treatment processes at the Bare Point Water Treatment Plant include raw water screening, pre-chlorination, chemically assisted coagulation-flocculation using polyaluminum chloride (PAC), sand-anthracite filtration and post chlorine disinfection. The northern part of the City's distribution system consists of four pressure zones, four pumping stations, and four reservoirs.

The Loch Lomond Water Treatment Plant is located south of the City on Mount McKay. This plant draws water from Loch Lomond, partially situated within the Fort William First Nation's Reserve. The temporary microfiltration system, which was built in 1998, has an operational capacity of 38.68 million litres per day (8.5 million gallons per day) in the summer when the temperature is 10 degrees Celsius (or above). The capacity is 27.28 million litres per day (6 million gallons per day) in winter when the water temperature is 3 degrees Celsius (or above). Treatment processes include ultra-filtration membrane technology, the addition of sodium silicate for corrosion control and chlorine for disinfection. The south part of the City's distribution system consists of two pressure zones, Loch Lomond reservoir and two pumping stations.

PER CAPITA WATER CONSUMPTION

In Canadian cities the per capita water consumption is a measure of the amount of treated water produced daily to serve each consumer in the water system. This takes into account all water used for residential, commercial, and industrial use including water used for fire protection , flushing ,street cleaning, and water lost through leakage or water main breaks.

The normal per person daily water consumption is about 450 litres (100 gallons). Per capita usage greater than 450 litres per day indicates high water practices in industrial or commercial use.

In 2006, based on an approximate service population of 102,500 for both Water Treatment Plants the per capita water usage equates to 525 litres, (115 gallons) per person per day. The City's goal is to reduce per capita usage for residents and local industry through successful water conservation plans and system improvements.

MAJOR PROJECTS

PLANT EXPANSION

During 2005 and 2006 the expansion project has made continuous progress and is near completion. Commissioning of the new plant process has been scheduled for May of 2007. Expansion of the existing Bare Point plant will incorporate state of the art membrane filtration to replace the existing direct filtration. Addition of a second raw water traveling screen and upgrades to the existing screen have been completed and are capable of handling average flows of 90.8 ML/day (20MIGD) and peak flows 136.2 ML/d (30MIGD). Additionally, two new raw water pumps along with modifications to the existing pumps have been completed to provide a total of four raw water pumps having the following capacities:

Pump 1	68.2 ML/d (15MIGD)	Pump 2	54.5 ML/d (12MIGD)
Pump 3	68.2 ML/d (15MIGD)	Pump 4	54.5 ML/d (12MIGD)

A 70m x 30m addition has been put on the west side of the existing plant building to house the membrane filtration system, membrane cleaning system, chemical feed system, clear water reservoir and high lift pumps, standby power generators, HVAC, control room and related facilities. The membrane filtration system will include five trains of ultra filtration membranes, air blowing system, six permeate

pumps, two backwash pumps, two recirculation pumps, and an air extraction system. The membrane cleaning system will include one 73,600 L concrete storage tank, three chemical feed pumps, a diaphragm metering pump for citric acid, a citric acid mixing tank, a process feeder hopper and a de-chlorination system consisting of two chemical metering pumps and one 21,200 L sodium bisulphite storage tank.

A new electrical service for the entire plant will introduce a supply voltage of 4160, replacing the existing transformers rated for 2300. Two standby diesel powered generator sets rated at 2000 kilowatts will provide standby power at 4160 volts for emergency use and have two 50,000 liter diesel fuel storage tanks.

Complete automation of the plant will be done with Allen Bradley Programmable Logic Controllers (PLC's) reporting to a Wonderware graphics package. Newly installed monitoring equipment will include state of the art instrumentation and control. Decommissioning of existing flocculators, gravity sand filters, filter backwash pumps, existing high lift pumps, standby generators, existing chlorinators, and other related equipment will take place after the commissioning is complete.

ROCKCLIFF RESERVOIR

The new 28.5 ML in-ground reservoir was commissioned in November 2006 and will supply the majority of the south distribution system with potable water from Lake Superior. The new reservoir site is located north of Highway 61 between Mount Forest Boulevard and Riverdale Road, complete with ancillary structures housing the following facilities and equipment:

- interconnected dual-celled in-ground reservoir, each sized approximately 95m x 25m x 6 meters deep, complete with baffle walls, level sensors and overflow level alarm, an emergency 750 mm diameter overflow pipe and reservoir drains for maintenance purpose;
- re-chlorination facility consisting of four chemical metering pumps (three duty, one standby) each rated at 6.6 L/hr. at 700 kpa, flow paced on discharge flow rate and chlorine residuals;
- two sodium hypochlorite tanks (duty and spare), complete with level sensors and stored within a 200 mm high concrete curb;
- one 750 mm diameter bi-directional magnetic flow meter, measuring range 0 to 600 L/s which monitors reservoir influent and discharge rates and is capable of transmitting data to the Bare Point Plant;

- newly installed continuous inline pH, turbidity and chlorine residual analyzers which monitors reservoir influent and discharge and are capable of transmitting data to the Bare Point Plant.

All instrumentation and control data, communication status and fault conditions are transmitted back the Bare Point Plant via GE Programmable Logic Controllers.

SECURITY UPGRADES

The Water Treatment Plants' security systems have been enhanced using new technology for communicating any intrusion or breach of security back to the plants. Security cameras have been added to all pump stations, reservoirs and tanks. Secondary barriers have been installed on all hatches at reservoir and pumping station sites. A complete site risk assessment has been completed at all sites and further improvements to a high standard of security will continue to be implemented through 2007.

SCADA UPGRADES

As part of the Bare Point Expansion project, upgrades to the existing SCADA (Supervisory Control and Data Acquisition) have been initiated or completed in 2006. The communication system between stations and the plant will be upgraded to use DSL, replacing leased telephone lines. To ensure a continuous method for retrieval of data, a backup wireless system using IX cellular has been adopted and will be placed into service in 2007.

ARC FLASH ANALYSIS

Arc Flash is an electric arc that flashes from one exposed live conductor to another, or to ground. The resulting ionized air creates electrically conductive superheated plasma that can reach temperatures of 5000°F and above. The explosion takes less than one second and produces a brilliant flash, intense heat, and a pressure blast equivalent to several sticks of dynamite. An Arc Flash study is underway to insure the safety of employees working on electrical equipment at all Water Treatment Facilities.

HODDER STATION (EMERGENCY BACKUP POWER)

A backup generator has been commissioned at the Hodder Station to ensure a continuance of potable water to the public in Zone 1 North. The generator is a portable unit that can be moved to other

sites in an emergency situation but will be retained at the Hodder station. An upgrade to the generator switchgear will take place in 2007.

WATER CONSERVATION/BYLAW PROGRAM

A water conservation program was implemented as a result of the limited treated water storage capacity of the temporary membrane filtration plant at Loch Lomond. The program is in compliance with the City of Thunder Bay's Municipal code which states: "The use of or curtailment of water used for purposes of lawn and garden sprinkling shall be subject to such regulations as may be enacted from time to time by Council." The program "Odd and Even Watering Restrictions" effectively reduces the opportunity to water lawns and gardens by 50 per cent.

In addition to lawn and garden watering restrictions, City of Thunder Bay, in partnership with EcoSuperior Environmental Programs provides five water efficiency programs for the community including:

- ❖ Ultra Low Flow Toilet Rebate Program
- ❖ High Efficiency Washing Machine Rebate Program
- ❖ Water Conservation Public Outreach Program
- ❖ Subsidized Rain Barrel Sales Program
- ❖ Downspout Disconnection Program

In order to encourage residents to participate in water conservation rain barrels have been provided to residents at a subsidized price. A water bylaw enforcement officer patrols the City from May to October, monitoring compliance with the Odd and Even Watering Restrictions. This staff member responds to enquiries from the public and responds to reports of by-law violations. The season with the high demand peak periods for treated water is usually May to October. It is estimated that this program has significantly reduced seasonal water use. *In 2006 watering restrictions were took effect on May 8 to reduce water consumption during the Bare Point Upgrade project*

Where demand meets or exceeds maximum possible output, it would be necessary to implement a total ban on outside watering. Failure to reduce the total demand to a figure less than the total output capacity of the plants would necessitate a bypassing of the temporary Loch Lomond Water Treatment Plant. The bypass option would allow unfiltered water to enter the distribution system and would immediately result in a declaration of a boil water advisory by the Medical Officer of Health.

In May 2003 the City of Thunder Bay was presented with *The Award of Excellence in Water Efficiency* presented by the Ontario Water Works Association. This award recognizes community efforts to reduce water consumption with an integrated and comprehensive water efficiency program for residents and businesses.

SOURCE WATER PROTECTION INTAKE ZONE STUDY

In December, 2005 MOE introduced Bill 43, the Clean Water Act. The purpose of this Act was to protect drinking water at its source as recommended by the Walkerton Inquiry. The Clean Water Act was passed by the Provincial Legislature and became law on October 19, 2006. It will require communities to create and carry out a plan to protect the sources of their municipal drinking water. The Clean Water Act will:

- Require communities to look at existing and potential threats to their drinking water supply and require them to set out and implement actions to reduce or eliminate significant threats
- Empower communities to take action to prevent threats from becoming significant
- Require public participation in developing local source protection plans
- Require that all plans and actions are based on sound science

As part of this initiative, MOE made funds available for Municipal water treatment plants and Conservation Authorities in Ontario to initiate Source Water Protection studies. The City of Thunder Bay, in conjunction with the Lakehead Region Conservation Authority received a grant to do an Intake Protection Zone (IPZ) study at the Bare Point WTP. The study involves delineation of an Intake Protection Zone at the plant intake and development of a threats inventory and threats assessment in the area surrounding the intake. A consultant was hired in the summer of 2006 to carry out this study and a report on their findings is due in April of 2007. Further information on the Clean Water Act, Source Protection Planning and ministry initiatives is available on the MOE website, www.ene.gov.on.ca under the Clean Water Act heading.

COMPLIANCE SUMMARY

COMPLIANCE WITH TERMS AND CONDITIONS OF THE CERTIFICATE OF APPROVAL

Bare Point Water Treatment Plant

Certificate Number	From Date	To Date	Comments
7-0748-90-006 C of A	July 19, 1990	February 20, 2002	Historical Certificate of Approval for Bare Point WTP
9385-575KF8 C of A	February 20, 2002	October 22, 2002	The two C of A's in 2002 were part of a consolidation of WTP done by MOE. MOE added specific disinfection/inactivation performance criteria & plant upgrade requirements based on Bare Point First Engineers Report of May 2001. Also amended date for completion of upgrade requirements from Dec 31, 2002 to June 30, 2003 & added specifications for Hazlewood Storage Tank.
1151-5F2J5B C of A	October 22, 2002	May 17, 2004	
1144-5WPPLZ C of A	May 17, 2004	September 15, 2004	Incorporates all additions planned for the Bare Point Plant expansion project
0338-63ZPBZ C of A	September 16, 2004	March 19, 2006	Update to Bare Point Plant Expansion C. of A. with addition of new 28.5 ML in-ground storage reservoir (Rockcliff)
4552-6M8S3R	March 20, 2006	Ongoing	Extension of completion date for Bare Point Expansion to Dec. 31, 2006
3618-6CSKB9 PTTW *	October 6, 2005	Expires October 5, 2015	Permit to take water to allow a maximum withdrawal of 30 million imperial gallons/day (136,200m ³) from Lake Superior.

* The current C. of A. specifies a maximum treated water flow of 787 Litres/second (68,000 m³/day) for the existing system and 1313 Litres/second (113,400 m³/day) for the plant when expansion is complete.

Loch Lomond Water Treatment Plant

Certificate Number	From Date	To Date	Comments
7-0706-98-006 C of A	August 24, 1998	February 20, 2002	
7206-575KCCX C of A *	February 20, 2002	Ongoing	Consolidated C of A added specific disinfection/inactivation performance criteria and upgrade requirements based on the Loch Lomond First Engineers Report of May 2001. December 19, amendment extended the date for upgrade requirements (Section 5.1) from December 31, 2002 to June 30, 2003. Since then the upgrade project at Bare Point has been in place and replaces upgrade requirements at Loch Lomond.
91-P-6015 PTTW	Renewed: July 25, 2002	Expires: July 24, 2007	Maximum withdrawal capacity of 17 MIG per day (77,282 m ³ /day) from Loch Lomond.

- The current C. of A. specifies a maximum treated water flow from the plant of 38,680 m³ per day in the summer when water temperature is 10° C or higher and 27,270 m³ per day in winter with water temperatures as low as 3° C.

NON-COMPLIANCE WITH TERMS & CONDITIONS OF THE CERTIFICATE OF APPROVAL

During June and July the Water Quality Unit of MOE did inspections of the Bare Point and Loch Lomond water treatment plants and their distribution systems. The inspection reports noted two non-compliance items and recommended one best management practice. These are summarized below with the action taken by the City’s Environment Division.

Bare Point Inspection – June 27/06

Item No.	Non Compliance Item Noted	Action Taken by Environment Division
1.	Ensure that the free chlorine residual is maintained in the distribution system at all times as required by legislation and control document (C. of A.) requirements. C. of A. specifies maintaining a minimum free chlorine residual of 0.2 mg/L in the distribution system during the Bare Point upgrade project period. It was noted that in one adverse report the free residual was measured at .04 mg/L, below the regulatory requirement of .05 mg/L.	-An automatic flushing unit was installed on one main of the Bare Point system during the summer and fall of 2006. -Continued looping and pipe replacement projects to eliminate dead-end main situations. -Routine testing and flushing in low-flow areas continued in 2006.

Loch Lomond Inspection – July 19, 2006

Item No.	Non Compliance Item Noted	Action Taken by Environment Division
1.	Records did not indicate that the chlorine residual levels in the distribution system were not less than 0.05 mg/L free chlorine. A number of adverse notices were cited where the free chlorine residual fell below the 0.05 mg/L level. It was noted that immediate corrective action (flushing) was taken to restore the chlorine level.	-An automatic flushing unit was again installed on one main of the Loch Lomond system during the summer and fall of 2006. -Continued looping and pipe replacement projects to eliminate dead-end main situations. -Routine testing and flushing in low-flow areas continued in 2006.

