



**The City of Flin Flon**

**PUBLIC WATER SYSTEM  
ANNUAL REPORT**

**2010**

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## **Description of the Water System**

The City of Flin Flon Public Water System provides potable water to approximately 5,800 persons, about 250 of which live in Flin Flon, Saskatchewan (Statistics Canada 2006 Census). Treated water produced from the Cliff Lake Water Pumphouse currently meets most health and aesthetic objectives as regulated by the Guidelines for Canadian Drinking Water Quality, but will require several upgrades as stated in the Drinking Water Assessment conducted by UMA ENGINEERING LTD. (now AECOM). The Drinking Water Safety Act has increased the standard that must be met for drinking water, and any public water supplier must illustrate how it will meet these standards by 2012. Therefore, The City of Flin Flon will be constructing a new Water Treatment Plant and Reservoir intended to be online prior to the 2012 deadline.

There are more than 80 guidelines for drinking water quality. Flin Flon supplies high quality drinking water, and normally meets these guidelines. However, we are not always able to meet the guidelines for odour and trihalomethanes.

**Odour** is difficult to measure in water.

- One observer may notice a 'smell'; another may not.
- The Canadian guideline for odour states that drinking water must be 'inoffensive'.
- In the summer and fall, when there are higher amounts of organics, mainly algae, in our water, some consumers have found the smell of the water to be offensive by having a musty smell.
- During times that the smell may be unpleasant, it is still potable and you can continue to use the water.

### **Trihalomethanes (THMs)**

- THMs are formed when chlorine reacts with naturally occurring organic matter in the water.
- Several research studies show a possible link between consuming chlorinated water containing high levels of THMs over long periods of time (i.e. 35 years+) and certain types of cancer.
- According to some research, consuming chlorinated water containing high levels of THMs may have adverse effects on pregnancy.
- Although, so far, there is no conclusive evidence that THMs have a serious effect on our health, water suppliers are trying to keep THMs as low as possible.
- THM levels in drinking water are measured in mg/L, based on 4 quarterly samples and averaged over a 1-year period. Flin Flon's most current results show this average to be slightly above the Canadian standard.

*"Drinking water is disinfected with chlorine to kill bacteria and viruses that can cause serious illness and death. The chlorination of drinking water has virtually eliminated typhoid fever, cholera and many other waterborne diseases from the western world. Without adequate disinfection, the health risks from micro-organisms far outweigh the risks from THMs" – City of Winnipeg website.*

### **Water Supply Source**

The City of Flin Flon Cliff Lake Pumphouse receives water from Cliff Lake, located approximately 2200 m north of Heating Plant No. 2.

### **Water Treatment Process**

The treatment process consists of chlorination and fluoridation. Chlorine is added to the water at two points - the first is located at the Cliff Lake Pumphouse, and uses chlorine gas, and the second is a sodium hypochlorite port located at No. 1 Heating Plant. Fluoride is added at the Cliff Lake Pumphouse.

### Distribution System

The City of Flin Flon's distribution system consists of a raw water pumphouse, 2 supply mains, an elevated water tower, a ground level reservoir, 2 main heating/re-circulating plants, 1 secondary distribution plant, and a double main re-circulating system.

Treated water from the Cliff Lake Water Pumphouse is pumped to No. 2 Heating Plant, which is the first distribution point. Water is also pumped to the tower and reservoir which supply No. 1 Heating Plant as a distribution point, and No. 3 Heating Plant as a secondary distribution point.

The distribution system is a double main re-circulating system which is fed by supply mains to all connections. Return mains bring unused water back to a common header where this water is then re-distributed by the supply mains. Due to above ground and shallow bury water mains, the re-circulation is required to keep the water moving so it will not freeze during the winter months.

The distribution piping is mainly comprised of cast iron, ductile iron, PVC, polyethylene, and copper.

### Storage Reservoirs

Water Tower	Capacity	175,000 gallons
Water Reservoir	Capacity	675,000 gallons

Total water storage represents approximately 1 day of potable water storage.

### Number of Connections, Population Served and Types of Water Users

The City of Flin Flon is comprised of approximately 2300 service connections, 300 of which are metered, and the remaining are residential flat rate accounts.

### Classification and Certification

Under Regulation 77/2003, Water and Wastewater Facility Operators Regulation, The Environment Act, C.C.S.M. E125, the Province requires every Provider of water to have its system classified. It is the responsibility of the Provider to ensure its employees have minimum certification level, to the classified level of its systems. The City of Flin Flon's water facilities have the following classifications:

Class 1 Water Treatment Facility Classification

Class 2 Water Distribution Facility Classification

The City of Flin Flon's employees are certified as follows:

Employee	Water Treatment	Water Distribution
Rick BACON	Class II	Class II
Dennis STRINGER	Class II	Class II
Mike CONLEY	Class II	Class II
Jon EVANS	Class II	Class II
Mike WESEEN	Class II	Class II
Andy CHAISSON	Class II (Conditional)	Class II (Conditional)
Al FEHR		Class II
Andy JEDELE		Class II
Jon SMALLEY		Class II (Conditional)
Darren JOHNSON		Class II

## **Disinfection System in Use**

The City of Flin Flon uses chlorine as its only form of disinfection.

As per the Drinking Water Safety Act, The City of Flin Flon must ensure that a disinfection residual of at least:

0.5 mg of free chlorine per litre of water is detectable at the point where water enters the distribution system, after a minimum contact time of 20 minutes.

