Public Water System Annual Report

March 20, 2015

Lac du Bonnet Water Treatment Facility

Town of Lac du Bonnet

Contact: Michelle Wazny, Chief Administrative Officer

Phone: 204-345-8693

Email: townldb@mts.net

Web:http//lacduBonnet.com/town

Water system Emergency# 204-345-3891

Operator: Raymond Avanthay, Senior operator/operator in charge

Business hours # 204-345-8693

Emergency# 204-345-3891
Alternate # 204-345-3124

Table of Contents

Introduction:

The 2014 Annual Report on the Lac du Bonnet Water Treatment Facility summarizes the Utilities ability to produce safe potable water to all users of the facility.

1. Description of the water system:

The Lac du Bonnet water system provides potable drinking water to a population of 1069 residents (2011 Census) as well as many other bulk and pail fill users in the rural areas around the town of Lac du Bonnet. Treated water produced @ our facility not only meets but exceeds all health and aesthetic objectives to date as stated in the *Guidelines for Canadian Drinking Water Quality.*

1.1 Water supply source + Intake Structures

Lac du Bonnet Water Treatment Facility draws surface water from the Winnipeg River System located approximately ½ a kilometer South East of the Water Treatment Plant, at the East end of McIntosh St. The Wet Well is gravity fed from the Winnipeg River. Raw water is pumped to the Water Treatment Facility when required by either of the two pumps. Each pump alternates pumping water daily, these pumps are always in use and ready to supply water. Having 2 pumps also insures a backup is always ready in case one should fail, this system only requires one pump to run when the plant is in operation. The pump house is fully winterized and heated, there is pre-heated diesel generator for a backup power supply, which switches on instantly and starts up if there is a power failure to ensure full operation of all equipment in this building needed to supply water to the treatment facility.

1.2 Water Treatment Process

The Lac du Bonnet Water Treatment Facility use a multi barrier treatment process to treat the raw water from the river, it uses a state of the art (built in 2003) Actiflo/dusenflo system which entails the raw water to be pumped into a flash mix station along with a coagulant chemical which is pumped by a metering pump, which helps draw particles out of the water it then flows under a small barrier wall where a coagulant aid (Polymer Clearfloc CP 1065) is pumped by a metering pump to another mixing station where silica sand is pumped through a hydro-cyclone unit, the sand, along with the coagulant and polymer, help bond even the smaller particles together to be sent into the Maturation mixer which is a slow mixing process to form larger particles called floc. After this maturation mixing station it flows under another barrier wall and comes up through a set of settling tubes, where most of the particles joined together settle out and are removed and the sand and sludge from the water are recycled through the hydro-cyclone system where the sludge is run to waste and the sand is re-used. The water from this point continues to flow upwards to a set of weirs and is then sent to 2 multi- media gravity filters

where most of the remaining Turbidity (nephelometric turbidity units(NTU)) is removed from the water. It then

flows through the UV system using ultra violet lights to neutralize or kill bacteria, and from this point flows into the Clear well which at this point the water is chlorinated(disinfected) by sodium hypochlorite(liquid chlorine) pumped by a metering pump. It is then monitored and tested daily for chlorine residuals. As per the *Drinking water safety act* the Lac du Bonnet Water Treatment plant operator must ensure a disinfectant residual of at least:

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

*0.1 mg/L of free chlorine is detectable at all times at any point in the distribution system.

1.3 Water storage reservoirs:

The reservoirs contain treated water to be supplied to the residents and other users at all times, they consist of 3 chambers beneath the plant and one exterior reservoir directly south of the plant. The exterior chamber holds 1,246,000L, chamber 1 beneath the plant holds 278,000 L, chamber 2 beneath the plant holds, 99,600 L, and chamber 3 holds 91,000 L, to come to a total of 1,714,600 L of treated water. The water used is replenished every day.

1.4 Distribution System

The distribution system consists of 3 turbine pumps at the treatment facility. One is the Jockey pump which pumps all the time and is smaller than duty pumps 1+2. Both duty pumps 1 and 2 are the same size but alternate pumping water only as required. When the distribution system requires more water the pumps moderately increase in speed and when the system requires less they gradually decrease in speed to ensure proper pressures and flow. The underground distribution system consists of many different sizes and types of piping including: cast iron, pvc(series160 and c900 blue brute) and copper, and sizes vary from 3/4" up to 10" in diameter.

1.5 # of Connections, types of users and population served

There are 526 connections to our distribution system users consist of commercial, home, bulk and pail fill users. The population served to date is 1069 as well as all bulk fill and pail fill users.