Recommended Best Management Action (Both Distribution Systems)

Item No.	Best Management Practice Recommendation	Action Taken
1.	Consider instituting a by-law to prohibit cross-connections and requiring the installation of backflow prevention at lateral connections to major industries.	-A revised waterworks by-law, with backflow prevention has been drafted and with additional improvements, will be presented to Council in 2007.

Bare Point – Filter to Waste

After each of the sand-anthracite filter units at Bare Point is backwashed and put back into service, there is an initial small increase in turbidity as the filter settles into its normal filtering state. It is recommended that this initial filter water be routed to waste to avoid having any higher turbidity water enter the distribution system. The Bare Point expansion will convert the entire Bare Point plant to membrane filtration technology, eliminating this waste stream. While the current plant configuration does not allow a filter to waste process, at no time has the current operation produced treated water turbidity levels above the operational guidelines. Average treated water turbidity values at Bare Point were 0.14 NTU and the highest daily average value recorded in 2006 was 0.77 NTU.

BARE POINT – ADVERSESES & EXCEEDANCES IN 2006

In 2006 analysis was done for 27 Volatile Organics, 48 Pesticides/PCB’s, 75 General Chemistry and Metals parameters and over 4500 bacterial tests at the plant and in the distribution system. There were no chemical exceedances in 2006. There were two locations with bacterial adverse results in 2006. These were isolated cases and were quickly cleared up by flushing and re-sampling. There were four operational exceedances reported in 2006. These were the result of chlorine analyzer maintenence, plant maintenance or chemical dosage adjustment. The Bare Point Adverse Tables on page 65 and 66 indicate the specific incidents and the corrective actions taken.

LOCH LOMOND – ADVERSESES AND EXCEEDANCES IN 2006

For the Loch Lomond Plant and Distribution System, a total of 27 Volatile Organic tests, 48 Pesticide/PCB tests, 75 General Chemistry and metals tests and over 4000 bacterial tests were done in 2006. There were no chemical adverses in 2006. Five bacterial adverses were reported in 2006 and these were quickly cleared up by flushing and re-sampling. There were five operational exceedances reported. These were due to instrumentation problems, communication link failure and routine maintenance. At no

time was the distribution system considered at risk. The Loch Lomond Adverse Tables on pages 63 and 64 indicate the specific incidents and the corrective actions taken.

SUMMARY OF WATER SUPPLIED

BARE POINT

The total treated water produced for 2006 was 14452.2 million litres or 3183.3 million gallons. The maximum day output occurred on July 13th when the plant produced 69.28 million litres or 15.24 million gallons. Data for treated water flows can be viewed on page 20 of this report.

LOCH LOMOND

The Loch Lomond Plant total treated water produced for 2006 was 5216.35 million litres (ML) or 1149 million gallons. The maximum day output occurred June 21st when the plant produced 19.55 million litres or 4.30 million gallons. Data for treated water flows can be viewed on page 38 of this report.

ANALYTICAL RESULTS AND REPORTING

Regulation 170/03 requires that public water quality reports be produced annually by large municipal drinking water systems. This annual report is available to the public in printed form and on the city's website, www.thunderbay.ca/water, in March of each year. Additional information on the Ontario Drinking Water regulations is available at the Ontario MOE website at www.ene.gov.on.ca (follow the Drinking Water links). In 2006, the standards for fecal coliforms, background colony counts and heterotrophic plate counts were removed. These parameters are now considered outdated. Total coliforms and e-coli are considered the two principal bacterial health indicators for protection of drinking water. The trichloroethylene(TCE) Maximum Acceptable Concentration (MAC) standard was revised downward from 50 ug/L to 5 ug/L following a similar revision in the Canadian drinking water TCE guideline.

BARE POINT

The analytical results for the Bare Point Plant and system are listed on pages 30 to 33. In general, the raw water supply is very stable in chemical composition, relatively soft and low in organics, which results in very low THM values on chlorination. All pesticide, PCB and volatile organics tests in 2006

were negative. Dissolved metals are consistently low. Because PAC, an aluminum salt is used as a treatment chemical, the aluminum residual is monitored daily by in-house analysis. The average value in 2006 was 0.049 mg/L, well below the operational guideline of 0.1 mg/L. Radionuclide tests, done in March/06 were below detection limits. A series of tests were also conducted on the Bare Point raw water for Pharmaceutical and Personal Care Products (PPCP's) through the MOE Drinking Water Surveillance Program (DWSP). All 50 PPCP parameters tested for were below detection limits.

LOCH LOMOND

The analytical results for the Loch Lomond Plant and system are listed on pages 37 to 54. The raw water supply from Loch Lomond is generally softer than that of Bare Point with lower hardness, lower alkalinity and lower conductivity. The higher organic content is reflected in the Dissolved Organic Carbon (DOC) values of 5-6 mg/L versus 2-3 mg/L at Bare Point. This water is prone to higher THM formation and has higher colour readings in the treated water. In 2006 the average treated water colour reading was 5.4 TCU, slightly above the Operational Guideline of 5 TCU. The membrane technology treatment at Loch Lomond does not remove any of the dissolved colour. Because of the softness of this water, it is more aggressive toward metal piping and is treated with low dosages of sodium silicate as an anti-corrosion agent and silicate levels are monitored monthly. As with the Bare Point supply, all pesticide, PCB and radionuclide tests in 2006 were negative.

LOCH LOMOND – TRIHALOMETHANE (THM) AVERAGE

In 2006, commissioning of the Rockcliff Reservoir took place and as part of this process, Bare Point water was introduced into the new South pressure zone. This resulted in the gradual lowering of the THM values at the South extremity point. By the fourth quarter, the running THM average had dropped to 50.1 ug/L. Since the downtown South core will remain on Loch Lomond water in 2007, a new extremity point will be used for that part of the distribution system. Chlorine consumption at Loch Lomond dropped to 18,197 kg in 2006, down from 22,850 kg the previous year.

TREATMENT CHEMICAL USAGE

BARE POINT

The Bare Point WTP used two chemicals for water treatment in 2006: PAC and chlorine gas. Chlorine

gas is added in two stages, prior to floc formation/filtration to disinfect the water and prevent fouling of the filtering material and post-filtration to provide a good residual in the distribution system. The average dosage for 2006 was 1.47 mg/L and the average free residual for water leaving the plant was 1.28 mg/L. A total of 25,257 kg of chlorine was used in 2006. In January 2006 a switch was made from the use of alum and polymer as coagulant aids to polyaluminum hydroxychloride (PAC). This switch was necessary as alum and polymer were not compatible with the new Zenon membrane filtration system. PAC combines with the raw water to form a sticky, insoluble floc which removes colour and fine particulate matter from the raw water. This floc settles at the top portion of the filter beds and is periodically back washed as a waste stream. This waste stream is currently discharged into Lake Superior through a backwash discharge line. With the Bare Point expansion, this waste streams will be eliminated and the wastewater will be sent directly to the Water Pollution Control Plant through the plant forcemain. A total of 159,153 kg of liquid PAC concentrate was used in 2006 with an average dose of 9.57 mg/L.

LOCH LOMOND

At the Loch Lomond Water Treatment Plant, chlorine gas and sodium silicate are used as the main processing chemicals with small quantities of sodium metabisulphite, sodium hydroxide and citric acid used for cleaning and waste neutralization. Chlorine is used for disinfection, again, in two stages: pre-filtration and post-filtration. The post-filtration stage was added in February 2002 with a corresponding drop in pre-filtration dosage in order to reduce THM formation. A lower chlorine dose in the raw water (pre-filtration) results in a slower rate of THM formation with suspended organics. Once these are removed by the membrane filters, there is less organic content for the post chlorine addition to react with. The total chlorine usage at Loch Lomond in 2006 was 18,197 kg, significantly less than the 30,144 kg used in 2001 with pre-filtration only. The average dosage in 2006 was 3.17 mg/L. The additional chlorine dosage at Loch Lomond is a result of the chemical reaction of chlorine with organic matter before a free chlorine residual is formed. The average free chlorine residual at the Loch Lomond reservoir was 2.10 mg/L.

Sodium silicate is added to the treated water for corrosion control. In 2006 a total of 46,073 kg of sodium silicate was added for an average dosage of 9.16 mg/L. Sodium silicate is a food grade material often used as a food additive. In the membrane ultra-filtration process, approximately 7% of the raw water is wasted during the backpulse cleaning cycle of the membrane tank. This water is de-chlorinated with sodium metabisulphite prior to discharge.

A citric acid bath is used for a Clean-in-Place (CIP) membrane cleaning process. This citric acid bath is also neutralized with sodium hydroxide (caustic soda) prior to discharge. The neutralization process results in formation of sodium citrate, a simple organic salt that is easily decomposed in the environment.

WATER QUALITY ASSURANCE

In 2006 Thunder Bay residents received a very good quality surface water supply 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 170/03 sets out mandatory treatment requirements for facilities using surface water as a source. These requirements include chemically assisted filtration and disinfection, or alternate 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 are taken and evaluated, at a frequency set by the Ministry, for a number of parameters as outlined in the Regulations. Water quality is monitored at both plants 24 hours a day, seven days a week by both operators and on-line instrumentation. Water treatment plants must meet strict provincial standards and regulations. Each plant operates under an Ontario Ministry of the Environment Certificate of Approval. We are committed to quality and continuous improvement in accordance with Ontario's water quality standards.

We are very serious about monitoring the water quality. Each year, certified labs test more than 2,400 samples for potential contaminants and plant staff routinely test operational parameters such as colour, pH, alkalinity. Our testing program meets, and in many areas, exceeds, regulatory requirements.

RESPONSIBILITY FOR TREATMENT

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 and Water Section are responsible for the operation and maintenance of the water distribution system.

We have a highly qualified team, certified by the Ontario Environmental Training Consortium. Staff is continually trained in accordance with provincial regulations.

The City of Thunder Bay has a preventative maintenance system designed to ensure annual, semi annual and monthly inspections and maintenance functions are performed on all equipment associated with the water treatment facilities. Records are kept on scheduled, non-scheduled and emergency repairs of facility equipment and are readily available for Ministry Inspections.

CUSTOMER SERVICE

Our qualified staff is available 24 hours per day, seven days per week to respond to consumer water quality concerns or issues. If needed, times can be arranged for a water sample to be taken by one of our field staff. Qualified staff collects samples in test specific bottles and delivers them to the lab. Homeowners will be informed promptly of test results and when necessary, further investigation will be undertaken.

The availability of the City of Thunder Bay's Annual report is communicated to the public through the media and is posted on the City web site at www.thunderbay.ca/water. Copies of the Annual Report are also available at City Hall, City Clerk's Office, Bare Point Water Treatment Plant, Front & Egan Service yard and all branches of the Thunder Bay Public Library. This process was undertaken to satisfy the requirements of Regulation 170/03.

Bare Point
Water Treatment Plant

R.R. #13, Bare Point Road

Thunder Bay, ON

P7B 5E4

Raw Water Flow Results*

Month	Total For Month	Avg. Peak Flow Daily Flow	Avg. Minimum Daily Flow	Average Daily Flow
January	1191.43	45.97	31.55	38.43
February	1096.94	47.82	31.11	39.18
March	1286.61	48.42	33.53	41.50
April	1174.46	47.23	31.84	39.15
May	1258.40	50.03	33.29	40.59
June	1419.02	56.50	36.73	47.30
July	1713.28	63.85	44.81	55.27
August	1616.94	65.42	41.13	52.16
September	1466.94	63.55	38.53	48.90
October	1594.57	64.71	38.35	51.44
November	2224.62	96.30	52.13	74.15
December	1520.28	62.58	39.35	49.04
Total	17563.49			577.11
Avg/Mth				48.09

* Flow Results in 1,000,000's of Litres

Treated Water Flow Results*

Month	Total For Month	Avg. Peak Rate Daily Flow	Avg. Min. Daily Flow	Average Daily Flow
January	1062.30	40.98	26.69	34.27
February	984.96	42.73	25.34	35.18
March	1154.20	43.69	28.82	37.23
April	1018.70	42.02	24.87	33.96
May	1100.70	43.69	25.58	35.51
June	1333.10	54.53	30.52	44.44
July	1711.60	63.61	38.87	55.21
August	1433.50	52.39	34.24	46.24
September	1205.10	47.98	28.60	40.17
October	1194.70	44.48	27.60	38.54
November	1151.40	43.33	28.28	38.38
December	1101.90	42.21	28.37	35.55
Total	14452.16			474.68
Avg/Mth				39.56

* Flow Results in 1,000,000's of Litres

Process Chemicals

Month	Primary Coagulant Used (kg/month)	Primary Coagulant Dosage (mg/L)	Secondary Coagulant Used (kg/month)	Secondary Coagulant Dosage (mg/L)
January (1 st – 11 th)	1,513	3.51	56	0.13
January (12 th – 31 st)	7,536	9.88		
February	13,408	12.22		
March	12,065	9.39		
April	12,732	10.90		
May	14,881	11.87		
June	14,629	10.37		
July	15,045	8.83		
August	14,227	8.80		
September	13,062	8.96		
October	13,618	8.66		
November	15,967	7.09		
December	11,983	7.82		
Total	159,153			
Average per Month	13,608	9.57		

Note: Bare Point Water Treatment Plant replaced the Primary and Secondary Coagulants (Alum and Polymer) with Polyaluminum Hydroxychloride on January 12.
 Total usage and Average per Month based on Polyaluminum Hydroxychloride only.

