



Maritime Provinces Water & Wastewater REPORT

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MESSAGE FROM THE CHAIR

■ BY JERRY VILLARD

Another summer has come and gone and I'm sure everyone is going full out with fall maintenance to get ready for another winter. Feeling certain that everyone had a busy summer and hoping you had some time to spend with family and friends at the campground, cottage, or just at a family gathering.

As we are well into the fall routine, I'm hoping everyone is now looking at their requirements for CEUs if you are up for certification renewal in 2020. The MPWWA continues to offer a variety of courses between now and the end of the year, but if you have something you would like to have training on please let us know and we will follow up to see if we can make it available.

Training Coordinator, Jeff Rogers, will be looking for training requests so he can contact training providers. The Zone Directors will still be involved in training in their area and you can contact them with your requests/comments. A list of directors and their zones can be found on our website: mpwwa.ca.

Your executive is currently in full planning mode for the 40th Annual Training Seminar with the theme "Growing Our Industry: Environment, Technology, Your Future" to be held in Halifax at the Marriot Harbourfront Hotel April 19 to 22, 2020. More information will be coming in early January, but if you have any ideas for presenters at the workshops

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New pilot project will help design infrastructure for climate change

■ BY ANDY WALKER

When the City of Charlottetown designs future water and wastewater infrastructure, Richard MacEwen says greater emphasis will be put on making sure it stands up to the impacts of the current climate crisis.

The Island capital and Halifax Water are taking part in a climate change adaptation project funded by the Building Regional Adaptation Capacity and Expertise (BRACE) Program of Natural Resources Canada, the governments of the four Atlantic provinces, and the Atlantic Canada Water and Wastewater Association.

"We have a line in our infrastructure guidelines that requires the impacts of climate change be taken into account," says MacEwen, manager of the water/sewer utility in the P.E.I. capital. "Now we are going to better define what that means."

MacEwen says water and wastewater infrastructure is designed to last for decades and "we know climate conditions 50 or even 100 years from now are likely going to be quite different."

The federal government is providing \$318,000 to the three-year project, and Charlottetown MP Sean Casey says, "The impacts of climate change are being felt across Prince Edward Island and across the country, and they pose a risk to our infrastructure, communities, economy, and environment."

The program provides training for professionals, such as public works, utility, and consulting engineers, to build their awareness of climate change adaptation. The aim is to increase their capacity to put the guidelines into practice. It's ex-



Regional partners have come together to create a pilot project for adapting water and wastewater systems to be more resilient in the face of the evolving climate crisis.

pected the updated guidelines can be applied in other regions in Canada.

"Our climate continues to change, and new design guidelines and training opportunities will help us build our communities for the future," says Brad Trivers, the P.E.I. minister of Environment, Water and Climate Change. "They will protect our ocean resources and support economic sectors like fishing, tourism, and aquaculture. The project also supports regional collaboration. Atlantic Canada will be able to draw on the collective expertise, experience, and resources of its engineering professionals."

Trivers says the project is a good opportunity for the Atlantic Provinces to bring together their collective expertise.

Charlottetown Mayor Philip Brown says, "It is important for all levels of government to consider climate change in all

infrastructure decisions. As a coastal city, Charlottetown will benefit greatly from this investment."

The total value of the project is \$645,000. Lynne Lund, a Green Party MLA in P.E.I., says, "Using climate change as a lens whenever we're making policy decisions is always going to be smart, and allows for us to use evidence when making those decisions. Wastewater treatment systems are certainly one area where we have to consider the impacts of climate change."

Jennie Rand, chair of the Atlantic Canada Water and Wastewater Association, says the design guidelines have been vital resources for its members. "Their update ensures climate change implications become a key consideration that is vital to the long-term success and sustainability of water and wastewater projects."

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Publication No. 40064799

Continuous hands-off insulation resistance testing of critical motors

Constant monitoring of critical motors while de-energized prevents failures on start-up, reduces downtime, saves rewinding, increases personnel safety

■ SUBMITTED ARTICLE

For decades, wastewater treatment plant personnel have performed insulation resistance tests with handheld megohmmeters to prevent motor failures that could lead to reduced capacity, costly re-winding repairs, and even unplanned shutdowns.

However, these tests only provide a “snapshot” of motor health. In a matter of only a few days, motor windings and cables exposed to moisture, chemicals, contaminants, or vibration can become compromised and fail at start-up.

Portable megohmmeters also require electrical technicians to manually disconnect the equipment cables and connect the test leads on potentially energized or damaged equipment to perform the manual testing.