0.1 mg of free chlorine per litre is detectable at all times at any point in the distribution network.

### **Type of Disinfection System Used**

Chlorine is injected at 2 points in the distribution system – Cliff Lake, where chlorine gas is injected directly into the clear well; and No. 1 Heating Plant, where sodium hypochlorite 12% is injected via a single chlorine injection pump.

### **Equipment Redundancy & Monitoring Requirements**

The overall operational reliability of the system is very good. The operation reliability is likely attributable to the level of competence of the operations and maintenance staff, as well as some redundancies built into the system. Much of the critical equipment has inline spares as per the requirements of the Drinking Water Safety Act. The City of Flin Flon ensures continuous disinfection is maintained.

Disinfectant residuals are monitored daily at the Cliff Lake Pumphouse and periodically in the distribution system and recorded on the appropriate monitoring forms. Monthly Chlorination Forms are sent to the regional Drinking Water Officer at the end of each month.

### **Disinfectant Residual Overall Performance/Results**

For 2010, The City of Flin Flon met all regulatory requirements in regards to monitoring and reporting disinfection residuals leaving the Cliff Lake Pumphouse and in the distribution system 99% of the time (chlorine levels not recorded at Plant on March 31 and October 31). The requirement to have free chlorine residual in the distribution system was met 92% of the time, and at no time was the water tested and found to have zero chlorine residual (i.e. less than 0.01 mg/L).

## List of Water Quality Standards

In accordance with water quality standards adopted by the Province of Manitoba, the 2010 results for The City of Flin Flon Public Water System are summarized in the following table:

Testing Parameter	Standard	Frequency	Test Results
Bacteriological	0 Total coliforms/100 mL	Bi-weekly	96%
	0 <i>E.coli</i> /100 mL	Bi-weekly	96%
Chlorine (Leaving Cliff Lake)	0.5 mg/L	Daily	100%
Chlorine (Within Water Distribution System)	0.1 mg/L	Daily	92%
Trihalomethanes (THMs) (incl. Bromodichloromethane, bromoform, chloroform, dibromochloromethane)	0.1 mg/L	Quarterly Average	0.1267 mg/L
Lead *	0.01 mg/L	Annually	0.00230 mg/L
Antimony *	0.006 mg/L	Annually	<0.0002 mg/L
Arsenic *	0.010 mg/L	Annually	0.00235 mg/L
Barium *	1.0 mg/L	Annually	0.00925 mg/L
Boron *	5.0 mg/L	Annually	<0.010 mg/L
Cadmium *	0.005 mg/L	Annually	0.000916 mg/L
Chromium *	0.05 mg/L	Annually	<0.0010 mg/L
Dissolved Fluoride *	1.5 mg/L	Annually	0.75 mg/L
Nitrate & Nitrite-N - Dissolved *	10 mg/L	Annually	<0.0050 mg/L
Selenium *	0.01 mg/L	Annually	<0.0010 mg/L
Uranium *	0.02 mg/L	Annually	<0.0001 mg/L

\* The results for testing were provided by the Office of Drinking Water Officer, and the sample was taken during the Flin Flon Water Plant Inspection.

### TRIHALOMETHANES

Sample Date	Super K mg/L
February 3	0.093
May 7	0.131
August 4	0.136
November 3	0.146

## **Water System Incidents and Corrective Actions**

<b>Incident No.</b>	<b>Date</b>	<b>Description of Incident</b>
1	May 18/10	Low Positive Total Coliform (TC) Sample in Distribution System, Industrial Park Hydrants. Samples taken tested positive for a TC and no signs of <i>E.coli</i> (EC). Increased chlorine feed, flushed hydrants, retest done on supply line at 398 Queen Street, samples sent to Lab May 17/10. Results came back negative. Filled out Corrective Action Form and sent form to regional Drinking Water Officer along with test results at the end of the month.
2	May 25/10	Low disinfectant residuals in Distribution System, Hapnot Loop. Raised chlorine feed. Resample, results showed 0.13 mg/l. Filled out Corrective Action Form and sent form to regional Drinking Water Officer along with test results at the end of the month.
3	July 1/10	Low disinfectant residuals in Distribution System, Hillcrest Avenue Raised chlorine feed at No. 1 Heating Plant. Resample, results showed 0.09 mg/l. Filled out Corrective Action Form and sent form to regional Drinking Water Officer along with test results at the end of the month.
5	Sept. 4/10	Low Positive Total Coliform (TC) Sample in Distribution System, Mile 84 Loop. Samples taken tested positive for a TC and no signs of <i>Ecoli</i> (EC). Flushed hydrants, retest done on hydrant, Mile 84 Loop, samples sent to Lab Sept. 7/10. Results came back negative. Filled out Corrective Action Form and sent form to regional Drinking Water Officer along with test results at the end of the month.

## **Additional Records Required**

Fluoridation tests and records are maintained at City Hall.

## **Future System Expansion and/or Decreased Production**

The City of Flin Flon has been approved for funding through the Canada-Manitoba Infrastructure Program to construct a new Water Treatment Plant complete with reservoir and the rebuild of No. 2 Heating Plant. AECOM CANADA LTD. has been hired as Design Consultant for the duration of the project. This project is expected to tender in early March, with a 2011-12 construction schedule.