Disinfection

Month	Chlorine Used (kg)	Chlorine Dosage (mg/L)	Free Residual (mg/L)
January	1638.00	1.38	1.26
February	1611.70	1.47	1.27
March	1848.60	1.44	1.24
April	1777.80	1.51	1.26
May	1975.80	1.57	1.29
June	2339.40	1.65	1.27
July	2953.20	1.73	1.34
August	2724.00	1.70	1.33
September	2447.50	1.67	1.29
October	2309.90	1.46	1.29
November	1772.40	0.85	1.31
December	1859.50	1.27	1.27
Total	25257.80		15.42
Average Per Month	2104.82	1.47	1.28

Operational Report - Raw Water

Month	p.H. (-log10)	Hard. (mg/l)	Alk. (mg/l)	Turb. (N.T.U.)	Color (T.C.)	Alum. (mg/l)	Temp. (deg. C)
January	7.40	53.20	50.10	1.30	11.09		3.96
February	7.32	57.20	39.20	0.83	10.67		3.92
March	7.35	56.20	44.00	0.57	10.50		4.90
April	7.25	54.20	48.80	0.69	12.33		5.66
May	7.31	52.40	48.20	0.80	9.36		8.15
June	7.44	46.00	30.00	0.85	9.70		11.89
July	7.60	43.60	44.80	1.13	10.90		13.44
August	7.62	45.60	41.20	0.88	9.33		17.45
September	7.68			0.71	5.63		17.43
October	7.49	48.00	48.80	0.95	3.73		12.40
November	7.57	46.40	43.73	0.98	3.67		9.86
December	7.37	47.60	48.40	1.35	4.21		7.21
Average	7.45	50.04	44.29	0.92	8.43		9.69

Hard. - Hardness Alk. - Alkalinity Turb. Turbidity Alum. - Aluminum Residual Temp. - Temperature

Operational Report - Treated Water

Month	p.H. (-log10)	Hard. (mg/l)	Alk. (mg/l)	Turb. (N.T.U.)	Color (T.C.)	Alum. (mg/l)	Iron (mg/L)	Lead (ug/L)
January	7.09	56.40	53.20	0.22	2.73	0.073		<
February	7.02	50.20	38.20	0.31	1.89	0.114		<
March	6.96	58.40	46.60	0.11	2.56	0.045		<
April	6.91	56.00	50.20	0.13	3.00	0.058		<
May	6.90	52.40	48.20	0.12	2.82	0.046		<
June	7.02	46.10	33.20	0.11	5.44	0.033		<
July	7.20	48.20	40.80	0.12	3.89	0.029		<
August	7.19	44.20		0.11	6.50	0.028		<
September	7.27			0.10	4.75	0.039		<
October	7.26	44.00	45.60	0.09	2.36	0.041		<
November	7.46			0.10	2.86	0.045		<
December	7.23	43.20	43.20	0.10	2.72	0.037		<
Average	7.13	49.91	44.36	0.14	3.46	0.049	0.000	< 0.00

Hard. - Hardness Alk. - Alkalinity Turb. Turbidity Alum. - Aluminum Temp. - Temperature

**Chemical Analysis 1 - Raw Water
 (Drinking Water Surveillance Program)**

Month	Chlor. (mg/l)	Sulp. (mg/l)	Sil. (mg/l)	Turb. N.T.U.*	Colour T.H.U.**	Nitrates (mg/l)
October	1.40	3.00	0.80	0.45	1.80	0.377
Average	1.40	3.00	0.80	0.45	1.80	0.377

Chlor.-Chloride Sulp. – Sulphate Sil. – Silicates Turb.- Turbidity
 (*) – N.T.U. Nephelometric Turbidity Units (**) – T.C.U. – True Colour Units

**Chemical Analysis 2 – Raw Water
 (Drinking Water Surveillance Program)**

Month	Cond. (uS/cm)	Hard. (mg/l)	Calcium (mg/l)	Sodium (mg/l)	Alk. (mg/l)	pH (-log10)
October	102.00	45.00	13.60	1.60	46.00	7.92
Average	102.00	45.00	13.60	1.60	46.00	7.92

Cond. – Conductivity Hard. – Hardness Alk. – Alkalinity

**Chemical Analysis 1 – Treated Water
 (Drinking Water Surveillance Program)**

Month	Chlor. (mg/l)	Sulp. (mg/l)	Sil. (mg/l)	Turb. N.T.U.*	Colour T.H.U.**	Nitrates (mg/l)
October	4.10	3.10	0.76		0.20	0.464
Average	4.10	3.10	0.76		0.20	0.464

Chlor.-Chloride Sulp. – Sulphate Sil. – Silicates Turb.- Turbidity
 (*) – N.T.U. Nephelometric Turbidity Units (**) – T.C.U. – True Colour Units

**Chemical Analysis 2 – Treated Water
 (Drinking Water Surveillance Program)**

Month	Cond. (uS/cm)	Hard. (mg/l)	Calcium (mg/l)	Sodium (mg/l)	Alk. (mg/l)	pH (-log10)
October	105.00	43.50	13.00	1.80	39.80	7.67
Average	105.00	43.50	13.00	1.80	39.80	7.67

Cond. – Conductivity Hard. – Hardness Alk. – Alkalinity

Metal Analysis – Treated Water (Drinking Water Surveillance Program)

Month	Alum. (ug/l)	Barium (ug/l)	Boron (ug/l)	Chrom. (ug/l)	Copper (ug/l)	Iron (ug/l)	Lead (ug/l)	Mang. (ug/l)	MolyB. (ug/l)	Nickel (ug/l)	Uran. (ug/l)	Zinc (ug/l)
May	48.30	10.20	6.00	0.40	0.80	6.00	0.02	0.18	0.16	<0.2	0.02	0.60
October	93.60	10.10	6.00	0.10	0.60	6.00	0.01	0.07	0.13	<0.2	0.02	0.10
Average	70.95	10.15	6.00	0.25	0.70	6.00	0.015	0.13	0.15	<0.2	0.02	0.35

Alum. – Aluminum Chrom. – Chromium Mang. – Manganese MolyB. – Molybdenum Uran. - Uranium

Great Lakes Project #10 - Raw Water

Month	Chl. (mg/l)	Sil. (mg/l)	Total Phos. (mg/l)	Reactive Phos. (mg/l)	Total Ammon. (mg/l)	Total Nitrate (mg/l)	Total Nitrite (mg/l)	Chloro- phyll A (mg/l)	Total Nitro (mg/l)
January	1.42	1.11	0.0100	0.0007	0.009	0.356	0.001	0.85	0.100
February	1.77	1.17		0.0012	0.006	0.357	0.001	0.90	0.130
March									
April									
May	1.50	1.06	0.0020	0.0006	0.009	0.329	0.001	1.00	0.110
June	1.70	1.01	0.0190	0.0006	0.010	0.306	0.004	1.70	0.110
July	1.65	0.77	0.0080	0.0005	0.018	0.340	0.003	1.00	0.140
August	1.56	0.78	0.0030	0.0007	0.006	0.301	0.002	1.08	0.110
September	1.50	0.75	0.0030	0.0005	0.010	0.290	0.003	1.10	0.120
October	1.50	0.90	0.0060	0.0014	0.003	0.300	0.003	0.92	0.140
November	1.60	1.05	0.0040	0.0006	0.007	0.323	0.001	1.00	0.120
December	1.58	1.07	0.0060	0.0010	0.008	0.361	0.001	0.93	0.100
Average	1.58	0.97	0.007	0.001	0.009	0.326	0.002	1.05	0.118

Chl. - Chloride

Sil. - Silicate

Phos. - Phosphorus

Ammon. - Ammonium

Nitro - Nitrogen

**Priority Organics - Treated Water
 Drinking Water Surveillance Program**

Month	Chloro- form	Chloro- bromo- methane	Bromo- chloro- methane	Bromo- form	Total trihalo- methane
January					
February					
March					
April					
May	8.70		1.40		10.10
June					
July					
August					
September					
October	9.30		2.00		11.30
November					
December					
Total	18.00		3.40		21.40
Avg/Mth	9.00		1.70		10.70

(All Analysis in ug/L)

Bare Point Water Treatment Plant - Volatile Organics Tests, 2006

Source Water	Parameter	MAC/IMAC (ug/L)	# of Samples	# of Detectable Results	Date(s) dd/mm/yy	Range (ug/L)	Exceedance	Source of Parameter
Bare Point Treated Water	Vinyl Chloride	2	1	0	16/03/06	<0.5	NO	
	1,1-Dichloroethylene	14	1	0	"	<0.5	NO	
	Dichloromethane	50	1	0	"	<0.5	NO	
	Carbon Tetrachloride	5	1	0	"	<0.5	NO	
	Benzene	5	1	0	"	<0.5	NO	
	1,2-Dichloroethane	5	1	0	"	<0.5	NO	
	Trichloroethylene	50	1	0	"	<0.5	NO	
	Tetrachloroethylene	30	1	0	"	<0.5	NO	
	Monochlorobenzene	80	1	0	"	<0.5	NO	
	1,4-Dichlorobenzene	5	1	0	"	<0.5	NO	
	1,2-Dichlorobenzene	200	1	0	"	<0.5	NO	
	Chloroform	Note 1	4	4	16/03/06-20/12/06	7.3 – 21.8	NO	Type of trihalomethane (THM)
	Bromodichloromethane	16	4	4	"	1.8 – 5.0	NO	Type of trihalomethane (THM)
	Dibromochloromethane	Note 1	4	0	"	<0.5	NO	Type of trihalomethane (THM)
Bromoform	Note 1	4	0	"	<0.5	NO	Type of trihalomethane (THM)	
Total THM's – System Extremity (2)	100	4	4	16/03/06-20/12/06	18.0(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)

< 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/yy	Range (ug/L)	Exceedance	Source of Parameter
Bare Point Treated Water	Atrazine + N-dealkylated metabolites	5	1	0	16/03/06	<0.2	NO	Insecticide, herbicide and fungicide residues
	Alachlor	5	1	0	"	<0.1	NO	
	Azinphos-methyl	20	1	0	"	<0.1	NO	
	Chlorpyrifos	90	1	0	"	<0.1	NO	
	Cyanazine	10	1	0	"	<0.1	NO	
	Diazinon	20	1	0	"	<0.1	NO	
	Diclofop-methyl	9	1	0	"	<0.2	NO	
	Dimethoate	20	1	0	"	<0.1	NO	
	Dinoseb	10	1	0	"	<0.2	NO	
	Malathion	190	1	0	"	<0.1	NO	
	Metribuzin	80	1	0	"	<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/yy	Range (ug/L)	Exceedance	Source of Parameter	
Bare Point Treated Water (cont.)	Parathion	50	1	0	16/03/06	<0.1	NO	Insecticide, herbicide and fungicide residues	
	Phorate	2	1	0	“	<0.1	NO		
	Prometryne	1	1	0	“	<0.1	NO		
	Simazine	10	1	0	“	<0.1	NO		
	Terbufos	1	1	0	“	<0.2	NO		
	Triallate	230	1	0	“	<0.1	NO		
	Trifluralin	45	1	0	“	<0.1	NO		
	P,p'-DDD	30**	1	0	“	<0.1	NO		
	P,p'-DDE	30**	1	0	“	<0.1	NO		
	P,p'-DDT	30**	1	0	“	<0.1	NO		
	Aldrin	0.7*	1	0	“	<0.02	NO		
	Dieldrin	0.7*	1	0	“	<0.02	NO		
	Heptachlor	3 ⁺	1	0	“	<0.1	NO		
	Heptachlor Epoxide	3 ⁺	1	0	“	<0.1	NO		
	Lindane (Total)	4	1	0	“	<0.1	NO		
	Methoxychlor	900	1	0	“	<0.1	NO		
	Metolachlor	50	1	0	“	<0.1	NO		
	Chlordane	7	1	0	“	<0.1	NO		
	Bromoxynil	5	1	0	“	<0.2	NO		
	Dicamba	120	1	0	“	<0.2	NO		
	2,4-Dichlorophenol	900	1	0	“	<0.5	NO		
	2,4-D	100	1	0	“	<0.2	NO		
	Pentachlorophenol	60	1	0	“	<0.5	NO		
	Picloram	190	1	0	“	<0.2	NO		
	2,3,4,6-Tetrachlorophenol	100	1	0	“	<0.5	NO		
	2,4,6-Trichlorophenol	5	1	0	“	<0.5	NO		
	2,4,5-T	280	1	0	“	<0.2	NO		
	Glyphosate	280	1	0	“	<10	NO		
	Diquat	70	1	0	“	<7	NO		
	Paraquat	10	1	0	“	<1	NO		
Aldicarb	9	1	0	“	<9	NO			
Bendiocarb	40	1	0	“	<0.2	NO			
Carbaryl	90	1	0	“	<0.2	NO			
Carbofuran	90	1	0	“	<0.2	NO			
Diuron	150	1	0	“	<10	NO			
Temephos	280	1	0	“	<0.1	NO			
PCB's	3	1	0	“	<0.06	NO			

< - 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/yy	Range (mg/L)	Exceedance	Source of Parameter
Bare Point Raw Water	Alkalinity	500**	1	1	16/03/06	43		Natural sources, mostly dissolved carbonate
	Calcium		1	1	"	14.6		Common mineral constituent
	Sodium	200**	1	1	"	1.74		Natural mineral constituent
	Total Phenolics		4	0	"	<0.001		Decomposition of wood
	Chloride	250**	1	1	"	1.8		Natural sources at low levels
	Conductivity (us/cm)		1	1	"	101		Natural dissolved material in water
	Disolved Organic Carbon	5**	1	1	"	<1		Organic matter leached into surface water from vegetation
	Hardness	100**	1	1	"	49		Natural dissolved minerals (Ca, Mg)
	Nitrate	10	4	4	16/03/06 - 20/12/06	0.30 - 0.34	NO	Natural sources at low levels, Fertilizer, septic runoff at high levels
	Nitrite	10 ⁺	4	0	"	<0.02	NO	Natural sources in oxygen-poor water
	Cyanide	0.2	1	0	16/03/06	<0.002	NO	Industrial processes

