



PUBLIC WATER SYSTEM ANNUAL REPORT

2013

TOWN OF BEAUSEJOUR

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1.0 INTRODUCTION

The operation of all public water systems in Manitoba is regulated in part by the Drinking Water Safety Regulation (40/2007). Section 32(1) of the Regulation (MR40/2007) requires all public water systems serving 1000 or more people to produce an annual report regarding the operation of the system.

2.0 PURPOSE

The purpose of this annual report is to provide the residents of Beausejour with:

1. Easy access to information related to the quality of the water they consume and the system that produces and transports the final product into their homes.
2. Assurance that the quality of the water they consume meets all of the requirements for aesthetic objectives as stated in the *Health Canada (2012) Guidelines for Canadian Drinking Water Quality—Summary Table*.
3. Assurance that the water system is operated to remain in compliance with *The Drinking Water Safety Act* and its supporting regulations.
4. Assurance that the water system complies with the conditions stipulated in the Public Water System Operating Licence PWS-08-203-01 issued by Manitoba Conservation and Water Stewardship – Office of Drinking Water.
5. A report on the accountability of the Town of Beausejour to be in compliance with the regulatory requirements governing the provision of safe drinking water.

3.0 DESCRIPTION OF THE WATER SUPPLY, TREATMENT AND MONITORING

3.1 Water Supply Source

The Town of Beausejour draws water from the Lower Carbonate Aquifer, which lies approximately 21 – 24.5 metres below the ground surface. The major recharge area for this aquifer is located in the vicinity of Ross, an area south of Provincial Trunk Highway 15, south east of Beausejour. The Town has Water Rights Licence #2005-023 that allows it to with draw up to 450 cubic decameters (364.82 acre feet) annually from the aquifer.

Three raw water supply wells have been drilled into this aquifer. All three wells are located on the Water Treatment Plant property at 914 Park Avenue. Well #1 was drilled in 1957 and is housed in the Water Treatment Plant building. This well was developed to produce water at a rate of 9.5 liters per second (125 imperial gallons) per minute. Well #2 was drilled in 1962 and is housed in a separate building in the south east corner of the property near Ashton Avenue. This well was developed to produce water at a rate of 15 liters per second (200 imperial gallons per minute). Well #3 was drilled in 1995 and is housed in a separate building along the east side of the property about midway between Park Avenue and Ashton Avenue. This well was developed to produce water at a rate of 22.5 liters per second (300 imperial gallons per minute).

Well #1 on its own cannot supply enough water to meet the normal daily demand for water by the Town. It is exercised on a regular schedule and samples are drawn quarterly to ensure the water remains fresh and safe. It can be run in conjunction with Well #2 to supply raw water to the Treatment Plant in times of high demand.

Under normal operating conditions Wells #2 and #3 alternate to supply raw water to the Water Treatment Plant. The treated water is stored in the under ground reservoir. The level of water in the under ground reservoir controls the operation of the well pumps and the Water Treatment Plant to keep the level in the reservoir between 3.9 and 4.3 metres (13 and 14 feet). During periods of high demand the Treatment Plant Controls are set so that either Well #3 is run or Well #1 and Well #2 are run together to supply water at higher rates.

A natural gas fired 55 KW Onan Stand-by Generator c/w Automatic Transfer Switch supplies power to the Water Treatment Plant and Well Pumps in the event of a power outage.

3.2 Water Treatment and Disinfection

The original Water Treatment Plant was built in 1957 to house Well #1 and two pressure filters 1.67 metres (5.5 feet) in diameter, piping and related equipment. The two filters have a rated filter capacity of 7.9 liters per second (125 US gal per minute). In 1962 an addition was built onto the Water Treatment plant for two more pressure filters. A second addition to the Water Treatment Plant was built in 1976. This addition houses two more pressure filters bring the total number of filters to six for a rated total filter capacity of 23.6 liters per second (375 US gal per minute). The reported rated capacity of the Treatment Plant is actually 22.5 liters per second (300 imperial gallons per minute) to allow for filter maintenance and in house water use. The 1976 addition included a separate room for the gas chlorination equipment.

As with all ground water sources, the raw water Beausejour draws from the aquifer contains dissolved minerals and metals. With the exception of iron, the raw water meets all the drinking water standards as set out by the *Health Canada (2012) Guidelines for Canadian Drinking Water Quality—Summary Table*.

Iron does not pose a health concern, but is listed under aesthetic water quality parameters. Iron can cause staining of laundry and plumbing fixtures. Iron can also cause build up of materials in the distribution piping reducing the overall capacity of the system.

