

CITY OF SELKIRK

Public Water System Annual Report

- 2009 -

Name of the Public Water System: Selkirk Public Water System

Name of the Local Owner: City of Selkirk

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Date prepared: February 1, 2010

Introduction:

The 2009 Annual Report for the City of Selkirk summarizes the Water Utility's ability to produce safe potable water and meet provincial regulations.

The Selkirk Public Water System provides potable drinking water to a population of 9515 residents (2006 census). Treated water produced from the Water Treatment Plant (WTP) meets all health and aesthetic objectives as stated in the Guidelines for Canadian Drinking Water Quality.

Source Water:

The Selkirk WTP relies on four source wells located within the City to provide raw water for the treatment process. Three of these wells draw water from a deep carbonate bedrock aquifer, which leads to scale build up and gradual loss of productivity. The City has in place a redevelopment regime to maintain production rates. The Tower Well is a shallower well located in the upper part of the aquifer, but still within the bedrock. The raw source water has high hardness and dissolved solids as well as dissolved chloride concentrations. Bacteriological testing typically records low counts for both Total Coliforms and E.coli. The details of the four source wells are as follows:

Christie Well

- Constructed in 1968
- Sustainable pumping rate 21.6 L/s
- Depth 83.2 m
- Redeveloped in 1996 and 2006

McLean Well

- Constructed in 1959
- Sustainable pumping rate 12.9 L/s
- Depth 85.3 m
- Redeveloped 1997
- New submersible pump installed in 2006

Rosser Well

- Constructed in 1987
- Sustainable pumping rate 7.6 L/s
- Depth 79.3 m
- Redeveloped 1997
- New submersible pump installed in 2004

Tower Well

- Constructed in 1997
- Sustainable pumping rate 5.1 L/s
- Depth 14.2 m
- Well is developed in upper aquifer

Water Treatment:

The Selkirk Water Treatment Plant uses a lime softening treatment process to treat the raw source water before pumping it to the distribution system. The treatment process is comprised of the following components:

- Lime softening clarifier
- Recarbonation basin
- Gravity filters
- Clear well/disinfection basin
- Sludge dewatering

Source water from the four wells is combined at the WTP and conveyed by a 400mm asbestos cement pipe to the treatment facility. Upon reaching the treatment facility, the raw water enters the clarifier where it is mixed with lime and a polymer coagulant. The clarifier has a surface area of 176 m² and a design overflow rate of 2.58 m³/hr. The reaction with lime forms calcium carbonate and some residual calcium oxide that can precipitate in the clarifier.

The calcium carbonate sludge from the clarifier is collected and pumped into the sludge handling facility. The dewatering facility utilizes two rotating permeable cylinders to concentrate the sludge prior to disposal. A vacuum pump draws water from the sludge through a filter cloth on the exterior of the drum. The extracted water is returned to the clarifier, while the dewatering sludge is scraped off the filter cloth and disposed in a landfill via a tandem dump truck.

The treated water from the clarifier flows by gravity in a channel to the recarbonation basin. The water enters this 39.5 m³ chamber through an open channel, where carbon dioxide gas is used to neutralize the pH. After neutralization, the water passes through a bank of gravity sand filters. There are four filter beds with a combined surface area of 62.4 m². The backwash uses an integrated air scour system to improve filter cleaning efficiency. However, due to the filter's configuration, the air scour cannot be used while the filters are in operation, and requires the WTP to be down for a period of time. The water used for the backwash is discharged to the storm sewer system. After filtration, the treated water passes to the disinfection chamber where chlorine gas is injected to provide final disinfection before moving to the clearwell. The treated water is then pumped over to the storage reservoir located approximately 100 m to the northwest.

Treated water quality from the existing WTP is consistently within the limits for health parameters. The WTP does have difficulty producing treated water that meets the aesthetic objectives. Dissolved chloride concentration is usually in the range of 180 mg/L to 260 mg/L. While the average is around 215, the range does straddle the aesthetic objective of 250 mg/L. The major contributor to dissolved chloride is the Tower Well. As with dissolved chloride, sodium concentrations are usually within the limits, but are recorded over a range which straddles the aesthetic objective. Sodium concentrations in the treated water

range between 163 mg/L and 261 mg/L. The aesthetic objective is 200 mg/L. Once again, the major contributor to this parameter is the Tower Well. Total dissolved solids (TDS) are consistently over the aesthetic objectives established by Health Canada. The TDS in the treated water from the Selkirk Water Treatment Plant ranged between 641 mg/L and 780 mg/L. The aesthetic parameter for TDS is 500 mg/L.