Bare Point – Inorganic & General Chemistry Parameters (cont.)								
Source Water	Parameter	MAC/ IMAC	# of Samples	# Detectable Results	Dates dd/mm/yy	Range (mg/L)	Exceedance	Source of Parameter
Bare Point Distribution System Water	pH	**	4	4	16/03/06- 20/12/06	7.4 - 7.6		Measure of acidity (7.0 = neutral)
	Chloramines, total	3.0	1	1	23/12/06	0.05	NO	Chlorination byproduct
	Lead	0.01	1	0	16/03/06	<0.001	NO	Leaching from plumbing and service connections
	Alkalinity	500**	1	1	16/03/06	42		Natural dissolved carbonate minerals
	Conductivity (uS/cm)		1	1	"	104		Natural dissolved material in water
	Disolved Organic Carbon	5**	1	1	"	<1		Organic matter leached into surface water from vegetation
	Hardness	100**	1	1	"	50		Natural dissolved minerals (Ca, Mg)
	Nitrate	10	4	4	16/03/06 - 20/12/06	0.30 - 0.34	NO	Natural sources at low levels, Fertilizer, septic runoff at high levels
	Nitrite	10 ⁺	4	0	"	<0.02	NO	Natural sources in oxygen-poor water
	Chloride	250**	1	1	16/03/06	3.6		Natural sources at low levels

** -Aesthetic Objectives or no objective given. Exceedance column does not apply to these.
+ -Nitrite plus Nitrate MAC is 10 mg/L < - Means less than the specified method detection limit

Bare Point – Inorganic & General Chemistry Parameters (cont.)								
Source Water	Parameter	MAC/ IMAC	# of Samples	# Detectable Results	Dates dd/mm/yy	Range (mg/L)	Exceedance	Source of Parameter
Bare Point Treated Water	Alkalinity	500**	1	1	16/03/06	41		Natural sources, carbonate minerals
	Dissolved Organic Carbon (DOC)	5**	1	1	“	<1		Organic matter leached into surface water from vegetation
	Calcium	**	1	1	“	14.6		Common mineral constituent
	Chloride	250**	1	1	“	3.4		Natural sources at low levels
	Conductivity	**	1	1	“	102		Natural dissolved material in water
	Benzo(a)pyrene	.00001	1	0	16/03/06	<0.00001	NO	Incomplete combustion, diesel exhaust
	Antimony	0.006	1	0	“	<0.003	NO	
	Arsenic	0.025	1	0	“	<0.001	NO	Natural source at low levels
	Barium	1.0	1	0	“	0.01	NO	Common constituent of sedimentary rock
	Boron	5.0	1	0	“	<0.05	NO	Borates, borax detergents
	Cadmium	0.005	1	0	“	<0.0001	NO	Electroplating, Ni/Cad batteries
	Chromium	0.05	1	0	“	<0.001	NO	Electroplating, old yellow paints
	Mercury	0.001	1	0	“	<0.0001	NO	Metal refining, coal combustion, natural deposits
	Selenium	0.01	1	0	“	<0.005	NO	Natural deposits
	Uranium	0.02	1	0	“	<0.005	NO	Natural deposits, nuclear processing
	Cyanide	0.2	1	0	“	<0.004	NO	Industrial processes
	Fluoride	1.5	0	0	“	++		Natural deposits, water fluoridation
	Hardness	100**	1	1	“	49		Natural dissolved minerals (Ca, Mg)
	Nitrate	10	4	4	16/03/06- 20/12/06	0.30 - 0.33	NO	Natural sources at low levels, Fertilizer, septic runoff at high levels
	Nitrite	10 ⁺	4	0	“	<0.02	NO	Natural sources in oxygen-poor water
	Silica, reactive	**	4	4	“	1.45 - 2.46		Natural mineral leaching in oxygen-poor conditions, usually low in surface water
	Orthophosphate	**	4	1	“	<0.003 - 0.014		Bacterial action in ground water
	Gross Alpha (radioactivity)	0.1 Bq/L	1	0	16/03/06	<0.1	NO	Natural Background radiation, discharge of radioactive materials
	Gross Beta (radioactivity)	0.5 Bq/L	1	0	16/03/06	<0.1	NO	
	Tritium (radioactivity)	7000 Bq/L	1	0	16/03/06	<1000	NO	

++ Fluoride testing is done every 5 years in non-fluoridated systems. 2003 result for Bare Point was 0.31 mg/L

** -Aesthetic Objectives or no objective given. Exceedance column does not apply to these.

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

BARE POINT WATER TREATMENT PLANT
2006 DIRECT OPERATING EXPENDITURES

Hourly Wages & Fringe Benefits	\$ 666,400.00
Building Maintenance	\$ 2,519.82
Electricity	\$ 473,681.09
Chemicals	\$ 232,091.12
Equipment Maintenance and Operations	\$ 195,710.38
General Expenditures	\$ 37,730.33
<hr/>	
Total Operating Expenditure	\$1,608,132.74
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No. of Million Litres Treated in 2006	14,452.16
Cost Per Million Litres Treated	\$ 111.27

BARE POINT WATER TREATMENT PLANT

HISTORICAL OPERATING COSTS

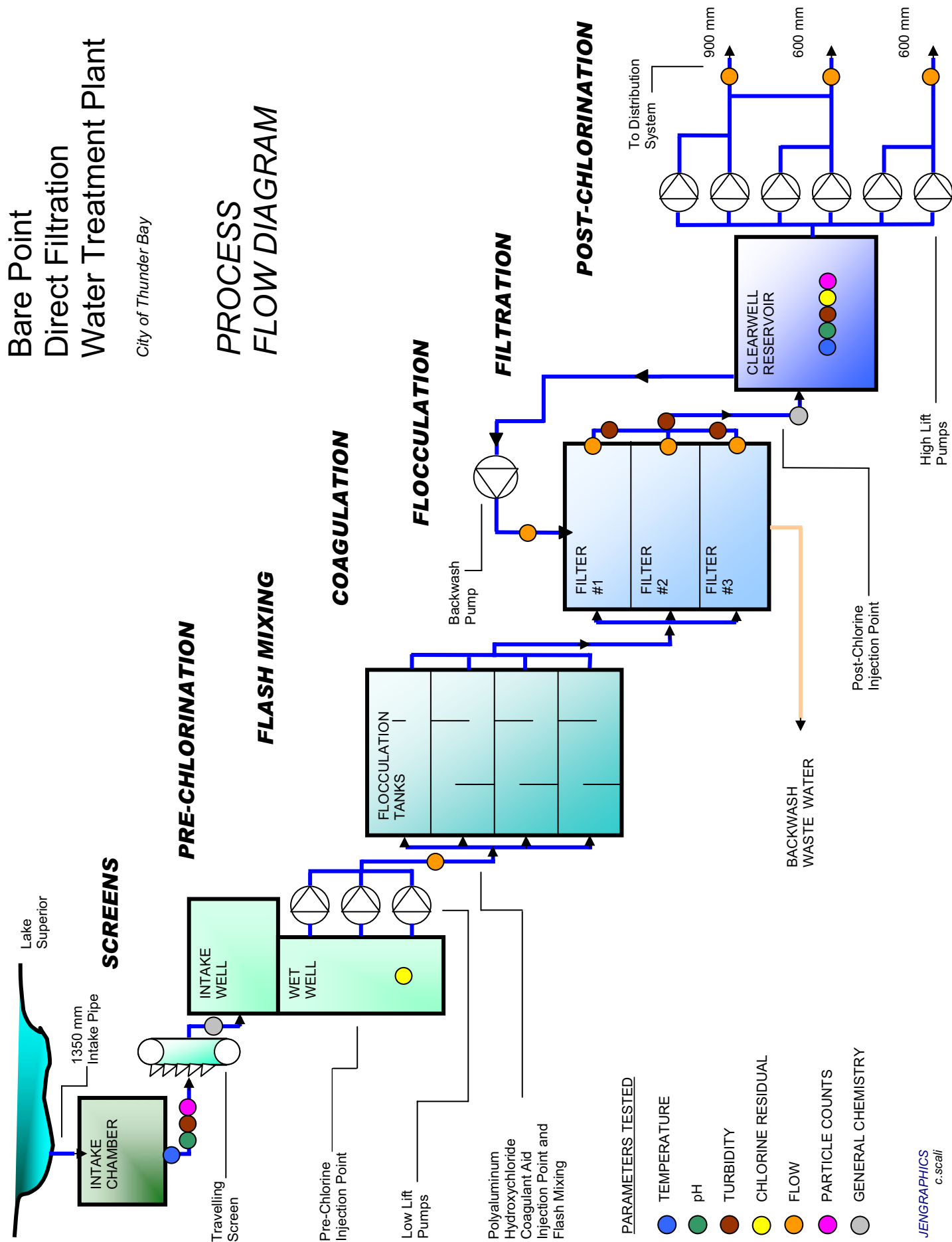
Year	Total Annual Flow(*)	Total Cost	Cost Per Million Litres
1985	13217.80	\$ 597494.63	\$ 45.20
1986	13777.55	\$ 650378.04	\$ 47.21
1987	13551.66	\$ 705033.91	\$ 52.03
1988	13221.18	\$ 612531.00	\$ 46.33
1989	12194.12	\$ 703281.00	\$ 57.67
1990	13673.08	\$ 688995.00	\$ 50.39
1991	12760.22	\$ 735409.00	\$ 57.63
1992	12270.34	\$ 724104.00	\$ 59.01
1993	12470.60	\$ 690107.28	\$ 55.34
1994	13169.20	\$ 758123.44	\$ 57.57
1995	12927.96	\$ 778917.96	\$ 60.25
1996	13464.00	\$ 782121.53	\$ 58.09
1997	11744.60	\$ 829325.31	\$ 70.61
1998	12276.90	\$ 740585.45	\$ 60.32
1999	11110.47	\$ 846144.20	\$ 76.16
2000	12229.58	\$ 882070.60	\$ 72.13
2001	13013.14	\$ 927899.39	\$ 71.30
2002	13314.86	\$ 1020587.61	\$ 76.65
2003	14595.70	\$ 997863.90	\$ 68.37
2004	14840.30	\$ 1264966.11	\$ 85.24
2005	13849.50	\$1300336.58	\$ 93.89
2006	14452.16	\$1608132.74	\$ 111.27

*Millions of Litres

Bare Point Direct Filtration Water Treatment Plant

City of Thunder Bay

PROCESS FLOW DIAGRAM



Loch Lomond
Water Treatment Plant

Mission Road
Thunder Bay, ON
P7C 4Z2

Raw Water Flow Results*

Month	Total For Month	Avg. Peak Rate Daily Flow	Avg. Minimum Daily Flow	Average Daily Flow
January	537.04	22.09	10.45	17.32
February	484.96	20.92	10.45	17.32
March	453.77	20.30	8.49	14.64
April	473.99	21.47	9.35	15.80
May	595.71	22.86	14.63	19.22
June	572.74	24.31	11.90	19.09
July	514.64	23.51	8.66	16.60
August	456.31	21.62	7.92	14.72
September	448.95	22.01	8.58	14.96
October	480.71	21.03	9.67	15.51
November	382.81	19.76	6.95	12.76
December	385.85	18.59	7.34	12.45
Total	5787.48			190.39
Average Per Month				15.87

* Flow Results in 1,000,000's of Litres

Treated Water Flow Results*

Month	Total For Month	Avg. Peak Rate Daily Flow	Avg. Min. Daily Flow	Average Daily Flow
January	485.85	22.09	10.56	15.67
February	440.92	20.92	10.79	15.75
March	403.65	20.30	8.70	13.02
April	429.47	21.47	8.92	14.32
May	515.81	22.86	14.70	17.19
June	527.00	24.31	11.90	17.57
July	468.86	23.51	8.67	15.12
August	413.12	21.62	7.92	13.33
September	400.73	22.01	8.58	13.36
October	432.66	21.03	10.00	13.96
November	350.21	19.76	6.95	11.67
December	348.07	18.59	7.34	11.23
Total	5216.35			172.19
Avg/Mth.				14.35

* Flow Results in 1,000,000's of Litres
 Loch Lomond Treated Water Flows 2006

Sodium Silicate Treatment

Month	Sodium Silicate Used (kg/month)	Sodium Silicate Dosage (mg/L)	Treated Water pH (-log10)
January	5154.40	10.65	7.01
February	4465.40	10.13	6.94
March	4080.00	10.28	7.00
April	4487.60	10.53	7.01
May	4489.20	12.69	7.03
June	3542.20	6.71	7.02
July	3756.60	8.00	7.02
August	4741.80	11.60	7.00
September	3855.40	9.67	7.02
October	3300.50	7.61	7.09
November	2335.50	6.71	7.05
December	1864.60	5.33	7.02
Total	46073.20		
Avg/Mth.	3839.43	9.16	7.02

Disinfection

Month	Chlorine Used (kg)	Chlorine Dosage (mg/L)	Free Residual (mg/L)
January	1841.30	3.42	2.15
February	1592.40	3.29	2.15
March	1479.40	3.31	2.08
April	1512.20	3.21	2.16
May	1609.10	2.70	2.13
June	1601.00	2.88	2.11
July	1640.00	3.19	1.90
August	1770.70	3.91	2.03
September	1695.50	3.81	2.04
October	1368.40	2.84	2.06
November	1071.20	2.81	2.16
December	1016.20	2.64	2.18
Total	18197.40		
Avg/Mth.	1516.45	3.17	2.10

Loch Lomond Disinfection 2006

Operational Report - Raw Water

Month	p.H. (-log10)	Hard. (mg/l)	Alk. (mg/l)	Turb. (N.T.U.)	Color (T.C.)	Temp. (deg. C)
January	7.01	24.20	21.60	0.21	17.67	3.74
February	6.94	20.40	18.70	0.21	13.00	3.21
March	7.00	26.60	21.40	0.35	16.50	2.97
April	7.01	28.20	22.20	0.27	15.63	3.78
May	7.03	24.80	20.80	0.34	16.30	6.45
June	7.02	18.60	18.20	0.36	16.42	9.07
July	7.02	25.60	24.80	0.51	17.42	10.40
August	7.00			0.45	12.71	12.19
September	7.02	27.00	24.00	0.26	14.00	14.05
October	7.09			0.41	12.25	10.35
November	7.05			0.36	8.80	6.23
December	7.02	25.50	23.80	0.40	12.68	4.02
Average	7.02	24.54	21.72	0.34	14.45	7.20