The treatment process to remove iron from the raw water is a chemical free process. Compressed air is injected into the flow of water immediately up stream of the filters. The air is broken up into many tiny bubbles by what is called an atomerator. The atomerator distributes the bubbles uniformly through the water column. The oxygen in the air reacts with the dissolved iron to form a solid precipitate, which is removed by filtration. The iron precipitate is flushed out of the filters to waste during the regular backwash cycle. Excess air introduced to the water is vented through air bleed valves at the top of each filter.

Because the raw water is drawn from a carbonate aquifer it also contains considerable quantities of dissolve calcium carbonate. This causes the water to be considered hard.

Evidence of the hardness can be seen by the soap ring in the sink after you wash your hands and the scale build up in kettles, coffee makers and hot water tanks.

The Beausejour water treatment process does not treat for hardness. Those people wishing to have the luxury of soft water for their laundry and baths can install their own individual water softeners. The modern water softeners have the ability to measure the water being treated by the unit and can determine the optimal time to regenerate the ion exchange media. The Town recommends that home owners to set their softeners to 23 grains of hardness for the best results. The Town also recommends that after power outages the owners adjust their softener clocks to the correct time. Softeners are set to regenerate during the night when water is not normally being used. If they regenerate when water is in use they impart a salty taste to the water.

The final step in the water treatment process is disinfection. Disinfection is defined as the selective destruction or inactivation of potential disease causing organisms in water. The chemical most commonly used is chlorine. The Town of Beausejour uses chlorine gas to disinfect the water. Chlorine in a gaseous form is injected at rate determined by the pumping rate of each pump through an injector into a separate stream of water under distribution system pressure. This stream of water/chlorine is then injected into the treated water as it leaves the water treatment plant for storage into the underground reservoir.

The Town of Beausejour operates two chlorinators each mounted separately on its own 68kg tank of chlorine gas. Normally only one chlorinator is in operation at any time. Once its tank runs empty the system switches over to the other chlorinator automatically. In this manor one chlorinator is in reserve back up at all times. The Town also keeps a stock of spare parts required for the chlorination system as well as a complete new chlorinator.

Disinfection residuals are monitored daily at the water treatment plant and periodically at various points in the distribution system and recorded and reported in accordance with *The Drinking Water Safety Act*.

The following table identifies the parameters, the target requirements and the performance of the Town Public Water System with respect to disinfection monitoring and reporting.

Disinfection Monitoring and Reporting		
Parameter	Regulatory Requirement	Beausejour Public Water System Performance
Free chlorine residual entering distribution system - Section 21(1) a – MR 40/2007	≥ 0.5 mg/l	100%
Frequency of testing Schedule A – MR 40/2007	Daily	100%
Free chlorine residual in the distribution system	≥ 0.1 mg/l	100%
Frequency of testing Schedule A – MR 40/2007	Bi-weekly	100%
Frequency of testing Section 22 a – MR 40/2007	Monthly	100%
<u>Comments:</u> The Town of Beausejour Public Water System has met their regulatory requirements for 2013.		

3.3 Bacteriological Monitoring of Raw and Treated Water

Every two weeks the Town collects three samples; one from the raw water entering the water treatment plant (samples are alternated between Wells #2 & #3, and an extra sample is submitted for Well #1 when required), one from treated water leaving the water treatment plant, and one of the water from the distribution system. The samples are taken and submitted to ALS Environmental to test for the presence or absence of Total Coliform Bacteria and E-Coli Bacteria. The following table identifies the parameters, the target requirements and the performance of the Town Public Water System with respect to bacteriological monitoring and reporting.

Bacteriological Monitoring and Reporting		
Parameter	Regulatory Requirement	Beausejour Public Water System Performance
Number of raw/incoming water samples Schedule A – MR 40/2007	26	100%
Number of treated water samples Schedule A – MR 40/2007	26	100%
Number of distribution water samples Schedule A – MR 40/2007	26	100%
Frequency of testing Schedule A – MR 40/2007	Bi-weekly	100%
Total Coliform present in samples Section 3(1) a – MR 41/2007	< 1 TC per 100mL	100%
E – Coli present in samples Section 3(1) a – MR 41/2007	< 1 EC per 100mL	100%
<u>Comments:</u> The Town of Beausejour Public Water System has met their regulatory requirements for 2013.		

3.4 List of Water Quality Standards – Aesthetic Criteria

The following table identifies the aesthetic criteria set by *The Guidelines for Canadian Drinking Water Quality, 6th Edition, 1996, updates to April 1999* and the results of testing of the Town of Beausejour's raw untreated water and treated water in comparison to the aesthetic criteria parameters.