These tests expose technicians to potential arc flashes when they access the cabinet. With so much at risk, wastewater treatment plant managers are recognizing the value of continuous megohm testing and monitoring of insulation resistance that initiates the moment the motor is off until it is re-started again.

Armed with this real-time information, maintenance personnel can take corrective actions ahead of time to avoid a failure that would interrupt or reduce plant capacity. By doing so, they can improve service

and save wastewater treatment plants potentially hundreds of thousands of dollars in repair fees for expensive rewinding over the life of the plant.

Furthermore, permanently installed automatic testing devices allow for “hands-off” monitoring without having to access cabinets, keeping technicians out of harm’s way.

MOTOR PROTECTION AT WASTEWATER TREATMENT PLANTS

Wastewater treatment plants rely heavily on motors, though the number and type vary depending on the size of the facility and type of wastewater treated.

Critical motors are essentially those that could significantly impair the ability to safely meet service objectives or affect water treatment quality levels if unexpectedly offline. Such motors can range from raw influent pumps and aeration blowers to various process pumps and final pumps. The motors can be 100 HP or more, as is the case with some aeration blowers.

Some of the critical motors include raw influent pumps that move incoming water to the highest point at the plant before gravity-fed systems take over; along with dry pit submersible pumps, aeration blowers and other motor-driven equipment.

To protect these motors, most wastewater treatment plants conduct time-based

preventative maintenance (PM) programs that include insulation resistance tests several times a year. Based on these tests, motors may be scheduled to be sent out to repair shops for reconditioning.

Wastewater treatment pumps are exposed to a wet, moist environment and the motors can burn up if they start up wet, which is costly. Rewinding or replacing the raw pumps, for instance, could cost as much as \$50,000 each.

As a solution, some wastewater plants use heaters in critical motor windings to keep them dry, as well as a continuous testing and monitoring device.

The testing device is permanently installed inside the high voltage compartment of the MCC or switchgear and directly connects to the motor or generator windings. The unit senses when the motor or generator is offline and then performs a continuous dielectric test on the winding insulation until the equipment is re-started.

The unit functions by applying a non-destructive, current limited, DC test voltage to the phase windings and then safely measures any leakage current through the insulation back to ground. The system uses DC test voltage levels of 500, 1,000, 2,500 or 5,000 volts that meet the IEEE, ABS, ANSI/NETA, and ASTM International standards for proper testing voltage based on the operating voltage of the equipment.

The test does not cause any deterioration of the insulation and includes current limiting technology that protects personnel.

The equipment tests continuously whenever the motor is off, so you can catch a problem like excess moisture or a breakdown of the windings before a critical motor burns up.

HANDS-OFF MONITORING

The continuous monitoring system also allows for a hands-off approach that does not require service technicians to access control cabinets to perform a manual insulation resistance test.

Instead, an analog meter outside on the control cabinet door shows the insulation resistance megohm readings in real time. The meter also indicates good, fair, and poor insulation levels through a simple green, yellow, red colour scheme. When predetermined insulation resistance set point levels are reached, indicator lights will turn on to signal an alarm condition and automatic notifications can be sent out to the monitoring network.

Most motors utilize heaters to maintain the temperature inside, so it doesn’t vary drastically from operating temperature or ambient temperatures outside the unit. If it goes below the dew point, the motor will start picking up condensation while offline.

However, if these heaters fail to operate properly or the circuit breaker is tripped, plant personnel may not be aware of it until the motor fails on start-up. Although these motor heaters are checked regularly, this can leave critical motors unprotected for weeks or even months.

Fortunately, continuous monitoring and real-time information equipment can also show if the heaters used to maintain thermal temperatures and prevent condensation are properly working. If not, maintenance personnel can take corrective actions ahead of time to avoid critical motor failures and interrupted production.

Continuous monitoring devices can be hooked to the critical motor starter and will prevent the motor from starting if there is a serious problem.

PREVENTING ARC FLASHES

Enhancing employee safety and preventing potential harm from arc flash is another key factor behind the decision to install the continuous insulation resistance testing and monitoring devices. Arc flashes are immediate and can produce temperatures four times that of the surface of the sun.

MESSAGE FROM THE CHAIR

Continued from page 1

please contact conference co-chairs Kevin Kelloway and Bill Cannon, or your local Zone Director.

We will be sending out seminar brochures with much more detailed information on workshop topics, presenters, and speakers.

Another important part of our Annual Training Seminar has become the charity Auction and once again we will be helping support a deserving local charity from Nova Scotia called Dreams Take Flight (Atlantic region). We appreciate all the support we get from the membership when you open your wallets, as well as from suppliers and employers for donating items for you to bid on.

