



SAINT JOHN



West Water Update & Copper Scale Stabilizing Treatment Option

February 20, 2018

West Water

Safe, Clean Drinking Water

- The City of Saint John is issued an **Approval to Operate** by the **Minister of Environment and Local Government**
- **Approval to Operate grants authority to the City of Saint John** to operate the drinking water system under specific conditions. For ex:
 - *The Approval Holder shall ensure that the drinking water supplied to the users meets the **New Brunswick Maximum Acceptable Concentrations (NBMACs)**, for the parameters listed in the **Sampling Plan**, approved under the **Potable Water Regulation 93-203**.*
- When **delivering Spruce Lake Water to west Saint John customers** the **City of Saint John was not able to meet its regulatory obligations**

West Water

Safe, Clean Drinking Water

- **West Saint John – now has Safe, Clean Drinking Water**
- **Since commissioning of the new South Bay Wells there has been a significant improvement in drinking water quality**
- **Drinking water** now delivered to west customers from the new South Bay Wellfield **exceeds regulatory requirements**
- **Public health is now protected from waterborne disease**
- **City of Saint John now meets the requirements of its Provincially issued Approval to Operate**

West Water

Copper Pipe Leaks

- Saint John Water has communicated directly with all west Saint John customers that have reported leaks regarding copper pipes
- **Collected and logged standardized information** relating to each situation
- Approx. 3% of 5,400 west Saint John Water customer base reported leaks
- Reports **not localized to any one neighbourhood** on west side
- **SJW has not experienced an increase in leaks of City-owned copper water services** that supply homes nor an increase in water main breaks
- **SJW has not increased water pressure in the system**; pressure has remained the same as when water was delivered from Spruce Lake
- SJW immediately engaged Industry Experts (& system Regulators) to began studying leaking pipes late January when vast majority of concerns received

West Water

Copper Pipe Leaks

Panel of Experts & Regulators Engaged

- **CBCL Limited**
 - Mike Chaulk, M.A. Sc., P.Eng., Principal, Practice Lead Water Treatment
 - John Flewelling, P.Eng., Senior Engineer and Branch Manager, Saint John
- **Dalhousie University**
 - Dr. Graham Gagnon P.Eng., PhD, Professor
 - NSERC Industrial Research Chair in Water Quality and Treatment
 - Director of the Centre for Water Resources Studies
 - Dr. Ben Trueman PhD
 - Industry-recognized expert in premise plumbing corrosion
- **Department of Health**
 - Dr. Isaac Sobol, Medical Officer of Health – South Region
 - Shaun Crawley, Acting Regional Director – Saint John
 - Ron MacIsaac, CPHI, Public Health Inspector – Saint John
- **Department of Environment & Local Government**
 - Numerous Officials of Healthy Environments Branch & Permitting Sections

West Water

Copper Pipe Leaks

Study Update

- Approximately **15 copper pipe samples** have been collected from citizens that experienced a leak
- Many pipe samples and large quantities of water have been shipped to Dalhousie University's Center for Water Resources Studies
- Study is ongoing along with residential analysis
- Studying is looking at copper corrosion locally and comparing Spruce Lake water to South Bay well water under various conditions & analyzing pipe scale
- Results to date further reinforce **South Bay well water is much less corrosive than the former Spruce Lake Water** – as expected

West Water

Copper Pipe Leaks

Water Quality

- Spruce Lake
 - Low pH (acidic water)
 - Low alkalinity
 - Aggressive, very soft surface water
- South Bay Well
 - pH is more neutral (8, not acidic)
 - Now meets the Guidelines for Canadian Drinking Water Quality
 - Increased alkalinity (120 - 150 mg/L)
 - Non-aggressive hard water (206 mg/L average to date)
 - **Fluctuations will occur naturally**
- **No linkage between hard water and copper pipe leakage**
- Water from South Bay Wellfield is **much less corrosive** than Spruce Lake Water