Water Storage:

A 643.5 m³ clear well built underneath the Selkirk Water Treatment Plant, a 9092 m³ underground reservoir next to the WTP and a 40 m high 945.6 m³ Water Tower, ensure that enough water is available to meet water users' needs and for fire fighting. The total of 10,681.1 is approximately 3 days worth of storage. The reservoir is designed so that the water is always moving and never gets stale.

Water Distribution:

The water distribution system is the network of underground pipes used to carry the treated water from the WTP to the homes and businesses in Selkirk. We have:

- 41.66 km of asbestos cement
- 12.36 km of polyvinyl chlorine
- 6.72 km of cast iron

pipings through Selkirk. The piping is interconnected (looped) to ensure that fresh safe water is continuously supplied. We carry out regular maintenance in the distribution system such as seasonable flushing in the summer and fire hydrant testing in cooperation with the Selkirk Volunteer Fire Department.

Water Testing:

Water tests are taken on a routine basis to ensure that the water is safe and to monitor how well the treatment facility is performing. We test the water at the WTP and in the distribution systems at various locations and times. It is a regulatory requirement that all water test results associated with water safety be submitted to the Provincial Office of Drinking Water for review.

Bacterial testing: We test the raw water (well water), treated water (leaving the WTP) and the water in the distribution system (within City limits) every two weeks for the presence of Total Coliform and E.coli bacteria. If these bacteria are present in the water it is an indication that disease causing organisms may also be present.

Disinfectant testing: We test the level of chlorine in the treated water every day to ensure that the water leaving the WTP has enough chlorine to ensure proper disinfection. We also test chlorine levels in the distribution system every time we take water samples for bacterial testing.

Turbidity testing: Turbidity is a measurement of the clarity of water. We are not required to do testing or report on our turbidity. We test it only on effluent leaving our plant and for our own information.

Trihalomethane (THM) testing: Trihalomethanes are formed when chlorine reacts with naturally occurring organic matter in the water. Studies have shown a link between high levels of THMs and cancer. For that reason, the Province has set a health based standard for THMs of 100 micrograms per litre of water. This testing is only required once a year, in August, and only on plant effluent.

Iron testing: The raw water has naturally occurring iron levels above the aesthetic limits established by Health Canada's Guidelines for Canadian Drinking Water Quality. As per City of Selkirk Ground Water Study by UMA, all metals analyzed were below the CCME and CEQG requirements (0.3 – 2.0 mg/L in raw water). Elevated iron levels do not pose a risk to health. However, excessive iron can produce unpleasant tastes and odors in the water and can cause the water to appear discolored and stain plumbing fixtures and laundry. Our treatment process removes iron. Tested once per year on effluent.

Results of Testing: Bacterial

	Regulatory Requirement	Selkirk Public Water System Performance
Number of raw/incoming water samples	26	Over 100%
Number of treated water samples	26	100%
Number of distribution water samples	104	Over 100%
Frequency of testing	Bi-weekly	96.1%
Total Coliform present in samples	0 TC per 100 mL	0%
E.Coli present in samples	0 EC per 100 mL	0%
Comments: One bi-weekly sample set was missed the week of June 15, 2009, resulting in a score of 96.1% vs. 100%. However, as there were two samples reported this month the regulatory compliance is not affected.		