1.6 Classification and certification

The classification of Lac du Bonnet treatment facility is a Level 2.
Certification of operators is as follows:
Raymond Avanthay Operator in Charge Level 3
Richard West Level 3 Certification
Geoff Blacklin Level 1 Operator in Training
The operator in charge holds all required licenses for the safe operation of this particular facility. Operators must attend other courses and conferences to maintain CEU'S (continuing education units). And apply for a license renewal every 5 years. They must obtain a certain limit of CEU's to be able to renew their license.

2. Disinfection system in use

2.1 Type of disinfection system being used:

The Lac du Bonnet Water Treatment Plant uses two disinfection systems that include, a UV Disinfection system and a Chlorination System to meet government regulations.

The first system is the UV system. This system uses UV rays to eliminate the organics before the chlorine is added to the system.

The second disinfection system is chlorination. The Water plant uses sodium hypochlorite at a 12% solution which is added to the water after the UV system. A metering pump is used to inject the chlorine to the system at a specific dosage rate to maintain optimal free chlorine values in the reservoirs. We have two metering pumps that are online and fully operational and used in rotation to ensure that both pumps are in good working order. If one of these pumps should fail we carry a back-up pump on hand that could be quickly installed to maintain the two pump system.

The Water Treatment system has a multi barrier alarm system that notifies the operator if the free chlorine limits reaches a certain level. This alarm would signal the plant to shut down and allow the operator to get to the plant and correct the dosage to maintain compliance with the drinking water regulations.

In the event of a power outage the water plant has a back-up generator to ensure uninterrupted and continuous power to the water treatment plant and distribution system to not only treat the water but supply safe drinking water at all times.

2.2 Equipment monitoring requirements and redundancy program:

Chlorine residuals are monitored 24/7/365. They are monitored continuously by an online analyzer, twice daily through manual readings done by the operator, and also bi-weekly in the distribution system as per our operating license requirements. These readings are recorded on monthly chlorination forms which are sent to the drinking water officer for review at the end of every month.

As required by the drinking water safety act the Lac du Bonnet Water treatment operators ensure continuous disinfection is maintained at the plant by keeping stock of all spare parts for the chlorinator plus 1 complete back up chlorinator ready to use at all times.

2.3 Disinfectant residual overall performance and results

For 2014, the Lac du Bonnet Water Treatment facility has met all regulatory requirements in regards to monitoring and reporting disinfection residuals leaving the facility.

3. List of water quality standards:

The province of Manitoba has adopted a number of water quality standards from the *Guidelines for Canadian drinking water quality*, developed by Health Canada. The parameters are health-based and they express the (MAC) Maximum Acceptable Concentrations for drinking water. Concentration values in excess constitute a health related issue and require corrective actions. The Aug 2012 results of these regulatory requirements are as follows:

Parameter	Quality Standard
Total coliform and E.coli	Less than one E.coli and total coliform bacteria detectable per 100 mL in all treated and distributed water
Chlorine residuals	* A free chlorine residual of at least 0.5mg/L in water entering the distribution system following a min. contact time of 20 minutes * A free chlorine residual of at least 0.1mg/L at all times at any point in the distribution system
Total Trihalomethanes(to include bromodichloromethane, bromoform, chloroform, dibromochloromethane	Less than or equal to 0.10mg/L as an annual average of quarterly samples

Turbidity	Less than or equal to 0.3 NTU in 95% of the measurements in a month of the effluent from each operating particulate filter Not exceed 0.3 NTU for more than 12 consecutive hours of filter operation or for 2 consecutive daily measurements Not exceed 1.0 NTU for any continuous or daily measurement
Lead	Less than or equal to 0.010mg/L

3.1 Disinfection Monitoring and reporting	Regulatory Requirements	PWS Performance
Free chlorine residual entering distribution system	**> 0.5 mg/L**	**100%**
Frequency of testing entering distribution system	**Daily**	**100%**
Free Chlorine residual in distribution system	**>0.1 mg/L**	**96.15%**
Frequency of testing in distribution system	**Bi-weekly**	**96.15%**
Report Submissions	**Monthly**	**100%**

3.2 Bacteriological Monitoring and reporting

	Regulatory requirement	**PWS Performance**
Number of raw/incoming water samples	26	25
Number of treated water samples	26	25
Number of distribution water samples	26	25
Frequency of testing	Bi-weekly	96.15%
Total Coliform present in samples	0 TC per 100ml	96.15%
E. Coli present in samples	0 EC per 100ml	96.15%

The Pubic Water System has not met their regulatory requirements for 2014 due to 1 separate inadvertently missed one bi-weekly sample in January.