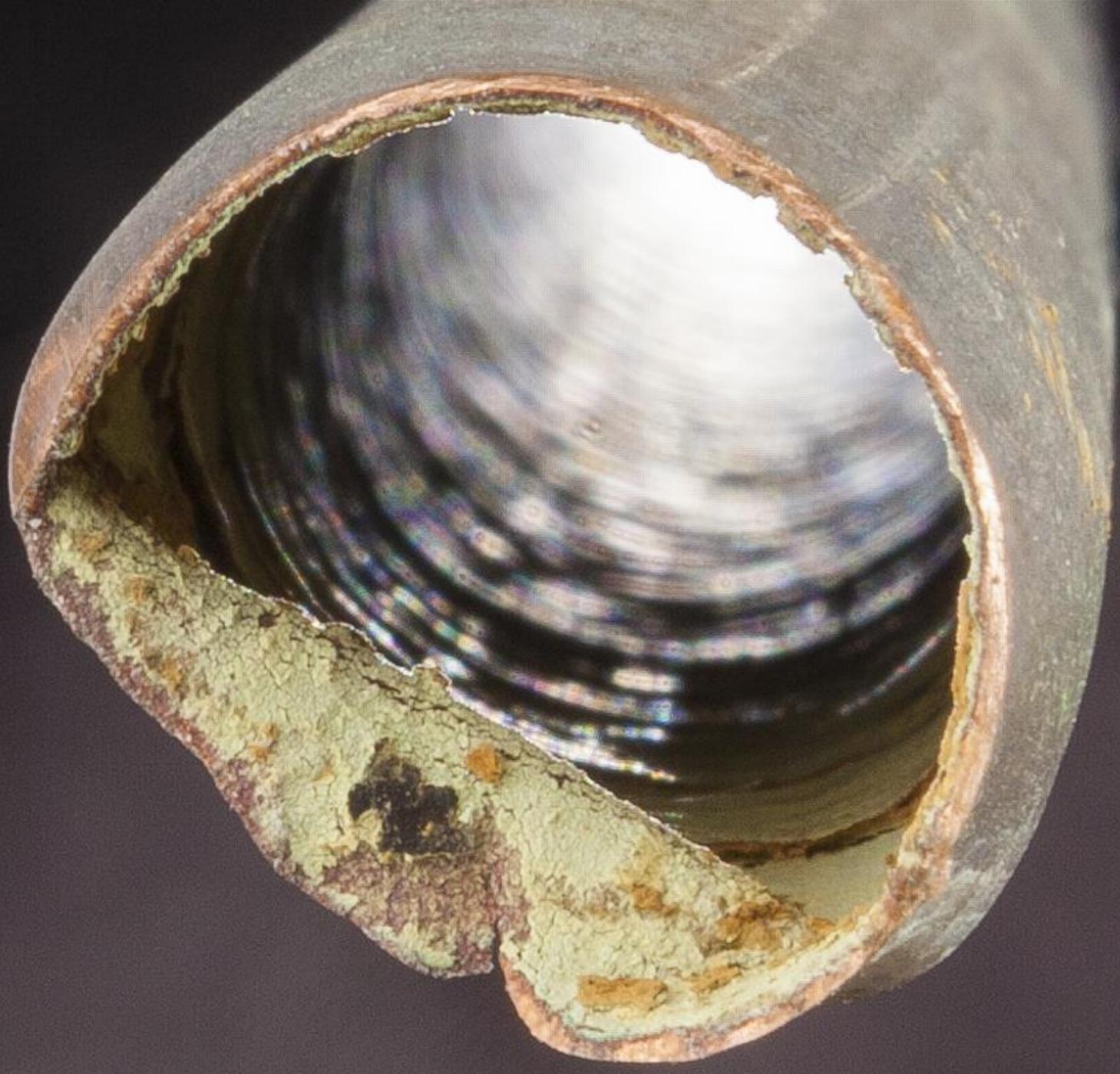
West Water

Copper Pipe Leaks

- Theoretical understanding at this point remains
 - With Spruce Lake water, **historical piping corrosion was high due to the low pH, unbuffered soft lake water being corrosive.**
 - **Some plumbing systems prior to the switch were corroded, a phenomenon which happened over years, and stable copper metal scale had formed, which helped limit leaks.**
 - The change in chemistry when the switch to groundwater was completed disrupted over a period of months the pre-existing copper scale and began a conversion to a new type of scale.
 - When the pre-existing scale was disrupted the already corroded piping systems had no strength left and leaks followed.
- Continued collection of data is valuable for scientific understanding
- Sufficient information that suggests there is **an opportunity to take action to stabilize existing scale on copper pipes**

West Water Copper Pipe Leaks







Options Available to Stabilize Scale

1. Increase pH

- Not recommended at this point as pH is in desired zone of finished water quality and could have impacts on increasing scale formation