Hard. - Hardness

Alk. - Alkalinity

Turb. Turbidity

Temp. - Temperature

Operational Report Raw Water 2006

Operational Report - Treated Water

Month	p.H. (-log10)	Hard. (mg/l)	Alk. (mg/l)	Turb. (N.T.U.)	Color (T.C.)	Temp. (deg. C)	Iron (mg/L)	Lead (ug/L)	Conductivity (Umho/Cm)
January	7.78	24.80	22.00	0.06	8.00	3.74			62.11
February	7.74	27.20	22.80	0.06	5.00	3.21			63.50
March	7.71	27.20	22.80	0.08	7.10	2.97			63.60
April	7.72	28.80	24.20	0.08	7.33	3.78			64.30
May	7.77	26.20	22.00	0.06	7.50	6.45			61.50
June	7.72	19.00	18.40	0.06	9.25	9.07			104.58
July	7.65	22.00	25.60	0.06	4.00	10.40			64.40
August	7.78			0.06	4.00	12.19			68.70
September	7.77	27.00	24.00	0.06	2.25	14.05			65.82
October	7.80			0.07	3.00	10.35			65.56
November	7.79			0.07	3.29	6.23			65.77
December	7.79	24.20	24.60	0.06	4.05	4.02			66.38
Average	7.75	25.16	22.93	0.07	5.40	7.20	0.000	0.000	68.02

Hard. - Hardness **Alk. - Alkalinity** **Turb. Turbidity** **Temp. - Temperature**
 Operational Report Treated Water 2006

Control Point Residual

Month	Sil. N.W. Hotel (mg/l)	Sil. St.P. School (mg/l)	Sil. L.L. Plant (mg/l)
January	9.15	9.25	10.00
February	10.80		11.10
March	10.60	9.90	10.50
April	10.40	10.80	12.50
May	8.70	8.40	9.80
June	4.60	6.60	11.30
July	4.70	10.00	9.30
August			
September	7.40	5.80	10.60
October	5.20	9.70	10.70
November	4.30	9.80	9.40
December			8.21
Total	75.85	80.25	113.41
Average Per Month	7.59	8.92	10.31
	<small>Sil.- Silicate</small>	<small>CL2 - Chlorine</small>	<small>St.P.- St Patrick School</small>
			<small>L.L.- Loch Lomond</small>

**Chemical Analysis 1 - Raw Water
 (Drinking Water Surveillance Program)**

Month	Chlor. (mg/l)	Sulp. (mg/l)	Sil. (mg/l)	Turb. N.T.U.*	Colour T.H.U.**	Nitrates (mg/l)
September	0.40	4.20	1.44	0.44	12.10	0.022
Average	0.40	4.20	1.44	0.44	12.10	0.022

Chlor.-Chloride Sulp. – Sulphate Sil. – Silicates Turb.- Turbidity
 (*) – N.T.U. Nephelometric Turbidity Units (**) – T.C.U. – True Colour Units

**Chemical Analysis 2 – Raw Water
 (Drinking Water Surveillance Program)**

Month	Cond. (uS/cm)	Hard. (mg/l)	Calcium (mg/l)	Sodium (mg/l)	Alk. (mg/l)	pH (-log10)
September	58.00	24.00	5.60	1.40	24.30	7.46
Average	58.00	24.00	5.60	1.40	24.30	7.46

Cond. – Conductivity Hard. – Hardness Alk. – Alkalinity

**Chemical Analysis 1 – Treated Water
 (Drinking Water Surveillance Program)**

Month	Chlor. (mg/l)	Sulp. (mg/l)	Sil. (mg/l)	Turb. N.T.U.*	Colour T.H.U.**	Nitrates (mg/l)
September	3.50	3.90	4.98		2.50	0.026
Average	3.50	3.90	4.98		2.50	0.026

Chlor.-Chloride Sulp. – Sulphate Sil. – Silicates Turb.- Turbidity
 (*) – N.T.U. Nephelometric Turbidity Units (**) – T.C.U. – True Colour Units

**Chemical Analysis 2 – Treated Water
 (Drinking Water Surveillance Program)**

Month	Cond. (uS/cm)	Hard. (mg/l)	Calcium (mg/l)	Sodium (mg/l)	Alk. (mg/l)	pH (-log10)
September	68.00	23.50	5.60	3.40	23.50	7.61
Average	68.00	23.50	5.60	3.40	23.50	7.61

Cond. – Conductivity Hard. – Hardness Alk. – Alkalinity

Metal Analysis – Treated Water (Drinking Water Surveillance Program)

Month	Alum. (ug/l)	Barium (ug/l)	Boron (ug/l)	Chrom. (ug/l)	Copper (ug/l)	Iron (ug/l)	Lead (ug/l)	Mang. (ug/l)	MolyB. (ug/l)	Nickel (ug/l)	Uran. (ug/l)	Zinc (ug/l)
March	5.60	5.20	6.00	0.30	2.10	6.00	0.03	0.31	0.10	0.50	0.01	0.60
June	5.60	4.97	6.00	0.70	1.40	6.00	-0.08	0.06	0.11	0.20	0.01	0.70
September	4.50	5.21	7.00	0.30	3.40	6.00	-0.03	0.15	0.11	0.20	0.01	1.00
Average	5.23	5.13	6.33	0.43	2.30	6.00	-0.03	0.17	0.11	0.30	0.01	0.77

Alum. – Aluminum Chrom. – Chromium Mang. – Manganese MolyB. – Molybdenum Uran. – Uranium

**Priority Organics – Treated Water
 (Drinking Water Surveillance Program)**

Month	Chloro- form*	Chlordi- bromo- methane*	Bromodi chloro- methane*	Bromo- Form*	Total Trihalo- Methane*
March	50.80		1.00		51.80
June	58.60		1.20		59.80
September	64.00		1.40		65.40
December	58.40		1.40		59.80
Avg/Mth.	57.95		1.25		59.20

*(All analysis in ug/l)

Loch Lomond Water Treatment Plant - Volatile Organics Tests, 2006

Source Water	Parameter	MAC/ IMAC (ug/L)	# of Samples	# of Detectable Results	Date(s) dd/mm/yy	Range (ug/L)	Exceedance	Source of Parameter
Loch Lomond Treated	Vinyl Chloride	2	1	0	16/03/06	<0.5	NO	
	1,1-Dichloroethylene	14	1	0	"	<0.5	NO	
	Dichloromethane	50	1	0	"	<0.5	NO	
	Chloroform	Note 1	4	4	16/03/06 – 20/12/06	23.3 – 69.2	NO	Type of trihalomethane (THM)
	Carbon Tetrachloride	5	1	0	16/03/06	<0.5	NO	
	Benzene	5	1	0	"	<0.5	NO	
	1,2-Dichloroethane	5	1	0	"	<0.5	NO	
	Bromodichloromethane	16	4	4	"	2.9 – 4.8	NO	Type of trihalomethane (THM)
	Trichloroethylene	50	1	0	"	<0.5	NO	
	Tetrachloroethylene	30	1	0	"	<0.5	NO	
	Dibromochloromethane	Note 1	4	0	"	<0.5	NO	Type of trihalomethane (THM)
	Monochlorobenzene	80	1	0	"	<0.5	NO	
	Bromoform	Note 1	4	0	"	<1	NO	Type of trihalomethane (THM)
	1,4-Dichlorobenzene	5	1	0	"	<0.5	NO	
1,2-Dichlorobenzene	200	1	0	"	<0.5	NO		
Loch Lomond Distr. System	Total THM's – System Extremity (2)	100	4	4	16/03/06 – 20/12/06	50.1 (2)	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)

< Means less than the lab 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/yy	Range (ug/L)	Exceedance	Source of Parameter
Loch Lomond Treated	Atrazine + N-dealkylated metabolites	5	1	0	16/03/06	<0.2	NO	Insecticide, herbicide and fungicide residues
	Alachlor	5	1	0	"	<0.1	NO	
	Azinphos-methyl	20	1	0	"	<0.1	NO	
	Chlorpyrifos	90	1	0	"	<0.1	NO	
	Cyanazine	10	1	0	"	<0.1	NO	
	Diazinon	20	1	0	"	<0.1	NO	
	Diclofop-methyl	9	1	0	"	<0.2	NO	
	Dimethoate	20	1	0	"	<0.1	NO	
	Dinoseb	10	1	0	"	<0.2	NO	
	Malathion	190	1	0	"	<0.1	NO	
	Metribuzin	80	1	0	"	<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/yy	Range (ug/L)	Exceedance	Source of Parameter
Loch Lomond Treated Water (cont.)	Parathion	50	1	0	16/03/06	<0.1	NO	Insecticide, herbicide and fungicide residues
	Phorate	2	1	0	"	<0.1	NO	
	Prometryne	1	1	0	"	<0.1	NO	
	Simazine	10	1	0	"	<0.1	NO	
	Terbufos	1	1	0	"	<0.2	NO	
	Triallate	230	1	0	"	<0.1	NO	
	Trifluralin	45	1	0	"	<0.1	NO	
	P,p'-DDD	30	1	0	"	<0.1	NO	
	P,p'-DDE	30	1	0	"	<0.1	NO	
	P,p'-DDT	30	1	0	"	<0.1	NO	
	Aldrin	0.7	1	0	"	<0.02	NO	
	Dieldrin	0.7	1	0	"	<0.02	NO	
	Heptachlor	3	1	0	"	<0.1	NO	
	Heptachlor Epoxide	3	1	0	"	<0.1	NO	
	Lindane (Total)	4	1	0	"	<0.1	NO	
	Methoxychlor	900	1	0	"	<0.1	NO	
	Metolachlor	50	1	0	"	<0.1	NO	
	Chlordane	7	1	0	"	<0.1	NO	
	Bromoxynil	5	1	0	"	<0.2	NO	
	Dicamba	120	1	0	"	<0.2	NO	
	2,4-Dichlorophenol	900	1	0	"	<0.5	NO	
	2,4-D	100	1	0	"	<0.2	NO	
	Pentachlorophenol	60	1	0	"	<0.5	NO	
	Picloram	190	1	0	"	<0.2	NO	
	2,3,4,6-Tetrachlorophenol	100	1	0	"	<0.5	NO	
	2,4,6-Trichlorophenol	5	1	0	"	<0.5	NO	
	2,4,5-T	280	1	0	"	<0.2	NO	
Glyphosate	280	1	0	"	<10	NO		
Diquat	70	1	0	"	<7	NO		
Paraquat	10	1	0	"	<1	NO		
Aldicarb	9	1	0	"	<9	NO		
Bendiocarb	40	1	0	"	<0.2	NO		
Carbaryl	90	1	0	"	<0.2	NO		
Carbofuran	90	1	0	"	<0.2	NO		
Diuron	150	1	0	"	<10	NO		
Temephos	280	1	0	"	<0.1	NO		
PCB's	3	1	0	"	<0.06	NO	Electrical insulating oil	

< 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/yy	Range (mg/L)	Exceedance	Source of Parameter
Loch Lomond Raw Water	Calcium	**	1	1	16/03/06	6.6		Common mineral constituent
	Sodium	200**	1	1	"	1.30		Natural mineral constituent
	Alkalinity	500**	1	1	"	22		Natural sources, mostly dissolved carbonate
	Chloride	250**	1	1	"	0.8		Natural sources at low levels
	Conductivity (us/cm)	**	1	1	"	61		Natural dissolved material in water
	Dissolved Organic Carbon	5**	1	1	"	4		Organic matter leached into surface water from vegetation
	Hardness	100**	1	1	"	27		Natural dissolved minerals (Ca, Mg)
	Nitrate	10	4	3	16/03/06 – 20/12/06	0.04 - 0.1	NO	Natural sources at low levels, Fertilizer, septic runoff at high levels
	Nitrite	10 ⁺	4	0	"	<0.02	NO	Natural sources in oxygen-poor water
	Cyanide	0.2	1	0	16/03/06	<0.002	NO	Industrial processes
	Total Phenolics	**	1	0	"	0.001		Decomposition of wood

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

Source Water	Parameter	MAC/ IMAC	# of Samples	# Detectable Results	Dates dd/mm/yy	Range (mg/L)	Exceedance	Source of Parameter
Loch Lomond Distribution System Water	pH	**	4	4	16/03/06 – 20/12/06	7.6 – 7.9		Measure of acidity (7.0 = neutral)
	Calcium	**	1	1	16/03/06	6.8		Common mineral constituent
	Chloramines, total	3.0	1	1	22/12/06	0.14	NO	Chlorination byproduct
	Sodium	200**	1	1	16/03/06	3.54		Natural deposits
	Alkalinity	500**	1	1	"	23		Natural dissolved carbonate minerals
	Chloride	250**	1	1	"	3.1		Natural sources at low levels
	Conductivity (us/cm)	**	1	1	"	69		Natural dissolved material in water
	Dissolved Organic Carbon	5**	1	1	"	5		Organic matter leached into surface water from vegetation
	Hardness	100**	1	1	"	27		Natural dissolved minerals (Ca, Mg)
	Lead	0.01	1	0	"	0.003	NO	Leaching from plumbing and service connections
	Nitrate	10	4	2	16/03/06 – 20/12/06	<0.20 – 0.32	NO	Natural sources at low levels, Fertilizer, septic runoff at high levels
	Nitrite	10 ⁺	4	0	"	<0.02	NO	Natural sources in oxygen-poor water