Water Quality Standards				
Parameters Aesthetic Criteria	Raw Water	Treated Water	Aesthetic Objective	Units
Total Dissolved Solids - TDS	460	512X	500	mg/l
Dissolved Chloride - Cl	34.1	36.6	250	mg/l
Dissolved Sulfate - SO ₄	58.1	60.9	500	mg/l
pH, laboratory	8.44	8.50	6.5-8.5	pH units
Total Alkalinity - CaCO ₃	313	316		mg/l
Bicarbonate Alkalinity - HCO ₃	362	359		mg/l
Carbonate Alkalinity - CO ₃	7.54	10.3		mg/l
Hydroxide Alkalinity - OH	<0.4	<0.4		mg/l
Copper - Cu	0.0114	0.0056	1.0	mg/l
Iron - Fe	2.73X	0.11	0.3	mg/l
Manganese - Mn	0.032	0.015	0.05	mg/l
Sodium - Na	24.8	25.9	200	mg/l
Zinc - Zn	0.012	<0.050	5.0	mg/l
<u>Comments:</u> The Public Water System met their regulatory requirements.				

mg/l = milligrams per liter

< = Less than detection limit

X = result is outside the aesthetic limit

The results in are from the analysis of water samples collected by Manitoba Water Stewardship – Office of Drinking Water's Chemistry Audit sampled on December 1, 2011 and submitted to ALS Environmental for analysis. These results for these parameters were part of the Office of Drinking Water's Chemical Audit. As a groundwater source, a chemical analysis is only required every 3 years. The next chemical analysis will be required by 2014.

3.4 List of Water Quality Standards – Health Criteria

The following table identifies those water quality standards for a ground water supply source adopted by the Province of Manitoba from the *The Guidelines for Canadian Drinking Water Quality 6th Edition, 1996, updates to April 1999*. The results are categorized by health concerns and any parameter in excess of the maximum accepted quality standard constitutes a health-related issue and requires corrective action.

Water Quality Standards				
Parameters Health Criteria	Quality Standard	Test Frequency	Test Results	Units
Total Coliform & E. coli	No TC & E. coli	Bi-weekly	100% Passed	per 100ml
Chlorine Residual	>0.5 WTP	Daily	100% Compliance	mg/l
	Distribution (0.1)	Periodically	100% Compliance	mg/l
Dissolved Fluoride - F	1.5	One Raw & One Treated Sample Every Three Years	0.22	mg/l
Nitrate and Nitrite - N	10		0.16	mg/l as N
Arsenic - As	0.025		0.0005	mg/l
Lead - Pb	0.01		0.0001	mg/l
Uranium - U	0.02		0.0005	mg/l
Trichloroethylene	0.005		<0.50	mg/l
Tetrachloroethylene	0.03		<0.50	mg/l
Benzene	0.005		<0.50	mg/l
<u>Comments:</u> The Public Water System had met their regulatory requirements.				

mg/l = milligrams per liter

< = less than detection limit

The results in are from the analysis of water samples collected by Manitoba Water Stewardship – Office of Drinking Water’s Chemistry Audit sampled on December 1, 2011 and submitted to ALS Environmental for analysis. These results for these parameters were part of the Office of Drinking Water’s Chemical Audit. As a groundwater source, a chemical analysis is only required every 3 years. The next chemical analysis will be required by 2014.

4.0 DESCRIPTION OF WATER DISTRIBUTION SYSTEM

Water leaving the Treatment Plant is stored in the concrete underground reservoir located immediately to the south of the plant. The reservoir capacity is 3,400 cubic metres (750,000 Imperial gallons). Under normal water use this approximately three days of reserve supply.

Two 25 horsepower service pumps alternate to supply water to the distribution system. Excess water pumped to the distribution system is stored in the Water Tower (Elevated Reservoir). The Water Tower has a storage capacity of 285 cubic metres (62,500 Imperial gallons). The water level in the tower controls the operation of the service pumps and supplies the water pressure to the distribution system. The normal range of operation for the water tower level is 85 to 97 percent. This represents a variance of approximately one half pound per square inch of water pressure. At the base of the Water Tower the pressure is 296 kilopascals (43 pounds per square inch).

A natural gas fired Fire Pump is available to supply water to the distribution system in the event of a power failure. The water level in the water tower controls the operation of the Fire Pump. The range of operation with the Fire Pump for the water Tower level is 65 to 97 per cent.