2. Treat water with orthophosphate

- **Use is well established** in literature and in practice
- **Very commonly used in water treatment** for copper corrosion or scale stabilization control. Examples below:
- **New Brunswick**
 - Moncton and new east Loch Lomond Water Treatment Facility
- **Nova Scotia**
 - Halifax (all three water treatment facilities), Sydney, Antigonish and New Glasgow, Stellarton, Bridgewater, Windsor, Lunenburg, etc
- **United States**
 - Approximately 60% of all utilities

West Water

Orthophosphate Treatment

- Orthophosphate would acts as an inhibitor to slow the breakdown of scale and stabilize existing piping by forming a protective coating
- Limited treatment can be effective at stabilizing scale considering low corrosiveness of groundwater
- Results are shown immediately
- What is orthophosphate?
 - Phosphates are generally consumed by the public as part of a daily diet;
 - Product is **NSF/ANSI** (National Sanitation Foundation) Standard 60 certified (**approved food grade product**)

West Water

Orthophosphate Treatment

Recognized Industry Treatment Practice

- **American Water Works Association (AWWA)**, a non-profit, scientific and educational association founded to improve water quality and supply supports the treatment of drinking water with orthophosphate
- **Moncton, NB**
 - Treats water with poly/orthophosphate as a corrosion & scale inhibitor
 - Poly/orthophosphate established a microscopic film on pipes reducing rate of metallic corrosion
 - Other stated benefits:
 - fewer water discolouration events
 - reduced chlorine demand
 - *“To date we have not had any customer complaints related to the use of the product and we believe it has been effective in reducing water quality complaints.”*

West Water

Orthophosphate Treatment

Health - Food and Drug Administration (FDA)

- FDA considers phosphates as a food additive to be "generally recognized as safe."
- NSF International maintains recommended maximum dosages of drinking water additives including phosphate products.
- Typical phosphate levels found in a litre of drinking water are about **one hundred times lower** than the phosphate levels found in the average American diet.

West Water

Orthophosphate Treatment

New Brunswick Department of Health

- Reviewed data and has no objections to treatment of water with orthophosphates
- From a Public Health perspective sees no apparent health issues with the treatment of water with orthophosphate
- Numerous other Canadian cities are using the same treatment product
- Product is NSF 60 certified (food grade product)

West Water

Orthophosphate Treatment

Implementation and Cost

- Temporary system could be operational within approx.1 month
- Cost is approximately \$46k for completed set-up including engineering design, mechanical, electrical, programming, materials and contingency
- Treatment cost approx. \$90k (purchase of orthophosphate)
- Costs can be managed within the 2018 Water & Sewerage operating budget

West Water Communication Update

Over past few weeks:

- New link added to the City's home page & dedicated west water page created www.saintjohn.ca/westsidewater
- New Tips and Solutions Guide on hardness prepared and on webpage
- New set of FAQs & answers on the new South Bay well water posted on webpage
- Presentation and report delivered on January 29, 2018 posted as well as the link to the Rogers video that shows the delivery of the presentation
- News release issued February 6, 2018 to provide citizens with an update on the work underway relating to pipe leakage
- Mailer that will be sent to all west customers (under development) and is scheduled to be mailed in the month of February 2018

West Water Communication Update

This week

Tues, Feb 20	Public	Release of invitation for Information Sessions* (a.m.) & posting of Council presentation on website (p.m.)	CSJ Comms
	Media	Interview following meeting of Council	SJW / industry experts / Dept. of Health / Mayor
Wed, Feb 21	Public & Media	Ad in TJ for Information Sessions	CSJ Comms
		Proactive media interviews	SJW / 3 rd party experts / CSJ Comms
		News release	CSJ Comms
Thurs, Feb 22	Public	Information Sessions (St. Mark's United Church, 50 Dexter Drive)	SJW / CSJ Comms / 3 rd party experts / Mayor

Recommendation

Common Council's adoption of the following resolution:

RESOLVED that as a result of the copper pipe leakage review completed to date and based upon the opportunity to stabilize copper pipe scale, your City Manager is recommending that Council direct staff to undertake the following actions:

- Over approximately the next month install a temporary orthophosphate treatment system at the South Bay Water Treatment Facility (formerly the Spruce Lake Water Treatment Facility) to assist in stabilizing the existing scale formation on copper pipes.
- Report back to Council within approximately 5 months once research is completed and results available.