**0 - Aesthetic Objective or no objective. 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 – Inorganic & General Chemistry Parameters (cont.)								
Source Water	Parameter	MAC/ IMAC	# of Samples	# Detectable Results	Dates dd/mm/yy	Range (mg/L)	Exceedance	Source of Parameter
Loch Lomond Treated Water	Chloride	250**	1	1	16/03/06	2.7		Natural sources at low levels
	Conductivity	**	1	1	“	70		Natural dissolved material in water
	Dissolved Organic Carbon (DOC)	5**	1	1	“	4		Organic matter leached into surface water from vegetation
	Antimony	0.006	1	0	“	0.004	NO	
	Arsenic	0.025	1	0	“	<0.001	NO	
	Barium	1.0	1	0	“	<0.01	NO	Common constituent of sedimentary rock
	Boron	5.0	1	0	“	<0.05	NO	Borates, borax detergents
	Cadmium	0.005	1	0	“	<0.0001	NO	Electroplating, NiCad batteries
	Chromium	0.05	1	0	“	<0.001	NO	Electroplating, old yellow paints
	Hardness	100**	1	1	“	27		Natural dissolved minerals (Ca, Mg)
	Mercury	0.001	1	0	“	<0.0001	NO	Metal refining, coal combustion, natural deposits
	Selenium	0.01	1	0	“	<0.005	NO	Natural deposits
	Sodium	200**	1	1	“	3.68	NO	Natural deposits and treatment salts
	Uranium	0.02	1	0	“	<0.005	NO	Natural deposits, nuclear processing
	Benzo(a)pyrene	.00001	1	0	“	<0.00001	NO	Incomplete combustion, diesel exhaust
	Cyanide	0.2	1	0	“	<0.002	NO	Industrial processes
	Nitrate	10	4	3	16/03/06 – 20/12/06	0.04 - 0.10	NO	Natural sources at low levels, Fertilizer, septic runoff at high levels
	Nitrite	10 ⁺	4	0	“	<0.02	NO	Natural sources in oxygen-poor water
	Orthophosphate	**	4	3	“	<.003 - 0.015		Bacterial action in ground water
	Reactive Silica	**	4	4	“	8.2 – 12.5		
Gross Alpha(radioactivity)	0.1 Bq/L	1	0	16/03/06	<0.1	NO	Natural background radiation,	
Gross Beta (radioactivity)	0.5 Bq/L	1	0	“	<0.1	NO	discharge of radioactive materials	
Tritium (radioactivity)	7000 Bq/L	1	0	“	<1000	NO		

** -Aesthetic Objective or no objective. 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

2006 DIRECT OPERATING EXPENDITURES

Hourly Wages & Fringe Benefits	\$ 370,216.64
Building Maintenance	\$ 336.69
Electricity	\$ 238,072.03
Chemicals	\$ 115,977.31
Equipment Maintenance and Operations	\$ 58,434.70
General Expenditures	\$ 8,795.84

Total Operating Expenditure	\$ 791,833.21
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No. of Million Litres Treated in 2006	5,216.35
Cost Per Million Litres Treated	\$ 151.80

LOCH LOMOND WATER TREATMENT PLANT

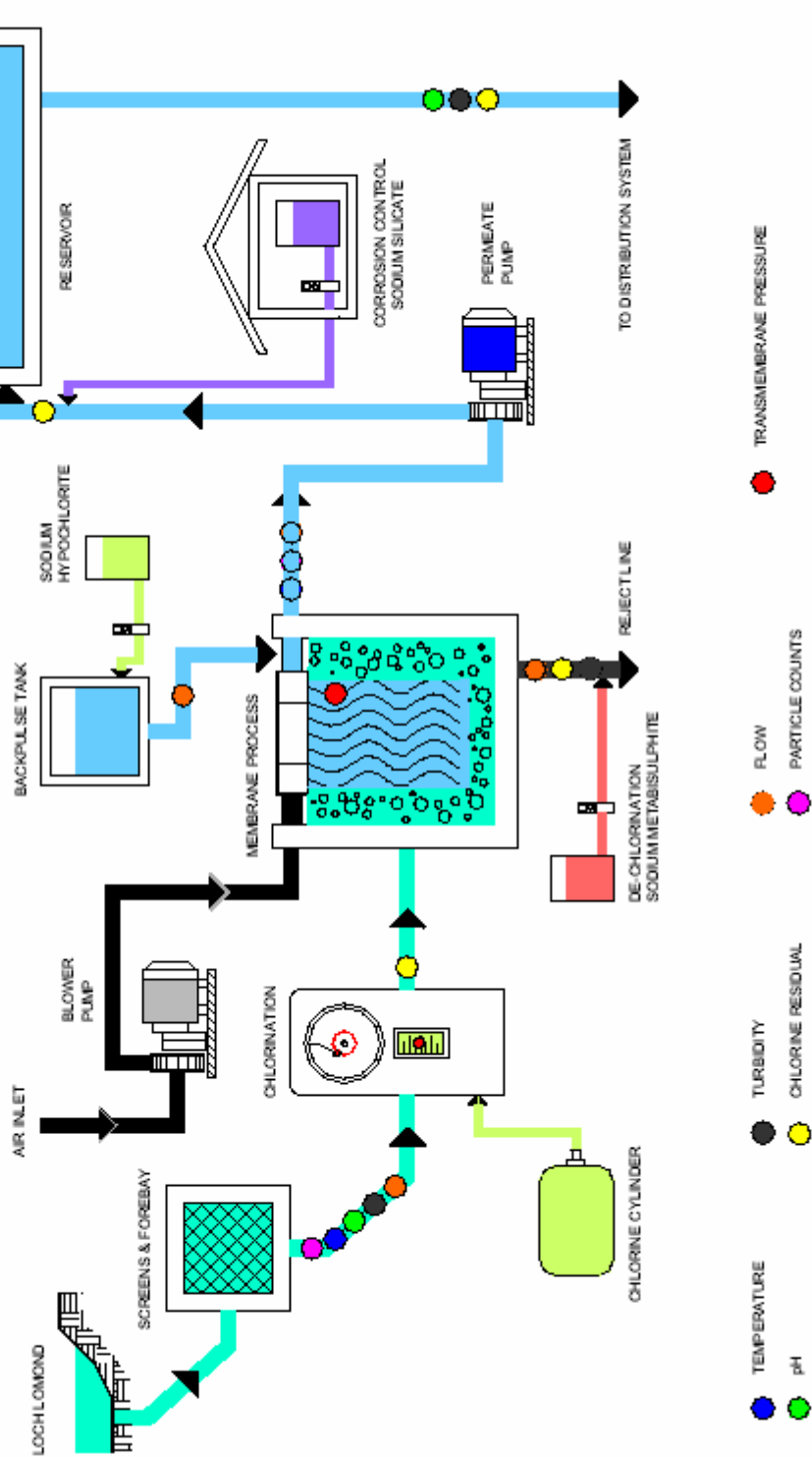
HISTORICAL OPERATING COSTS

Year	Total Annual Flow(*)	Total Cost	Cost Per Million Litres
1985	12825.45	\$ 227958.11	\$ 17.78
1986	12268.26	\$ 290036.07	\$ 23.64
1987	12497.24	\$ 346792.58	\$ 27.75
1988	12431.00	\$ 389382.00	\$ 31.32
1989	10958.00	\$ 332113.00	\$ 30.31
1990	11749.00	\$ 301610.00	\$ 25.67
1991	11631.00	\$ 309233.00	\$ 26.59
1992	11173.70	\$ 342037.00	\$ 30.61
1993	10183.70	\$ 304573.22	\$ 29.91
1994	9670.50	\$ 296776.40	\$ 30.69
1995	9899.50	\$ 329433.49	\$ 33.28
1996	10054.80	\$ 365922.20	\$ 36.39
1997	8970.50	\$ 344535.91	\$ 38.41
1998	9151.50	\$ 507953.91	\$ 55.50
1999	9386.85	\$ 776628.32	\$ 82.71
2000	9832.39	\$ 712039.62	\$ 72.42
2001	10178.71	\$ 787739.76	\$ 77.39
2002	9427.16	\$ 858695.28	\$ 91.09
2003	7385.86	\$ 935855.48	\$ 126.71
2004	9386.85	\$ 676316.76	\$ 72.05
2005	6764.79	\$ 757935.82	\$112.04
2006	5216.35	\$791,833.21	\$151.80

*Millions of Litres

Loch Lomond
Temporary Membrane
Water Treatment Plant
City of Thunder Bay

PROCESS
FLOW DIAGRAM



Thunder Bay

North Distribution

System

Bacteriological Results

Routine Sampling Program

Month	Number of Samples	Number of HPC	Number of Total Coliform	Number of E. coli
January	115	31	0	0
February	88	23	0	0
March	99	27	0	0
April	94	26	0	0
May	112	29	1	0
June	88	24	0	0
July	72	18	0	0
August	93	25	1	0
September	82	21	0	0
October	92	25	0	0
November	95	25	0	0
December	64	17	0	0

HPC – Heterotrophic Plate Count Total Col. – Total Coliform Bacteria
 E. coli – Escherichia coli

Metal Analysis – Treated Water (Drinking Water Surveillance Program)

Month	Alum. (ug/l)	Barium (ug/l)	Boron (ug/l)	Chrom. (ug/l)	Copper (ug/l)	Iron (ug/l)	Lead (ug/l)	Mang. (ug/l)	MolyB. (ug/l)	Nickel (ug/l)	Uran. (ug/l)	Zinc (ug/l)
May	43.10	10.70	6.00	0.50	1.50	6.00	0.03	0.65	0.13	0.20	0.03	0.90
October	93.50	10.40	6.00	0.30	1.50	6.00	0.07	0.70	0.14	0.20	0.02	0.80
Average	68.30	10.55	6.00	0.40	1.50	6.00	0.05	0.68	0.14	0.20	0.03	0.85

Alum. – Aluminum Chrom. – Chromium Mang. – Manganese MolyB. – Molybdenum Uran. – Uranium

Priority Organics – Treated Water (Drinking Water Surveillance Program)

Month	Chloroform	Chlordi-bromo-methane	Bromodi-chloro-methane	Bromo-form	Total Trihalo-methane
May	13.90		2.20		16.10
October	12.90		3.00		15.90
Total	26.80		5.20		32.00
Avg/Mth.	13.40		2.60		16.00

(All analysis in ug/l)

North Distribution System

ADVERSE 2006

Date	AWQI No.	Parameter	Result	Corrective Action	Corrective Action Date
May 12/06	AD06-01, #66961	Total Coliform, Fecal Coliform	Present Present	Flushed and resampled, May 12, 13, May 13 th . Resample failed (see below)	May 12, 13/06
May 14/06	AD06-01, #66983	Total Coliform, Fecal Coliform	Present Present	Flushed and resampled, results okay	May 14, 15/06
Aug. 27/06	AD06-05, #67365	Total Coliform	Present	Flushed and resampled. Resample failed (see below)	Aug. 27/06
Aug. 28/06	AD06-05, #67365	Total Coliform,	Present	Flushed and resampled. Resamples OK	Passed Aug. 28/06

North Distribution System

OPERATIONAL ADVERSE 2006

Date	AWQI No.	Parameter	Result	Summary of Action Taken	Corrective Action Date
Mar. 22/06	OAD01-06, #63031	Chlorine Analyzer	No Data	Chlorine analyzer out of service for routine maintenance at Duke St Reservoir – Manual readings were taken to ensure proper residual	Mar. 22/06
Mar. 28/06	OAD02-06, #63138	Chlorine Analyzer	No Data	Chlorine analyzer out of service for routine maintenance at Duke St Reservoir – Manual readings were taken to ensure proper residual	Mar. 28/06
Apr. 11/06	OAD04-06, #63349	Chlorine Analyzer	No Data	Temporary WTP shutdown at Bare Point for maintenance. Chlorine residual readings taken manually	Apr. 11/06
May 17/06	OAD08-06, #64060	Turbidity	1.0 NTU	Turbidity was at or over 1.0 NTU for 15 minutes – chemical dosages adjusted to compensate	May 17/06

Thunder Bay

South Distribution

System

**Bacteriological Results
 Routine Sampling Program**

Month	Number of Samples	Number of HPC	Number of Total Coliform	Number of E. coli
January	102	27	0	0
February	77	20	0	0
March	89	24	0	0
April	78	21	0	0
May	95	25	0	0
June	77	20	0	0
July	69	19	0	0
August	73	19	1	0
September	63	17	0	0
October	78	21	1	0
November	85	23	1	0
December	65	18	0	0

**HPC – Heterotrophic Plate Count Total Col. – Total Coliform Bacteria
 E. coli – Escherichia coli**

Metal Analysis – Treated Water (Drinking Water Surveillance Program)

Month	Alum. (ug/l)	Barium (ug/l)	Boron (ug/l)	Chrom. (ug/l)	Copper (ug/l)	Iron (ug/l)	Lead (ug/l)	Mang. (ug/l)	MolyB. (ug/l)	Nickel (ug/l)	Uran. (ug/l)	Zinc (ug/l)
March	16.40	5.55	6.00	0.30	1.70	12.00	0.02	0.58	0.11	0.30	0.01	1.40
June	6.00	5.13	6.00	0.90	17.50	6.00	0.02	0.28	0.10	0.30	0.05	3.00
September	4.60	5.30	6.00	0.30	25.30	3.00	0.07	0.99	0.10	0.30	0.01	0.05
Average	9.00	5.33	6.00	0.50	14.83	7.00	0.04	0.62	0.10	0.30	0.02	1.48

Alum. – Aluminum Chrom. – Chromium Mang. – Manganese MolyB. – Molybdenum Uran. – Uranium

**Priority Organics – Treated Water
 (Drinking Water Surveillance Program)**

Month	Chloroform	Chlordi- bromo- methane	Bromodi- chloro- methane	Bromo- form	Total Trihalo- methane
March	89.00		2.80		91.80
June	61.50		1.40		62.90
September	67.00		1.60		68.60
Total	217.50		5.80		223.30
Average	72.50		1.93		74.43

All analysis in ug/l

South Distribution System

ADVERSE 2006

Incident Date	AWQI No.	Parameter	Result	Corrective Action	Corrective Action Date
Aug. 11/06	AD06-02, #66968	Total Coliform	Present	Resampled upstream & downstream, resample failed (see below)	Aug. 14/06
Aug. 14/06	AD06-03, #67066	Total Coliform	Present	Flushed and resampled, resample failed second time (below)	Aug. 17, 18/06
Aug. 17/06	AD06-04, #67122	Total Coliform	Present	Flushed and resampled, resamples OK	Aug. 18/06
Oct. 2/06	AD06-06, #68216	Total Coliform	Present	Flushed and resampled, resamples OK	Oct. 2, 3/06
Nov. 10/06	AD06-07, #68959	Chlorine Residual	Low Residual	Flushed and resampled, results OK	Nov. 10/06
Nov. 22/06	AD06-08, #69088	Total Coliform	Present	Flushed and resampled, results OK	Nov. 22, 23/06
Dec. 16/06	AD06-09, #69485	Pseudomonas	Present	Flushed upstream and downstream, resampled, results OK	Dec. 16, 17/06

