Belgrave Drinking Water System – 2016 Compliance Summary

February 24, 2017

This is a summary of the Belgrave well supply’s regulatory compliance. A complete summary of flows, chemical use, laboratory analysis and activities on the system was submitted with the Annual Report on February 24, 2017.

**System Description**
The Belgrave water system is characterized as a “secure ground water” system and is classified as a large municipally owned water system. The well house and its equipment have a daily maximum capacity to deliver 501 cubic metres of potable water per day to the Belgrave community in Morris-Turnberry and the Humphrey subdivision in North Huron.

The current water sources are two secure deep bed rock wells. The Jane St. production well is located at 32 Hamilton St. and the McCrea well is located at 23 McCrea St. Both are connected to the treatment plant at 28 McCrea St. via dedicated raw water mains.

The treatment plant is equipped with high lift pumps, backup diesel generator set, chlorinators, a chlorine contact reservoir, green sand filtration for iron removal and online monitoring. The system is controlled and monitored by an on-site PLC.

The Belgrave well supply was put in service May 1, 2007 and replaces the former Jane St, McCrea St. and Humphrey subdivision water systems. The Jane St. and McCrea St. wells were upgraded and retained as sources. The Humphrey subdivision well was abandoned. The Humphrey well house was retained and acts as a sample station and houses an on-line chlorine analyzer for the distribution system.

The distribution system in the Morris-Turnberry side of Belgrave was constructed in 2008 and is constructed of PVC with polyethylene services.

There is a connection to the Humphrey subdivision on the North Huron side. This distribution system is polyethylene and was constructed in the 1980’s.

There is no elevated storage to maintain pressure and therefore, the system pressure is maintained using pressure tanks and the high lift pumps.

The system has no hydrants and lacks the capacity to provide fire flows.

**Chemicals Fed**

**Disinfectant**

Disinfection was achieved on the Belgrave well supply through the use of 6% sodium hypochlorite.

In the well house, this chemical was added prior to the water entering the chlorine contact chambers at dosages high enough to achieve both primary and secondary disinfection objectives. The chlorine dosages ranged from 3.00 mg/l to 3.42 mg/l, varying with the chlorine demand of the raw water.
The free chlorine residual was monitored at the point of entry to the distribution system with a target residual of > 0.65 mg/l and < 1.00 mg/l which is typical of the treated water in other municipal water systems.

Iron Removal
The well water at Belgrave has iron levels higher than what is considered aesthetically acceptable. The well house provides chemically assisted iron filtration through green sand pressurized filters. The chemical used is potassium permanganate. This chemical was fed to the raw water prior to the filters.

Flows
The Belgrave water system PTTW (permit to take water) # 5042-8Y5KVG allows 501 cubic metres per day from the combined wells: Jane Well 138.2 and McCrea 362.8. The permit was issued November 12, 2012 and the PTTW expires on October 31, 2022. This limit was not exceeded in 2016. A full summary of the 2016 flows is attached with the annual report sent February 24, 2017.

The Drinking Water Works Permit (DWWP) #247-201 Issue 2 for the Belgrave Drinking Water System was issued on July 20, 2016. The maximum flow rate for the treated water is 6.9 litres per second. The limiting factor regarding flow is chlorine contact time in the chlorine contact reservoir. Flow monitoring is necessary to meet the regulatory CT requirements. Increased flows beyond 6.9 litres per second must have increased free chlorine residual to counter the decreased retention time in the chlorine contact chamber.

The combination of maximum flows through the chlorine contact reservoir and minimum free chlorine residuals exiting the contact reservoir did not exceed limitations in 2016 as recorded by the flow meters and the on-line chlorine analyzer.

The maximum flow in 2016 was 223 cubic meters per day or 44.5% of capacity. The average flow in 2016 was 70.33 cubic meters per day or 14.0% of capacity.

Precautionary Boil Water Notices
No precautionary boil water notices were placed on the Belgrave system in 2016.

Boil Water Advisory
There were no Boil Water Advisories issued by the Huron County MOH on the Belgrave water system in 2016.

Adverse Water Quality Indicators AWQI
In 2016 there were no instances of adverse water quality in Belgrave.
Annual Ontario Ministry of the Environment Inspection
The most recent Ministry of Environment inspection occurred on December 14, 2016. Three non-compliances were noted. Final Inspection Rating: 100%.

1. On several occasions during the inspection period, the flow rates and daily volumes of raw and treated water were recorded on the daily summary sheet as zero. According to the operating authority, issues with the recording of data have been occurring due to the age of the current computer system. SCADA system upgrades are included in the 2017 capital upgrades for the Belgrave Drinking Water System and the operating authority is currently reviewing system upgrade options.

2. The “Instrument Calibration and Maintenance Schedule” Procedure for the Morris-Turnberry Operations Manual – Belgrave, states that the Morris-Turnberry (Belgrave) well house is equipped with a US Filter (Wallace & Tiernan) Depolox 3 Plus Residual Analyzer as the on-line chlorine analyzer, this analyzer was replaced with a HACH CL17 chlorine analyzer on July 17, 2015.

3. A review of the logbook indicated that an OIT (Operator in Training) signed the logbook as an OIC on at least four occasions during the inspection period which are violations of s.25(5) of O. Reg. 128/04.

Exceedences
Fluoride
O. Reg. 169/03 (Ontario Drinking Water Standard) has a MAC (maximum allowable concentration) of 1.5 mg/l for fluoride. The water from the Belgrave wells is monitored every 5 years for fluoride. The wells have naturally occurring levels that can exceed 1.5 mg/l.

As required by O. Reg. 170/03 schedule 13 section 13.9 an AWQI (adverse water quality indicator) is filed every 60 months. This was reported November 2012. Fluoride was not sampled in 2016. The most recent samples were taken in 2015:

May 5/15 — 1.48 mg/L

Infrastructure Assessment
Regular contact is maintained with the Belgrave representative. The JobsPlus program is continually updated with preventative and corrective maintenance issues. A complete summary can be forwarded to the client upon their request. Through regular communication between the operating authority and the client, capital items are discussed. A list of capital items and concerns was discussed with Belgrave’s representatives on October 21, 2016.

The annual Management Review was conducted by the operating authority on May 18, 2016, as per the DWQMS requirement in Element 14. These regular discussions between the client and the operating authority for this water system are continued throughout the year by emails, phone calls, and meetings as per the requirements of Element 15 of the DWQMS.

The Internal Audit was completed November 23, 2016 and the Risk Assessment was completed October 19, 2016. An offsite Surveillance Audit was completed by SAI on June 30, 2016. The staff was involved with an Emergency Response exercise on October 21, 2016, which involved a
severe thunderstorm causing a fire at the Huron Bay Co-Op and resulting in damage to the well house and well contamination.

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