Lancaster Tank

2013 Annual Water Report

2013 Saint John Water - Annual Water Report

Table of Contents

APPENDICES

A. East & West Raw Water Sample Sites

B. Raw Water Analytical Results

C. Raw Water & Distribution System Organic & Inorganic Analytical Results

D. Monthly Water Testing Summaries

E. CoA, Water Sampling Plan with Map & ACE Review

F. Chlorine Residual Assurance Program – Data & Graphs

G. Chlorine Residual Data & Other Monitoring Data

H. 2013 Approved Water and Sewerage Utility Fund Capital Program

I. 2014 Approved Water and Sewerage Utility Fund Capital Program

J. Examples of Field Test Unit Functional Check Record

K. Summary of Accreditations

L. Certifications Achieved to Date

M. 2013 Summary of Watermain Breaks

N. 2013 Staff Training Summary

O. CALA Proficiency Testing Report – Saint John Water Environmental Laboratory

P. Examples of Weekly Construction Update

Q. Public Communication

R. Examples of 2013 Media Coverage

S. 2013 Customer Requests Relating to Pressure & Water Quality

T. 2013 THM, HAA, TOC, DOC, Turbidity, Temperature, and UVT Data

U. 2013 Cross Connection Removal Program

V. 2013 Taste & Odour Data

W. 2013 Water Quality Flushings Inventory

INTRODUCTION

Saint John Water, a department of the City of Saint John, is responsible for the delivery of three public facing services; *Drinking Water*, *Industrial Water* and *Wastewater*. The following annual report covers the Drinking Water and the Industrial Water services.

The goal of the *Drinking Water* service is to supply safe, clean potable water reliably to all users. Currently, drinking water simply receives limited treatment; coarse screening, and disinfection (chlorine gas at Latimer Lake and sodium hypochlorite at Spruce Lake). The service is regulated under the Clean Environment Act – Water Quality Regulation and Clean Water Act - Potable Water Regulation and delivered under *Approval to Operate W-669: Drinking Water Treatment and Distribution Facilities*. This *Approval to Operate* (a copy is enclosed in Appendix E) was issued by the New Brunswick Minister of the Environment effective April 1, 2011. This Approval supersedes Approval W-254 which expired March 31, 2011. The City's current certificate is valid for a 5-year period from April 1, 2011 to March 31, 2016. The certificate represents formal authorization to the City of Saint John (Approval Holder) by the Minister to operate drinking water facilities.

The Industrial Water service provides some industries in Saint John (namely Irving Pulp & Paper, Coleson Cove and Irving Paper) with raw industrial water to support and carry out their processes.

All municipal drinking water systems in New Brunswick are required to abide by the various conditions set out in *Approvals to Operate* drinking water treatment and distribution facilities. These regulatory tools set standards for water treatment facilities, distribution facilities, system operators and overall operation of facilities that strive to ensure safe and reliable drinking water for all users. Saint John Water fully endorses these standards and the philosophy behind the need for strict regulation of systems supplying such a vital service to the public.

Protective Barriers

People must have water to live; good health depends on consuming adequate quantities of safe, clean drinking water. That water must be delivered, at the best cost possible, to Saint John homes, institutions and businesses in a state that is clear, colourless, odourless and free of disease-causing micro-organisms (pathogens) or harmful chemicals.

The *Drinking Water Service* is a public service that provides drinking water to the community and is vital to the economic vitality of the region. This service includes the supply of water, treatment, testing, transmission and distribution, administration of the service, and billing and collections.

Saint John Water manages its drinking water service based on the Multi-Barrier Approach from the water source to the user's tap. Drinking water quality must be assured through a series of protective barriers:

1. Source (Watershed) Protection
2. Drinking Water Treatment
3. Operations and Maintenance (including staff training, development and staff levels)
4. Monitoring and Alarms (Sampling Plan, SCADA system, and record keeping)
5. Distribution System (residual chlorine, total coliform, E. coli, flushing, storage reservoirs, backflow prevention and cross connection control)
6. Emergency Response (contingency plans, boil order responses, safety training, etc)

Annual Report

Condition 36 of the certificate requires submission of an *Annual Report* to the Department of the Environment and Local Government no later than March 1 of the following year. The report provides pertinent technical and operating information to the regulator on the City's water systems:

