



**PUBLIC WATER SYSTEM ANNUAL REPORT**

**-2010-**

**TOWN OF BEAUSEJOUR**

**WATER WORKS DEPARTMENT**

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Date Updated:

March 18, 2011

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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 (MR40/2007), which came into force on March 1, 2007. Section 32(1) of the Regulation (MR40/2007) requires all public water systems serving 1000 or more people to produce an annual report about the operation of the system.

## **2.0 Purpose:**

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

1. Easy access to information related to the quality of the water they consume and the system that produces and transports to the taps in their homes.
2. Assurance that the quality of the water they consume meets all the requirements for aesthetic objectives as stated in the “Guidelines for Canadian Drinking Water Quality” and the health objectives consistent with the standards listed on the Public Water System Operating Licence PWS-08-203 issued by Manitoba Water Stewardship – Office of Drinking Water.
3. 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.
4. Answers to questions most often asked.

## **3.0 Description of the Water Supply, Treatment, & Monitoring**

### **.1 Water Supply Source:**

The Town of Beausejour draws water from the Lower Carbonate Aquifer, which lies approximately 70-80 feet below the ground surface. The major recharge for this aquifer is the Ross area south of Hwy. #15, south east of Beausejour. The Town has a 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 with-in the Water Treatment Plant building. This well was developed to produce water at a rate of 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 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 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 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.

## **.2 Water Treatment:**

The original Water Treatment Plant was built in 1957 to house Well #1 and two pressure filters 5.5 feet in diameter, piping and related equipment. The two filters have a rated filter capacity of 125 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 375 gal. per minute. The reported rated capacity of the Treatment Plant is actually 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 “Guidelines for Canadian Drinking Water Quality” 6<sup>th</sup> Edition, 1996 including updates to April 1999.

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.

### .3 List of Water Quality Standards

Table #1 list the results of the analysis of Beausejour water samples to the Aesthetic Objectives as set by “Guidelines for Canadian Drinking Water Quality” 6<sup>th</sup> Edition, 1996, updates to April 1999.

<b>TABLE 1</b>						
<b>TOWN OF BEAUSEJOUR</b>						
<b>WATER QUALITY COMPARISON TO "GUIDELINE FOR CANADIAN DRINKING WATER"</b>						
<b>FOR POTABILITY (Aesthetic Criteria) IN WATER</b>						
<b>Conventional Parameters</b>			<b>Raw Water</b>	<b>Treated Water</b>	<b>Aesthetic Objective</b>	<b>Units</b>
<b>Aesthetic Criteria</b>						
Total Dissolved Solids			455	510X	500	mg/l
Dissolved Chloride	Cl		35.5	55.8	250	mg/l
Dissolved Sulphate	SO4		59.9	69.1	500	mg/l
ph, laboratory			7.47	7.51	6.5-8.5	ph units
Total Alkalinity	CaCO3		314	310		mg/l
Bicarbonate Alkalinity	HCO3		383	378		mg/l
Carbonate Alkalinity	CO3		<0.5	<0.5		mg/l
Hydroxide Alkalinity	OH		<0.5	<0.5		mg/l
Copper	Cu		0.0024	0.0052	1.0	mg/l
Iron	Fe		1.67X	0.03	0.3	mg/l
Manganese	Mn		0.028	0.016	0.05	mg/l
Sodium	Na		29	46.6	200	mg/l
Zinc	Zn		0.009	0.006	5.0	mg/l

mg/l = milligrams per liter

< = Less than detection limit

X = result is outside the aesthetic limit

Table #2 lists those water quality standards for a ground water supply source adopted by the Province of Manitoba from the “Guidelines for Canadian Drinking Water Quality” 6<sup>th</sup> Edition, 1996, including updates to April 1999 developed by Health Canada. For the parameters tested, results are categorized by health concerns. Any parameter in excess of the maximum accepted concentration, constitute a health related issue and require corrective action.