3.3 Physical Monitoring and Reporting

	Regulatory requirement	PWS performance
Chemically assisted, rapid gravity filtration process	< 0.3 NTU in at least 95% Of the samples taken per Month	100%
	Not to exceed 0.3 NTU	100%

	For more than 12continuos Hours where continuous measurements Are taken	
Frequency of testing	Continuous	100%
Report Submissions	Monthly	100%

3.4 Disinfection By-products Monitoring and Reporting

	Regulatory Requirements	PWS performance
Trihalomethane sampling requirements	4 times per year	50%
Total Trihalomethane Standard	0.10 mg/L	100%
Annual quarterly average	.047 /.052	100%

(This was the average from the two submitted samples for plant/distribution)

2 quarterly samples one was missed and the other was sent to the laboratory but the wrong testing was carried out on the sample.
To maintain due diligence and to keep good practice, the WTP operator reported 18 corrective actions reports. All events were related to general maintenance of the on-line turbidity equipment. The treatment plant was not in production at the time of these exceedances and they were not related to finished water production and corrective action reporting was not required. All corrective actions reports are attached.

The standards for Trihalomethanes is based on a running average of quarterly samples taken seasonally(usually submitted in March, June, September and December) which were completed for 2009, 2010, 2011 2012 season. Sampling THM's are required on a Bi-annual basis but will be sampled and submitted quarterly in 2015.

Health Canada initially established the Bromodichloromethane (BDCM) guideline because studies at the time indicated that there may be acute health effects associated with the compound. More recent research shows that BDCM does not have an acute health effect and Health Canada has rescinded the BDCM guideline. Manitoba water utilities are no longer required to meet the 0.016mg/L BDCM standard. Although it has been rescinded BDCM continues to be a component of Total THM's and their concentrations will be monitored accordingly, and we will continue to make every effort to reduce total THM concentrations(including BDCM) to as low of a level as possible.
Haloacetic acids are also chlorine disinfection by-products found in drinking water. In 2008, Health Canada established a guideline of 0.08mg/L for HAA's. It is anticipated that this guideline will be adopted as a standard in Manitoba in the future. HAA analysis was submitted in 2008 and the results for our system were 0.018mg/L which is below the guideline.

3.5 Water Chemistry Analyses

The Office of Drinking Water did submit water samples from the Lac du Bonnet PWS for chemical analyses for 2013. This action is considered to fulfill the general chemistry monitoring requirement outlined in our Operating license. The report (attached) indicated that the treated water met all health related guidelines as stipulated in health Canada's Guidelines for Canadian Drinking Water Quality. (http//www.hc-sc.gc.ca/ewh-semt/water-eau/drink-potb/guide/index_e.html), in addition we submitted samples ourselves in March, June, October and December as a part of our ongoing monitoring of the performance of the treatment facility.

4. Water System Incidents and corrective actions

The corrective action form was introduced in the *operational guidelines for monitoring and reporting-public and semi-public water systems*. This form is to be completed in instances where a non-compliance issue is observed but easily fixed.

The form specifies the following non-compliance incidents

* Low disinfection residual entering the distribution system, 21(1) MR 40/2007
* Low disinfection residual in the distribution system, 22 MR 40/2007
* Filtered water turbidity exceeding the turbidity standards, 6(1) MR 41/2007
* Low positive total coliform (<10 CFU/100mL) 3 MR 41/2007
* Other- small water main repairs etc.

Once completed the form is to be signed by the operator-in-charge and sent to the regional drinking water officer at the end of each month. Copies must be kept for a minimum of 24 months. There were several separate reports made in 2014, All of which were not required due to general maintenance of the turbidity meters and were only written to keep good practice, others were issues with chemical feed pumps air locking and resulted in a restart of the plant, all proper steps were taken to ensure proper operations of plant to meet guidelines. All reports are attached at end of annual reports.

5. Drinking water safety orders and actions taken:

In 2014, no drinking water safety orders were issued for the Lac du Bonnet Public Water System.

6. Boil Water advisories issued and actions taken in response

In 2014, no boil water advisories were issued for the Lac du Bonnet public water system.

7. Warnings issued or charges laid on the system in accordance with The drinking Water Safety Act

In 2014, no charges laid or warnings were received by the Lac du Bonnet Public water system.

8. System expansion and/or increased production

There were no system expansions or increased production plans for 2014.

9. Summary:

Currently the Lac du Bonnet treatment plant is having some re programming done on the computer system to allow for more accurate online monitoring of turbidity of its Actiflo and filtering systems

If you wish to obtain a copy of this report you can go to our website Web:http//lacduBonnet.com/town and download it or go to the Town office and request a copy of the report.