South Distribution System

OPERATIONAL ADVERSE 2006

Incident Date	AWQI No.	Parameter	Result	Corrective Action Taken	Corrective Action Date
Apr. 18/06	OAD05-06, #63454	Turbidity	1.52 NTU	Resampled, result less than 1 NTU	Apr. 18/06
Apr. 25/06	OAD06-06, #63580	Chlorine Residual	No Data	Communication link failure to Bare Point, chlorine confirmed to be in normal range. Communication was restored	Apr. 25/06
Apr. 27/06	OAD07-06, #63646	Chlorine Residual Turbidity	No Data	WTP shutdown for a valve change, chlorine and turbidity confirmed to be in normal ranges	Apr. 27/06
Oct. 4/06	OAD09-06, #68280	Chlorine Residual	Value dropped to zero	Faulty readings from analyzer, OK after maintenance, chlorine readings confirmed manually	Oct. 4/06
Oct. 23/06	OAD10-06, #68645	Chlorine Residual	No Data	Service on chlorine analyzer at Broadway Pump Station, OK after repair, chlorine confirmed manually	Oct. 23/06

**Water Quality
Monitoring Program
Results
Distribution Systems**

NEW MAINS - 2006

Location	New Main No.	Construction Completion Date	Pressure Test Date	Disinfection Date	Flushing Date	Sampling Date	Results
Central Ave. @ TB Expressway	NM06-01	Jan. 11/06	Jan. 12/06	Jan. 16/06	Jan. 18/06	Jan. 18, 19/06	Passed
Broadway to Rockcliff	NM06-02	Dec., 2005	Dec. 5/05	Feb. 21/06	Feb. 22/06	Feb. 23, 24/06	Passed
Bare Point WTP new construction	NM06-03	Oct., 2005	N/A	Apr. 4/06	Apr. 5/06	Apr. 6, 7/06	Passed
2027 Dereck Burney Drive	NM06-04	N/A	N/A	Apr. 10/06	Apr. 11/06	Apr. 11, 12/06	Passed
1050 Lithium Drive	NM06-05	N/A	Apr. 21/06	Apr. 21/06	Apr. 24/06	Apr. 24, 25/06	Passed
Dewe St. off Arundel	NM06-06	May 8/06	N/A	May 8/06	May 10/06	May 10, 11/06	Passed
Sunrise Blvd. off Summerhill Dr.	NM06-07	Dec., 2005	Jan. 11/06	Jun. 12/06	Jun. 13/06	Jun. 15, 16/06	Passed
Dewe St and Dacre	NM06-08	Jun. 6/06	Jun. 12/06	Jun. 12/06	Jun. 14/06	Jun. 16, 17/06	Passed
James St. Swing Bridge	NM06-09	Jun. 12/06	Jun. 13/06	Jun. 14/06	Jun. 15/06	Jun. 16, 17/06	Passed
James St Swing Bridge	NM06-10	Jun. 20/06	Jun. 26/06	Jun. 26/06	Jun. 27/06	Jun. 27, 28/06	Passed
Rockcliff Reservoir, Cell #1, 2	NM06-11	Jun. 27/05	N/A	Aug. 8/06	N/A	Aug. 17, 18/06	Passed
Rockcliff Reservoir, Cell #3, 4	NM06-11	Jun. 27/05	N/A	Aug. 24/06	N/A	Aug.29, 30/06	Passed
Loxley Bay	NM06-12	Apr., 2006	Jun. 12/06	Jul. 11/06	Jul. 13/06	Jul. 13, 14/06	Passed
James St.- Arthur to Walsh	NM06-13	Aug. 1/06	N/A	Aug. 1/06	Aug. 2/06	Aug. 3, 4/06	Passed
Mary St. – Sprague to 270 E.	NM06-14	Aug. 2/06	Aug. 2/06	Aug. 3/06	Aug. 4/06	Aug. 8, 9/06	Passed
225 River Street	NM06-15	Aug. 10/06	Aug. 11/06	Aug. 14/06	Aug. 15/06	Aug.16, 17/06	Passed
Mary St. – 251.5 West of Syndicate	NM06-16	Aug. 11/06	Aug. 11/06	Aug. 11/06	Aug. 13/06	Aug.14, 15/06	Passed
Vale Ave – Vale Crescent	NM06-18	Sep. 7/06	Sep. 11/06	Sep. 11/06	Sep. 12/06	Sep.13, 14/06	Passed
Johnson – Queen to Cornwall	NM06-19	N/A	Sep. 14/06	Sep. 18/06	Sep. 19/06	Sep. 20,21/06	Passed
Memorial Ave at Perth Dry Cleaning	NM06-20A	Sep. 6/06	Sep. 18/06	Sep. 18/06	Sep. 20/06	(see below)	(see below)
Memorial Ave at Perth Dry Cleaning	NM06-20B	Sep. 6/06	Sep. 25/06	Sep. 25/06	Sep. 26/06	Sep. 27,28/06	Passed
College St. – Tupper to Dawson	NM06-21	Sep. 25/06	Sep. 25/06	Sep. 26/06	Sep. 28/06	Sep. 28,29/06	Passed
Hewitson – Balmoral to Roland	NM06-22	Sep. 27/06	Sep. 28/06	Sep. 28/06	Sep. 29/06	Sep. 30, Oct. 1/06	Passed
Johnson Ave – Cornwall to Bay St.	NM06-23	Sep. 27/06	Sep. 27/06	Oct. 2/06	Oct. 3/06	Oct. 4, 5/06	Passed
Porcupine Blvd & Raccoon Square	NM06-24	Sep. 6/06	Sep. 27/06	Oct. 11/06	Oct. 13/06	Oct. 14, 15/06	Passed
William St. – Balmoral to Roland	NM06-25	Oct. 5/06	Oct. 5/06	Oct. 6/06	Oct. 7/06	Oct. 11, 12/06	Passed
Hilddale Retirement	NM06-26	N/A	N/A	Oct. 20/06	Oct. 25/06	Oct. 26, 27/06	Passed
Court Street	NM06-27	Oct. 18/06	Oct. 25/06	Oct. 26/06	Oct. 27/06	Oct. 30, 31/06	Passed
College St. – Dawson to River	NM06-28	Oct. 26/06	Oct. 26/06	Oct. 26/06	Oct. 27/06	Oct. 28, 29/06	Passed
205 Franklin Street	NM06-29	N/A	Nov. 7/06	Nov. 7/06	Nov. 9/06	Nov.15, 16/06	Passed
Bruce St. – Velva to Minot	NM06-30	Nov. 10/06	Nov. 10/06	Nov. 10/06	Nov. 11/06	Nov.13, 14/06	Passed
600 Montreal St.	NM06-31	Nov. 17/06	N/A	Dec. 4/06	Dec. 12/06	Dec.12, 13/06	Passed
1250 Golf Links Rd	NM06-32	Nov. 27/06	Nov. 27/06	Nov. 29/06	Nov. 30/06	Dec. 1, 2/06	Passed

Part III Form 2
Section 11. ANNUAL REPORT.

Drinking-Water System Number:	220000273
Drinking-Water System Name:	Bare Point Water Treatment Plant
Drinking-Water System Owner:	City of Thunder Bay
Drinking-Water System Category:	Large Municipal Residential
Period being reported:	January 1 – December 31, 2006

<p><u>Complete if your Category is Large Municipal Residential or Small Municipal Residential</u></p> <p>Does your Drinking-Water System serve more than 10,000 people? Yes [X] No []</p> <p>Is your annual report available to the public at no charge on a web site on the Internet? Yes [X] No []</p> <p>Location where Summary Report required under O. Reg. 170/03 Schedule 22 will be available for inspection.</p> <div style="border: 1px solid black; padding: 5px;"> <ul style="list-style-type: none"> -Bare Point Water Treatment Plant -All branches of the Thunder Bay Public Library -Env. Division Office - Victoriaville - City Hall - Front Street Service Yard </div>	<p><u>Complete for all other Categories.</u></p> <p>Number of Designated Facilities served: <div style="border: 1px solid black; width: 100px; height: 20px; margin: 5px 0;"></div> </p> <p>Did you provide a copy of your annual report to all Designated Facilities you serve? Yes [] No []</p> <p>Number of Interested Authorities you report to: <div style="border: 1px solid black; width: 100px; height: 20px; margin: 5px 0;"></div></p> <p>Did you provide a copy of your annual report to all Interested Authorities you report to for each Designated Facility? Yes [] No []</p>
----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

Note: For the following tables below, additional rows or columns may be added or an appendix may be attached to the report

List all Drinking-Water Systems (if any), which receive all of their drinking water from your system:

Drinking Water System Name	Drinking Water System Number

Did you provide a copy of your annual report to all Drinking-Water System owners that are connected to you and to whom you provide all of its drinking water? Yes [] No []

Indicate how you notified system users that your annual report is available, and is free of charge.

- Public access/notice via the web
- Public access/notice via Government Office (City Hall)
- Public access/notice via a newspaper
- Public access/notice via Public Request
- Public access/notice via a Public Library
- Public access/notice via other method - City News Insert "Your City"

Describe your Drinking-Water System

The Bare Point WTP treats an average of 40 ML of Lake Superior water daily using chemically assisted coagulation and filtration through sand-anthracite filters. The water is disinfected using chlorine gas and distributed to approximately 2/3 of the population of the City of Thunder Bay. The Loch Lomond WTP currently serves the remaining population. In May/04 work began on an expansion project at Bare Point to increase its capacity to 113 ML per day using microfiltration/disinfection for treatment and have this plant serve the entire city's population.

List all water treatment chemicals used over this reporting period

Alum (General Chemical)
 Polymer (Magnafloc LT7995)
 Polyaluminum Hydroxychloride (Brenntag Watercare A55010)
 Chlorine Gas

Were any significant expenses incurred to?

- Install required equipment
- Repair required equipment
- Replace required equipment

Please provide a brief description and a breakdown of monetary expenses incurred

See the attached copy of full Annual Report – Major Projects
 Bare Point Expansion project cost is approx. \$43. Million

Provide details on the notices submitted in accordance with subsection 18(1) of the Safe Drinking-Water Act or section 16-4 of Schedule 16 of O.Reg.170/03 and reported to Spills Action Centre

See North Distribution System Adverse Table in Annual Report

Microbiological testing done under the Schedule 10, 11 or 12 of Regulation 170/03, during this reporting period.

	Number of Samples	Range of E.Coli Or Fecal Results (min #)-(max #)	Range of Total Coliform Results (min #)-(max #)	Number of HPC Samples	Range of HPC Results (min #)-(max #)
Raw	53	0 – 4	0 – 24	NA	NA
Treated	53	0 – 0 (absent)	0 – 0 (absent)	53	0 – 4
Distribution	1094	E. coli absent Fecal 1 present	2 present, rest all absent	292	0 -212

Operational testing done under Schedule 7, 8 or 9 of Regulation 170/03 during the period covered by this Annual Report.

	Number of Grab Samples	Range of Results (min #)-(max #)
Turbidity	8760	0.06 – 0.77 NTU
Chlorine	8760	1.14 – 1.46 mg/L
Chlorine Residual Distrib. System	1152	0.04 – 1.40 mg/L
Fluoride (If the DWS provides fluoridation)	N/A	N/A

NOTE: For continuous monitors use 8760 as the number of samples.

*NOTE: Record the unit of measure if it is **not** milligrams per litre.*

Summary of additional testing and sampling carried out in accordance with the requirement of an approval, order or other legal instrument.

Date of legal instrument issued	Parameter	Date Sampled	Result	Unit of Measure
CofA #1151-5F2J5B	Chloramines	23/12/06	0.05	mg/L as Cl
CofA #1151-5F2J5B	Cyanide	16/03/06	<0.002	mg/L
CofA #1151-5F2J5B	Orthophosphate	16/03/06 – 20/12/06	<0.003 – 0.014	mg/L
CofA #1151-5F2J5B	Reactive Silica	16/03/06 – 20/12/06	1.45 – 2.46	mg/L

Summary of Inorganic parameters tested during this reporting period or the most recent sample results

Parameter	Sample Date	Result Value	Unit of Measure	Exceedance
Antimony	16/03/06	<0.001	mg/L	No
Arsenic	16/03/06	<0.001	mg/L	No
Barium	16/03/06	0.01	mg/L	No
Boron	16/03/06	<0.05	mg/L	No
Cadmium	16/03/06	<0.0001	mg/L	No

Chromium	16/03/06	<0.001	mg/L	No
Lead	16/03/06	<0.001	mg/L	No
Mercury	16/03/06	<0.0001	mg/L	No
Selenium	16/03/06	<0.005	mg/L	No
Sodium	16/03/06	1.74	mg/L	N/A
Uranium	16/03/06	<0.005	mg/L	No
Fluoride	(Done in 2003)			N/A
Nitrate	16/03/06 – 20/12/06	0.30 – 0.33	mg/L	No (done quarterly)
Nitrite	16/03/06 – 20/12/06	<0.02	mg/L	No (done quarterly)

Summary of Organic parameters sampled during this reporting period or the most recent sample results