<b>TABLE 2</b>					<b>For the Year 2009</b>				
<b>TOWN OF BEAUSEJOUR</b>									
<b>WATER QUALITY COMPARISON TO PWS-08-203 LICENCE WATER QUALITY STANDARDS</b>									
<b>FOR POTABILITY (Health Criteria at point of Use) IN WATER</b>									
<b>Conventional Parameters</b>				<b>Quality Standard</b>	<b>Test Frequency</b>	<b>Test Results</b>	<b>Units</b>		
<b>Health Criteria</b>									
Total Coliform & Ecoli				No TC & EC	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	0.33	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		<0.0002	mg/l		
Uranium	U			0.02		0.0005	mg/l		
Trichloroethene				0.005		0.0001	mg/l		
Tetrachloroethylene				0.03		0.0001	mg/l		
Benzene				0.005		<0.0001	mg/l		

mg/l = milligrams per liter  
 < = less than detection limit

The results in Table #1 are from the analysis of water samples collected by Manitoba Water Stewardship – Office of Drinking Water’s Chemistry Audit sampled on August 19, 2008 and submitted to Cantest Ltd. for analysis. The results in Table #2 were based samples submitted to the ALS Laboratory Group for analysis by the Town of Beausejour March 12, 2008 with the exception of Benzene, Tetrachloroethylene, and Trichloroethylene. These results for these parameters were part of the Office of Drinking Water’s Chemical Audit. The next chemical audit will be required by 2012.

#### .4 Disinfection:

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 “Drinking Water Safety Act“ requires that a disinfectant residual level 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 of water is detectable at all times at any point in the distribution system.

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 in the under ground reservoir.

The “Drinking Water and Safety Act” requires that disinfection is continuously maintained. 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.

The “Drinking Water Safety Act” requires that the disinfection residuals are monitored daily at the water treatment plant and periodically at various points in the distribution system and recorded on the appropriate monitoring forms. These forms are sent to the regional “Drinking Water Officer” at the end of each month. Table 3 records the results of the Provincial Annual audit for 2010.

<b>Table 3</b>	<b>Disinfection Monitoring and Reporting</b>	
	<b>Regulatory Requirement</b>	<b>PWS Performance</b>
Free chlorine residual entering the 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 Section 22 a – MR 40/2007	≥ 0.1 mg/L	100%
Frequency of testing Schedule A – MR 40/2007	Bi-weekly	100%
Report submissions Section 25(2) – MR 40/2007	Monthly	100%
<b>Comments:</b> The Public Water System has met their regulatory requirements for 2010.		

**. 5 Bacterial Monitoring of Raw and Treated Water**

As per Provincial regulatory requirements, every two weeks the Town collects three samples; one from the raw water entering the water treatment plant( Note: 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, and submits them to Maxxam Analytics to test for the presence or absence of Total Coliform Bacteria and E-Coli Bacteria. Table 4 records the results of the Provincial Annual Audit for 2010.

<b>Table 4 Bacteriological Monitoring and Reporting</b>		<b>Beausejour Public Water System Performance</b>
	<b>Regulatory Requirement</b>	
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%
<b>Comments:</b> The Public Water System has met their regulatory requirements for 2010.		

**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 750,000 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 62,500 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 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 1” up to 10”. The 10” and 8” water mains serve as arterial branches while the majority of the piping is 6” in diameter. The system is complimented by 166 fire hydrants and 224 main valves. 69 % of the piping material 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 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:

Jeff Matychak	Director of Operations	Operator in Training
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	Operator in Training

The Town continually supports its Operators by sending them to training Courses and Seminars. All new and existing staff receive the necessary training and related education to write the required 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:**

1. January 19, 2010 a water main break appeared at approximately 2:00 PM in front of 503 William Avenue. The water was turned off January 20, 2010 at 8:30 AM while the repair was being made. A section of pipe 1.22 meters (4.0 feet) long was cut out of the water main and was replaced with C900 PVC pipe and two Ford FC2W Ultra-Flex Couplings. Normal water service was restored at 12:30 PM the same day.

2. July 7, 2010 a water main break occurred at the intersection of Fourth Street South and Ashton Avenue. The water main break was caused by an excavation error while installing new sewer and water mains down Fourth Street South. The water was turned off at 10:30 AM on July 7, 2010 to make repairs. The damaged section of 150mm (6 inch) diameter universal cast iron pipe was cut out and replaced with approximately 2.4 meters (7.87 feet) of C900 PVC pipe and two Ford FC2W Ultra-Flex Couplings. Normal water service was restored at 4:00 PM the same day.