- Monitoring results (daily/weekly/monthly data such as free chlorine residual, turbidity, pH, temperature, iron, manganese, etc.)
- Monthly water production
- Operational highlights (significant incidents and system improvements, changes, or additions);
- Alarm log (major alarms – the balance to be discussed during formal Compliance Evaluations)
- Summary of backflow prevention and cross-connection activities;
- Summary of flushing activities;
- Operator information (training, certifications, and staffing changes);
- Public relations (notifications & public education)
- List of major new extensions and/or renewals complete with analytical results (microbiological, organic& inorganic) and the balance to be discussed during formal Compliance Evaluations
- Additional comments

MONITORING RESULTS

Raw Water and Distribution System

The City of Saint John obtains its drinking water from two watersheds – Spruce Lake (west) and Loch Lomond (east). The quality of water in the lakes that make up the watersheds is important to the final quality of treated potable water. To that end, Saint John Water analyzed raw water sources in the eastern water system from ten locations and in the western water system from four locations. This raw water sampling is in addition to the water quality Sampling Plan approved by the Department of Environment. Appendix A includes maps of

the east and west systems which note the raw water sample sites. Appendix B provides a summary of all parameters measured for each of the respective raw water sampling locations. The approved Water Sampling Plan from the Department of Environment and Local Government required that samples be collected weekly at thirty five locations across the three water systems and microbiologically analyzed. Twenty of the sites are required to be analyzed semi-annually for inorganic parameters and quarterly for organic parameters.

In 2013, there was an issue with one Sampling Plan locations as described below:

- Irving Pulp Mill, Meter Chamber, 301 Mill Road (NBSID 15601) - was not sampled during 2013. Sampling point was replaced with Falls View Restaurant 200 Bridge Road (NBSID 21852)

The sampling plan adhered to during 2013 is summarized below.

Bacteriological (weekly sampling)		
Source	**Raw Water**	**Distribution System**
Loch Lomond	1	17
Spruce Lake	1	10 (NBSID 15601 not sampled)
Red Head	2	4
Total	**4**	**30**

Inorganic (semi-annual sampling)		
Source	**Raw Water**	**Distribution System**
Loch Lomond	1	7
Spruce Lake	1	7 (NBSID 15601 not sampled and replaced with NBSID 21852)
Red Head	2	2
Total	**4**	**16**

Organic (quarterly sampling)		
Source	**Raw Water**	**Distribution System**
Loch Lomond	1	7
Spruce Lake	1	7 (NBSID 15601 not sampled and replaced with NBSID 21852)
Red Head	2	2
Total	**4**	**16**

Organic and inorganic analytical results are included in Appendix C noting each location where the respective samples were collected.

Weekly microbiological results for *E. coli* (EC), total coliforms (TC) and monthly results for Heterotrophic Plate Count (HPC) are in Appendix D.

A full copy of the Sampling Plan, developed in conjunction with the Department of the Environment and Local Government and the Department of Health, is contained in Appendix E. A map showing the various sampling locations is also included in Appendix E.

- Given the levels of trihalomethanes (THMs) found at some of the sampling locations, the frequency of THM sampling remained at monthly; well above the Sampling Plan requirements of quarterly analyses. THMs are formed when the disinfectant chlorine reacts with decaying organic material in the untreated water. Results are reported in Appendix T.

- Haloacetic acids (HAAs) are another disinfection by-product formed when chlorine reacts with organic material in the untreated water. Although HAAs are not currently regulated in New Brunswick, it is expected that this will happen in the near future. Results are reported in Appendix T.

- Dissolved organic carbon (DOC) and total organic carbon (TOC) are precursors to the formation of both THMs and HAAs. These parameters continued to be monitored during 2013. A goal in the design of new water treatment facility is the reduction of these organic precursors, so that when the disinfectant (chlorine) is added near the end of the treatment process, the quantities of THMs and HAAs formed will be substantially less than current, and less than the levels regulated by Health Canada. Results are reported in Appendix T.

- Collection of samples for ultraviolet transmittance (UVT) began in May of 2007. Starting March 19, 2010, readings were taken at 254 nm, as per *Standard Methods for the Examination of Water and Wastewater*, 21st edition, (2005). Previously, readings were taken at 265 nm. Results for 2013 are reported in Appendix T.

- Taste and odour sampling continued to be monitored in 2013. The indicator parameters for taste and odour are Geosmin and MIB (2-methylisoborneol). Results are included in Appendix V.

With respect to water testing, Saint John Water utilizes a number of laboratories. Analytical service providers include Saint John Laboratory Services Ltd. for microbiological analyses, SGS Lakefield for organics (including THMs and HAAs) and taste/odour analyses, AGAT Laboratories for inorganics and organic carbon (dissolved and total), Research and Productivity Council for benzo[a]pyrene and pentachlorophenol, and AGAT Laboratories for the watershed analyses.