



**PUBLIC WATER SYSTEM ANNUAL REPORT**

**-2012-**

**TOWN OF BEAUSEJOUR**

**WATER WORKS DEPARTMENT**

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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<br/>WATER QUALITY COMPARISON TO "GUIDELINE FOR CANADIAN DRINKING WATER"<br/>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   |       |  | 460              | 512X                 | 500                        | mg/l         |
| Dissolved Chloride   | Cl    |  | 34.1             | 36.6                 | 250                        | mg/l         |
| Dissolved Sulfate  | SO4   |  | 58.1             | 60.9                 | 500                        | mg/l         |
| ph, laboratory   |       |  | 8.44             | 8.50                 | 6.5-8.5                    | ph units     |
| Total Alkalinity   | CaCO3 |  | 313              | 316                  |                            | mg/l         |
| Bicarbonate Alkalinity   | HCO3  |  | 362              | 359                  |                            | mg/l         |
| Carbonate Alkalinity   | CO3   |  | 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         |

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 2011</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 | 0.22                | 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 |  |  |

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

The results in Table #1 and Table #2 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 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 2012.

| <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<br>Section 21(1) a – MR 40/2007  | ≥ 0.5 mg/L                                   | 100%                   |
| Frequency of testing<br>Schedule A – MR 40/2007  | Daily  | 100%                   |
| Free chlorine residual in the distribution system<br>Section 22 a – MR 40/2007           | ≥ 0.1 mg/L                                   | 100%                   |
| Frequency of testing<br>Schedule A – MR 40/2007  | Bi-weekly                                    | 100%                   |
| Report submissions<br>Section 25(2) – MR 40/2007   | Monthly                                      | 100%                   |
| <b>Comments: The Public Water System has met their regulatory requirements for 2012.</b> |  |                        |

**. 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 ALS Environmental 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 2012.

| <b>Table 4                      Bacteriological Monitoring and Reporting</b>             |                               | <b>Beausejour<br/>Public Water<br/>System<br/>Performance</b> |
|--|-------------------------------|---|
|  | <b>Regulatory Requirement</b> |   |
| Number of raw/incoming water samples<br>Schedule A – MR 40/2007                          | 26                            | 100%  |
| Number of treated water samples<br>Schedule A – MR 40/2007                               | 26                            | 100%  |
| Number of distribution water samples<br>Schedule A – MR 40/2007                          | 26                            | 100%  |
| Frequency of testing<br>Schedule A – MR 40/2007  | Bi-weekly                     | 100%  |
| Total Coliform present in samples<br>Section 3(1) a – MR 41/2007                         | < 1 TC per 100mL              | 100%  |
| E – Coli present in samples<br>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 2012. |                               |   |

**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 | WT Class II | WD Class II |
| 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  |

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:**

In 2012, no Water System Incidents had occurred.

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

In 2012, no Drinking Water safety Orders were issued.

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

In 2012, 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 2012.

**10.0 Major Expenses Incurred:**

1. Water meters have been purchased for the distribution system at a cost of \$8,363.12. These water meters are used for new connections and water meter replacements.
2. The pump motor for Well# 3 has been rebuilt at a cost of \$1,552.57. By rebuilding the pump motors on a five year rotation alternating between wells; the wells continue to provide raw water to the treatment plant improving the reliability of the treatment process.
3. A utility locator has been purchased for \$4,443.71 to assist the Water Works Department with repairs to the existing Cathodic Protection System to reduce the chances of water main breaks. The Water Works Department has also purchased \$1,861.40 in supplies to perform the repairs to the existing system.

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

1. Repairs to the existing Cathodic Protection System to reduce the chances of water main breaks. This system consists of Rectifier Stations that put out low current to a number of Sacrificial Anodes located all over Town. With much of the system offline, the goal is to make repairs to the existing Cathodic Protection System, which would give our water mains some protection against corrosion.
2. Nine new water services were connected to the existing water mains in the distribution system.

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

1. Twinning the Supply Line from the Reservoir Building to the Distribution System. This will allow for adequate back up to the reservoir should the existing line fail.
2. Replacing the three air compressors at the Water Treatment Plant with a single compressor that is capable of producing the same volume of air as all three existing compressors. These three air compressors were originally installed as the Water Treatment Plant received upgrades and have become worn and outdated over time. One of the three air compressors in our operators opinion is about to fail and with replacement parts for the existing compressors obsolete a new compressor is required.