3. September 21, 2010 a water main break was repaired at 639 Gertrude Avenue. This water main break was found by the leak detection survey completed in the spring of 2010. The water was turned off September 21, 2010 at 8:30 AM while the repair was being made. The damaged section of 150mm (6 inch) diameter universal cast iron pipe was cut out and replaced with approximately 1.0 meter (3.28 feet) of C900 PVC pipe and two Ford FC2W Ultra-Flex Couplings. Normal water service was restored at 2:00 PM the same day.

#### **7.0 Drinking Water Orders and Corrective Actions Taken:**

In 2010, no Drinking Water safety Orders were issued.

#### **8.0 Boil Water Advisories Issued and Actions Taken in Response:**

In 2010, no Boil Water Advisories were issued.

#### **9.0 Warnings Issued or Charges Laid on the System in Accordance with The Drinking Water Safety Act:**

No charges or warnings were issued in 2010.

**10.0 Major Expenses Incurred:**

1. The cost to provide service to well pumps in Well # 2 and # 3, which was \$11,412.03. The service provided included the supply and installation of a new pump end and top shaft in Well # 3. Also included in the servicing was pulling the pump from Well # 2 to perform a routine cleaning.
2. The cost to conduct a leak detection survey of all the metallic piping in Beausejour's water distribution system was \$12,000.00.
3. The cost of a spare Chlorinator for the Water Treatment Plant was \$4,172.53. Our spare Chlorinator was used after one of the Chlorinators broke down in the Water Treatment Plant.
4. The cost of new water meters was \$7,727.14. The cost of spare valves, hydrant extensions, PVC pipe and couplers was \$10,150.51. It is important to keep these spare parts in stock to repair water main breaks quickly, with little damage to the surrounding area.
5. The cost for renting a Hydrovac Truck to perform what is referred to as a "soft dig" was \$10,800.00. This soft digging is used when replacing curb stop valve boxes and rods. With most of the water system being over 50 years in age, a lot of curb stops do not function properly. By using the soft dig approach it allows the Town to complete the repair with minimum excavation, disturbance and restoration costs.

**11.0 System Expansion and/or Increased Production:**

1. During the summer of 2010 a water main was installed to service the tri-plex being built on Fourth Street South. This water main is 38mm (1.5 inches) in diameter, approximately 36 meters (118 feet) in length, and contains one main valve. This new main was installed to supply the three water services connected to the tri-plex.
2. In 2010 a leak detection survey was completed on all the metallic piping in Beausejour's water distribution system. This represents 69% of the system and is the oldest portion of the distribution system. A total of four leaks were found by this leak detection survey and in 2010 the two major leaks were repaired. By reducing the amount water lost through undetected leaks more water will be available for consumer use and/or less water will have to be treated to meet current demands.
3. Twenty-Three new water services were connected to the existing water mains in the distribution system.

**12.0 Future System Expansion and/or Increased Production:**

- 1.** To complete the distribution system looping it is planned to install 115.4 (380 feet) of new 150mm (6") PVC water main from James Avenue to Woodridge Drive. Looping of the water mains within the system is important because it eliminates dead ends where the water can become stale. Also, it provides options in providing continuous service to an area should a portion of the mains servicing it have to be shut down for maintenance or repair.
- 2.** A filter audit for the Water Treatment Plant will be purposed to Council for the 2011 budget. Seeing as how the two original filters were installed in 1957, the addition of two more filters was completed in 1962 and the final addition of two filters was completed in 1976; a filter audit should be performed in the near future. Depending on the recommendations of the filter audit, if filter upgrades are required it could increase the production of our Water Treatment Plant.
- 3.** To repair the remaining two leaks found by the 2010 leak detection survey, which was completed on all the metallic piping in Beausejour's water distribution system. By reducing the amount water lost through undetected leaks more water will be available for consumer use and/or less water will have to be treated to meet current demands.