The water distribution system is made up 27,764 meters (91,089 feet) of water main piping ranging from 25 millimeter (1 inch) diameter up to 250 millimeter (10 inch) diameter. The 250 millimeter (10 inch) and 200 millimeter (8 inch) water mains serve as arterial branches while the majority of the piping is 150 millimeter (6 inch) diameter. The system is complimented by 166 fire hydrants and 224 main valves. Most of the watermain piping material, about 69 % is cast or ductile iron installed between 1957 and 1985. The remaining 31% of piping material is PVC plastic pipe installed after 1985.

5.0 CLASSIFICATION AND CERTIFICATION

Regulations M.R. 77/2003 and amendment M.R. 162/2005 under the Environment Act (C.C.S.M. c. E125) regulate the Classification of all Water or Wastewater Facilities and the Certification of all Water and Wastewater Facility Operators in Manitoba.

All Water and Wastewater Facilities were required to make application for Classification before January 3, 2006. The Classification for Beausejour Water Treatment (WT) and Water Distribution (WD) is Class I WT (Iron Removal); Class II WD.

As of September 1, 2006 all owners of Water and Wastewater Systems must employ only Provincially Certified Operators. The two Operators assigned to the Water Works Department are certified as follows:

Soren Thogersen	Lead Hand Utility	WT Class I	WD Class II
Darryl Mazur	Operator 1 Level 3	WT Class I	WD Class II

In addition to the Operators normally assigned to the Utility, the Town of Beausejour requires all other operators in Works and Operations to have or obtain Provincial Certification. The Certification level of the other staff in Works and Operations is as follows:

Allan Murash	Lead Hand Public Works	WT Class II	WD Class II
Andy Severinsen	Operator 2 Level 3	WT Class I	WD Class I
Dave Brown	Operator 1 Level 2	WT Class I	WD Class I
Kevin Mazur	Operator 1 Level 1	WT Class I	WD Class I
John Proceviat	Operator 2 Level 1	WT Training	WD Class I
Carl Schapansky	Operator 1 Level 1	WT Training	
Chris Trupish	Director of Operations	WT Training	

The Town continually supports its Operators by sending them to training Courses and Seminars. All new and existing staff is required by legislation to write examinations to obtain their Provincial Operators Certification.

The Town continues to maintain an Operator On-Call Program. Works and Operations Operators rotate to take on On-Call duties. To report an emergency to the Town please call (204)268-7555 and leave a message. The Operator On-Call will be paged and alerted to the emergency. New staff members do not participate in the Operator On-Call Program until they are Provincially Certified Operators.

6.0 WATER SYSTEM INCIDENTS AND CORRECTIVE ACTIONS

In 2013, no Water System Incidents had occurred.

7.0 DRINKING WATER ORDERS AND CORRECTIVE ACTIONS TAKEN

In 2013, no Drinking Water safety Orders were issued.

8.0 BOIL WATER ADVISORIES ISSUED AND ACTIONS TAKEN IN RESPONSE

In 2013, no Boil Water Advisories were issued.

9.0 WARNINGS ISSUED, CHARGES LAID IN ACCORDANCE WITH THE DRINKING WATER SAFETY ACT

In 2013, no charges or warnings were issued.

10.0 MAJOR EXPENSES INCURRED

10.1 Water Treatment Plant

A new air compressor was installed to feed the Atomerators at a cost of \$20,000.

Waterworks staff installed back-up rebuilt pumps due to normal wear found on wear rings. Work pumps sent to be re-built at a cost of \$12,000.

Repairs to the Fire Pump were necessary as leaks were visible near the water-cooled exhaust manifold. The manifold was machined and new gaskets installed at a cost of \$6,000.

Cl₂ Chlorinators were re-built and a new smart valve controller was installed. A new spare was ordered at the same time at a cost of \$6,000.

10.2 Distribution System

The watermain flushing program completed approximately 33% of the Town's watermains in 2013.

A new hydrant and valve were installed on Poplar Avenue.

In January a 150 mm ductile iron watermain break on Elm Avenue was repaired.

In October a 200 mm ductile iron watermain break on James Avenue at 5th Street South was repaired. Four holes were discovered in approximately 1.5 meters of the piping and replaced with C900 PVC piping.

No positive samples or re-tests were required.

11.0 SYSTEM EXPANSION AND/OR INCREASED PRODUCTION

There were 15 new service connections to the distribution system serving 20 units.

12.0 FUTURE SYSTEM EXPANSION AND/OR INCREASED PRODUCTION

An engineering consultant has started to assess the requirement for a new water treatment plant to address aging infrastructure and the future growth of Beausejour.