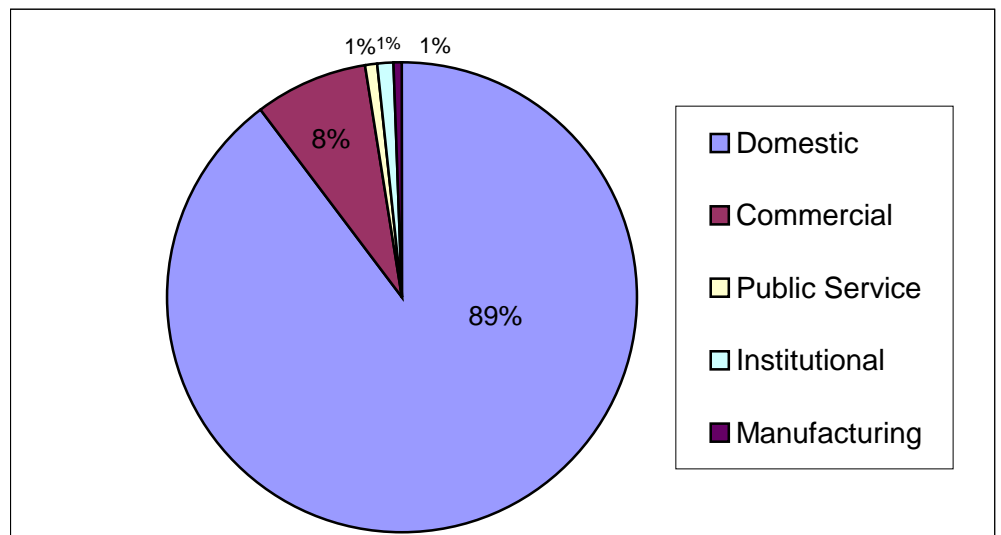
Results of Testing: Disinfection

	Regulatory Requirement	Selkirk Public Water System Performance
Free chlorine residual entering the distribution system	≥ 0.5 mg/L	100%
Frequency of testing entering the distribution system	Daily	100%
Free chlorine residual in the distribution system	≥ 0.1 mg/L	100%
Frequency of testing in the distribution system	Bi-weekly	100%
Report submissions	Monthly	100%
Comments: Measurements of disinfection residual were at all times at or above regulatory requirements. No corrective action reporting was required.		

Distribution Connections and Users:

The City of Selkirk distribution system is comprised of 3181 connections. All service connections are metered.

Domestic	2857
Commercial	241
Public Service	29
Institutional	33
Manufacturing	21



Classification and Certification:

- Class 3 Water Treatment Facility Classification
- Certification level of operators

	Water Treatment	Water Distribution
Dale Scott	III	II
Rick West	III	II
Ron Grove	III	II
Troy Grobb	III Conditional	II
Ed Partyka	II	II
Dennis Whall		II
Scott Parisian		I
Pat Skrypnyk		I

Water System Incidents and Corrective Actions:

March 8, 2009 – 217 Taylor Street
 Water break at hydrant
 Repaired with 6" stainless steel repair clamp
 Tested at 0.02
 How many homes affected: 14 houses

August 25, 2009 – 445 Eveline Street
 Water break
 Repaired with 6" stainless repair clamp
 Flushed hydrant – tests at 0.02
 How many homes affected: 1 business

Major Expenses incurred in 2009:

The Water Treatment Plant Engineering Assessment required by the Province of Manitoba Water Stewardship, Office of Drinking Water was undertaken and comprised by AECOM at a cost of \$18,035.71.

The Hydraulic Water Model Update of the Water Distribution System started in 2008 was completed by AECOM in April 9, 2009 at a cost of \$11,140.

Installation of variable frequency drives by Contec Projects Limited on the 3 distribution pumps in Reservoir II at a cost of \$130,000 has been started and will be completed in 2010.

On May 1, 2009, the Federal and Provincial Governments approved 2/3 funding for the City of Selkirk Water Treatment Facility Rehabilitation with total project funding of \$9,708,110.

On August 17, 2009, Council of the City of Selkirk awarded the contract for the supply and installation of a SCADA System to Honeywell Limited in the amount of \$237,000.

On September 14, 2009, Council of the City of Selkirk awarded the contract for the engineering services at the Water Treatment Facility Expansion to Wardrop Engineering for the sum of \$597,898. Wardrop working on the pre-design report which should be completed in February 2010.

Future System Expansion or Expenses:

- Completion of the Water Treatment Facility Expansion and Upgrade Project in 2010 and 2011 at an estimated cost of \$9,708,110 including engineering.
- Exterior painting of the Water Tower at a cost of \$445,882.
- A Water and Sewer Rate Study at a cost of \$7,800.
- Source new well installation and licencing at a cost of \$126,500.
- Design drawings for watermain booster station at a cost of \$30,000.
- Watermain upgrades and replacements at a cost of \$2,080,260.
- Installation of pipeline from well to Water Treatment Facility at a cost of \$2,275,000.