Parameter	Sample Date	Result Value	Unit of Measure	Exceedance
Alachlor	16/03/06	<0.1	ug/L	No
Aldicarb	16/03/06	<9	ug/L	No
Aldrin + Dieldrin	16/03/06	<0.04	ug/L	No
Atrazine + N-dealkylated metabolites	16/03/06	<0.02	ug/L	No
Azinphos-methyl	16/03/06	<0.1	ug/L	No
Bendiocarb	16/03/06	<0.2	ug/L	No
Benzene	16/03/06	<0.5	ug/L	No
Benzo(a)pyrene	16/03/06	<0.01	ug/L	No
Bromoxynil	16/03/06	<0.2	ug/L	No
Carbaryl	16/03/06	<0.2	ug/L	No
Carbofuran	16/03/06	<0.2	ug/L	No
Carbon Tetrachloride	16/03/06	<0.5	ug/L	No
Chlordane (Total)	16/03/06	<0.3	ug/L	No
Chlorpyrifos	16/03/06	<0.1	ug/L	No
Cyanazine	16/03/06	<0.1	ug/L	No
Diazinon	16/03/06	<0.1	ug/L	No
Dicamba	16/03/06	<0.2	ug/L	No
1,2-Dichlorobenzene	16/03/06	<0.5	ug/L	No
1,4-Dichlorobenzene	16/03/06	<0.5	ug/L	No
Dichlorodiphenyltrichloroethane (DDT) + metabolites	16/03/06	<0.4	ug/L	No
1,2-Dichloroethane	16/03/06	<0.5	ug/L	No
1,1-Dichloroethylene (vinylidene chloride)	16/03/06	<0.5	ug/L	No
Dichloromethane	16/03/06	<0.5	ug/L	No
2-4 Dichlorophenol	16/03/06	<0.5	ug/L	No
2,4-Dichlorophenoxy acetic acid (2,4-D)	16/03/06	<0.2	ug/L	No
Diclofop-methyl	16/03/06	<0.2	ug/L	No
Dimethoate	16/03/06	<0.1	ug/L	No

Dinoseb	16/03/06	<0.2	ug/L	No
Diquat	16/03/06	<7	ug/L	No
Diuron	16/03/06	<10	ug/L	No
Glyphosate	16/03/06	<10	ug/L	No
Heptachlor + Heptachlor Epoxide	16/03/06	<0.2	ug/L	No
Lindane (Total)	16/03/06	<0.1	ug/L	No
Malathion	16/03/06	<0.1	ug/L	No
Methoxychlor	16/03/06	<0.1	ug/L	No
Metolachlor	16/03/06	<0.1	ug/L	No
Metribuzin	16/03/06	<0.1	ug/L	No
Monochlorobenzene	16/03/06	<0.5	ug/L	No
Paraquat	16/03/06	<1	ug/L	No
Parathion	16/03/06	<0.1	ug/L	No
Pentachlorophenol	16/03/06	<0.5	ug/L	No
Phorate	16/03/06	<0.1	ug/L	No
Picloram	16/03/06	<0.2	ug/L	No
Polychlorinated Biphenyls(PCB)	16/03/06	<0.06	ug/L	No
Prometryne	16/03/06	<0.1	ug/L	No
Simazine	16/03/06	<0.1	ug/L	No
THM (NOTE: show latest annual average)	16/03/06 – 20/12/06	18.0	ug/L	No
Temphos	16/03/06	<0.1	ug/L	No
Terbufos	16/03/06	<0.2	ug/L	No
Tetrachloroethylene	16/03/06	<0.5	ug/L	No
2,3,4,6-Tetrachlorophenol	16/03/06	<0.5	ug/L	No
Triallate	16/03/06	<0.1	ug/L	No
Trichloroethylene	16/03/06	<0.5	ug/L	No
2,4,6-Trichlorophenol	16/03/06	<0.5	ug/L	No
2,4,5-Trichlorophenoxy acetic acid (2,4,5-T)	16/03/06	<0.2	ug/L	No
Trifluralin	16/03/06	<0.1	ug/L	No
Vinyl Chloride	16/03/06	<0.5	ug/L	No

List any Inorganic or Organic parameter(s) that exceeded half the standard prescribed in Schedule 2 of Ontario Drinking Water Quality Standards.

Parameter	Result Value	Unit of Measure	Date of Sample

(Only if DWS category is large municipal residential, small municipal residential, large municipal non residential, non municipal year round residential, large non municipal non residential)

**Part III Form 2
Section 11. ANNUAL REPORT.**

Drinking-Water System Number:	220000282
Drinking-Water System Name:	Loch Lomond Water Treatment Plant
Drinking-Water System Owner:	City of Thunder Bay
Drinking-Water System Category:	Large Municipal Residential
Period being reported:	January 1 – December 31, 2006

<p><u>Complete if your Category is Large Municipal Residential or Small Municipal Residential</u></p> <p>Does your Drinking-Water System serve more than 10,000 people? Yes [X] No []</p> <p>Is your annual report available to the public at no charge on a web site on the Internet? Yes [X] No []</p> <p>Location where Summary Report required under O. Reg. 170/03 Schedule 22 will be available for inspection.</p> <div style="border: 1px solid black; padding: 5px;"> <ul style="list-style-type: none"> -Bare Point Water Treatment Plant -All branches of the Thunder Bay Public Library -Environment Division Central Office -City Hall -Front Street Service Yard </div>	<p><u>Complete for all other Categories.</u></p> <p>Number of Designated Facilities served: <input style="width: 100px; height: 20px;" type="text"/></p> <p>Did you provide a copy of your annual report to all Designated Facilities you serve? Yes [] No []</p> <p>Number of Interested Authorities you report to: <input style="width: 100px; height: 20px;" type="text"/></p> <p>Did you provide a copy of your annual report to all Interested Authorities you report to for each Designated Facility? Yes [] No []</p>
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Note: For the following tables below, additional rows or columns may be added or an appendix may be attached to the report

List all Drinking-Water Systems (if any), which receive all of their drinking water from your system:

Drinking Water System Name	Drinking Water System Number

Did you provide a copy of your annual report to all Drinking-Water System owners that are connected to you and to whom you provide all of its drinking water? Yes [] No []

Indicate how you notified system users that your annual report is available, and is free of charge.

- Public access/notice via the web
- Public access/notice via Government Office (City Hall)
- Public access/notice via a newspaper
- Public access/notice via Public Request
- Public access/notice via a Public Library
- Public access/notice via other method City Newspaper Insert – “Your City”

Describe your Drinking-Water System

The Loch Lomond WTP treated an average of 18.5 ML per day of water from Loch Lomond using microfiltration and chlorination. Sodium silicate is added for corrosion control and the water is distributed to approximately 1/3 the population of Thunder Bay on the South side of the Neebing River. As part of the Bare Point expansion currently in progress, the reservoir at Loch Lomond will be replaced by a larger one on Hwy 61 and the Loch Lomond plant operations will be replaced by membrane filtration at Bare Point WTP.

List all water treatment chemicals used over this reporting period

Chlorine Gas (Microfiltration treatment)
Sodium Silicate
Citric Acid, Sodium hydroxide

Were any significant expenses incurred to?

- Install required equipment
- Repair required equipment
- Replace required equipment

Please provide a brief description and a breakdown of monetary expenses incurred

See the full Annual Report – Major Projects

Provide details on the notices submitted in accordance with subsection 18(1) of the Safe Drinking-Water Act or section 16-4 of Schedule 16 of O.Reg.170/03 and reported to Spills Action Centre

See South Distribution System Adverse Table in Annual Report

Microbiological testing done under the Schedule 10, 11 or 12 of Regulation 170/03, during this reporting period.

	Number of Samples	Range of E.Coli Results (min #)-(max #)	Total Coliform Results (min #)-(max #)	Number of HPC Samples	Range of HPC Results (min #)-(max #)
Raw	52	0 - 1	0 - 8	NA	NA
Treated	52	0 - 0 (absent)	0 - 0 (absent)	52	0 - 320
Distribution	950	Absent	3 present, rest absent	254	0 - 470

Operational testing done under Schedule 7, 8 or 9 of Regulation 170/03 during the period covered by this Annual Report.

	Number of Grab Samples	Range of Results (min #)-(max #)
Turbidity	8760	0.05 – 0.62 NTU
Chlorine	8760	1.45 – 2.47
Chlorine Residual Distrib. System	950	0.06 – 2.03
Fluoride (If the DWS provides fluoridation)	NA	NA

NOTE: For continuous monitors use 8760 as the number of samples.

*NOTE: Record the unit of measure if it is **not** milligrams per litre.*

Summary of additional testing and sampling carried out in accordance with the requirement of an approval, order or other legal instrument.

Date of legal instrument issued	Parameter	Date Sampled	Result	Unit of Measure
CofA #7206-575KCX	Chloramines	22/12/06	0.14	mg/L as Cl
CofA #7206-575KCX	Radionuclides – Gross Alpha	16/03/06	<0.1	Bq/L
CofA #7206-575KCX	Radionuclides – Gross Beta	16/03/06	<0.1	Bq/L
CofA #7206-575KCX	Radionuclides – Tritium	16/03/06	<1000	Bq/L
CofA #7206-575KCX	Orthophosphate	16/03/06 - 20/12/06	<0.003 – 0.015	mg/L
CofA #7206-575KCX	Reactive Silica	16/03/06 - 20/12/06	8.2 -12.5	mg/L

Summary of Inorganic parameters tested during this reporting period or the most recent sample results

Parameter	Sample Date	Result Value	Unit of Measure	Exceedance
Antimony	16/03/06	0.004	mg/L	No
Arsenic	16/03/06	<0.001	mg/L	No
Barium	16/03/06	<0.01	mg/L	No
Boron	16/03/06	<0.05	mg/L	No
Cadmium	16/03/06	<0.0001	mg/L	No
Chromium	16/03/06	<0.001	mg/L	No
Lead(Distribution System)	16/03/06	0.003	mg/L	No
Mercury	16/03/06	<0.0001	mg/L	No
Selenium	16/03/06	<0.005	mg/L	No
Sodium	16/03/06	3.68	mg/L	N/A
Uranium	16/03/06	<0.005	mg/L	No
Fluoride	(Done in 2003)			N/A
Nitrate	16/03/06 -	0.04 – 0.10	mg/L	No (done)

	20/12/06			quarterly
Nitrite	“	<0.02	mg/L	No (done quarterly)

Summary of Organic parameters sampled during this reporting period or the most recent sample results

Parameter	Sample Date	Result Value	Unit of Measure	Exceedance
Alachlor	16/03/06	<0.1	ug/L	No
Aldicarb	16/03/06	<9	ug/L	No
Aldrin + Dieldrin	16/03/06	<0.04	ug/L	No
Atrazine + N-dealkylated metabolites	16/03/06	<0.2	ug/L	No
Azinphos-methyl	16/03/06	<0.1	ug/L	No
Bendiocarb	16/03/06	<0.2	ug/L	No
Benzene	16/03/06	<0.5	ug/L	No
Benzo(a)pyrene	16/03/06	<0.01	ug/L	No
Bromoxynil	16/03/06	<0.2	ug/L	No
Carbaryl	16/03/06	<0.2	ug/L	No
Carbofuran	16/03/06	<0.2	ug/L	No
Carbon Tetrachloride	16/03/06	<0.5	ug/L	No
Chlordane (Total)	16/03/06	<0.3	ug/L	No
Chlorpyrifos	16/03/06	<0.1	ug/L	No
Cyanazine	16/03/06	<0.1	ug/L	No
Diazinon	16/03/06	<0.1	ug/L	No
Dicamba	16/03/06	<0.2	ug/L	No
1,2-Dichlorobenzene	16/03/06	<0.5	ug/L	No
1,4-Dichlorobenzene	16/03/06	<0.5	ug/L	No
Dichlorodiphenyltrichloroethane (DDT) + metabolites	16/03/06	<0.4	ug/L	No
1,2-Dichloroethane	16/03/06	<0.5	ug/L	No
1,1-Dichloroethylene (vinylidene chloride)	16/03/06	<0.5	ug/L	No
Dichloromethane	16/03/06	<0.5	ug/L	No
2-4 Dichlorophenol	16/03/06	<0.5	ug/L	No
2,4-Dichlorophenoxy acetic acid (2,4-D)	16/03/06	<0.2	ug/L	No
Diclofop-methyl	16/03/06	<0.2	ug/L	No
Dimethoate	16/03/06	<0.1	ug/L	No
Dinoseb	16/03/06	<0.2	ug/L	No
Diquat	16/03/06	<7	ug/L	No
Diuron	16/03/06	<10	ug/L	No
Glyphosate	16/03/06	<10	ug/L	No
Heptachlor + Heptachlor Epoxide	16/03/06	<0.2	ug/L	No
Lindane (Total)	16/03/06	<0.1	ug/L	No
Malathion	16/03/06	<0.1	ug/L	No
Methoxychlor	16/03/06	<0.1	ug/L	No

Metolachlor	16/03/06	<0.1	ug/L	No
Metribuzin	16/03/06	<0.1	ug/L	No
Monochlorobenzene	16/03/06	<0.5	ug/L	No
Paraquat	16/03/06	<1	ug/L	No
Parathion	16/03/06	<0.1	ug/L	No
Pentachlorophenol	16/03/06	<0.5	ug/L	No
Phorate	16/03/06	<0.1	ug/L	No
Picloram	16/03/06	<0.2	ug/L	No
Polychlorinated Biphenyls(PCB)	16/03/06	<0.06	ug/L	No
Prometryne	16/03/06	<0.1	ug/L	No
Simazine	16/03/06	<0.1	ug/L	No
THM (NOTE: show latest annual average)	16/03/06 - 20/12/06	50.1	ug/L	No
Temephos	16/03/06	<0.1	ug/L	No
Terbufos	16/03/06	<0.2	ug/L	No
Tetrachloroethylene	16/03/06	<0.5	ug/L	No
2,3,4,6-Tetrachlorophenol	16/03/06	<0.5	ug/L	No
Triallate	16/03/06	<0.1	ug/L	No
Trichloroethylene	16/03/06	<0.5	ug/L	No
2,4,6-Trichlorophenol	16/03/06	<0.5	ug/L	No
2,4,5-Trichlorophenoxy acetic acid (2,4,5-T)	16/03/06	<0.2	ug/L	No
Trifluralin	16/03/06	<0.1	ug/L	No
Vinyl Chloride	16/03/06	<0.5	ug/L	No

List any Inorganic or Organic parameter(s) that exceeded half the standard prescribed in Schedule 2 of Ontario Drinking Water Quality Standards.

Parameter	Result Value	Unit of Measure	Date of Sample
Total THM (running avg.)	50.1	ug/L	16/03/06 – 20/12/06

(Only if DWS category is large municipal residential, small municipal residential, large municipal non residential, non municipal year round residential, large non municipal non residential)