The Bylaw changes/clarifications brought forward at the 2019 AGM for approval have been made. We have our

financials “signed off” by the auditor, he is happy with changes the board made in the last few years to get the association back on a sound financial footing, so we are able to cover all amounts we have committed to with contracts for conferences. We are continually committed with venues three years in advance of seminars to ensure we get the pricing and time period we are looking for. The 2019 Seminar in Moncton cost \$113,370 to put on, to give you an idea of what type of dollar figures our contracts involve.

We will be making some changes to the MPWWR in the coming year to get more information to members from regulators, keep an eye out for the next issue.

Enjoy the fall and have a Merry Christmas and Happy New Year, since next issue is in 2020. Feel free to contact any of the board members or Clara with ideas or questions.

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Moncton official outlines plan to deal with 'do not consume' order

Algae bloom led to full-scale test, review of Fredericton's emergency action plans

■ **BY ANDY WALKER**

When blue-green algae was discovered in the Tower Road Reservoir in the fall of 2017, Julie Stokes says it served as a wake-up call to review procedures used in the event the municipality was forced to institute a "do not consume" order for its drinking water.

Stokes recently presented the details of that review during the MPWWA annual training seminar. Stokes says while the discovery of algae in its back-up reservoir didn't result in such an order, it did provide an opportunity to review operational plans with partners, including local and provincial emergency measures organizations, the water operators in the three communities, the provincial departments of health, environment, and fisheries, as well as the two hospitals in the city.

The system services a metro area with 25,900 service connections in Moncton, 7,900 in Dieppe, and 7,500 in Riverview. The area has been sourcing its water from the Turtle Creek reservoir since 1963 and added Tower Road in 2013.

After the algae was discovered, Stokes says the utility identified a number of causes for concern, including what spe-

cies of algae were present, what type of toxins might be released and at what level, what water treatment options were available, and what laboratory testing should be done. The key question, of course, was how to stop the spread, with several solutions (including phoslock and aeration) being explored.

Stokes says the emergency plan includes an incident response system with several phases, including communications, supply and distribution, and re-commissioning. The communication plan includes such things as alert ready messages, a call centre, door hangars, and a list of frequently asked questions.

Stokes says the city has calculated 12 million U.S. gallons per day of potable water would be needed in the case of a "do not consume" order, with an emergency supply of 130,000 U.S. gallons recommended. Possible sources of water identified under the plan include neighbouring municipalities, bottled water from the Red Cross (in the short term), and the Canadian Forces portable reverse osmosis system.

She says it's vital to establish priorities on who gets water delivery in the event of an emergency, with priority going to hospitals, special care homes, day cares and

schools, shelters and hotels (if possible). Stokes says one question to answer regarding distribution is whether to have a significant number of smaller centers or a relatively small number of central distribution facilities.

When setting up the centre, attention must be paid to such things as pedestrian traffic and site safety for truck deliveries. Moncton has identified the Coliseum as a main distribution centre, and Stokes says there are at least three distribution sites in each municipality.

Stokes says the re-commissioning phase

must also be coordinated to ensure every hydrant is flushed and sampling takes place to ensure safety. She says it's a challenge to coordinate all the players involved in an emergency plan.

"Asked yourself: Are we prepared? Is our emergency plan strong enough? Has it been tested?"

"We felt we had a pretty good plan to supply water to every resident in the event of a "do not consume" order before the algae was discovered, but there is no plan that can't be improved and we were able to do that working with all our partners."



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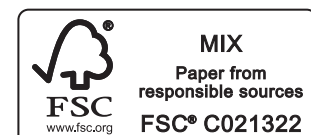
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Ryerson study shows no products meet definition of flushable

New definitions needed to keep inappropriate products out of the sewer system

■ **BY ANDY WALKER**

A report conducted recently by the Urban Water Department at Ryerson University casts doubt on claims by several product manufacturers that their products are flushable.

The study, conducted for the Municipal Enforcement Sewer Use Group of Canada, tested 101 single use products, including 23 listed as safe to flush by the manufacturer. However, no product was able to disperse safely through the Flushability Laboratory at the Toronto University.

Consumer products were tested for toilet and drain line clearance, disintegration under the International Water Services Flushability Group (IWSFG) specification, and fibre composition. The researchers also evaluated the products that claimed to be flushable against the claims made on the package label.

The research concluded none of the products met the IWSFG guidelines when it came to flushability. Barry Orr, the report lead, says there was little in the fi-

nal document that came as a surprise. In a statement issued when the study was released, the master's student in Environmental Applied Science and Management says: "This research confirms conclusively what those of us in the industry already knew: single-use wipes, including cleansing and diaper wipes, can't be safely flushed, even those labelled as 'flushable.'"

Orr, who is also control inspector with the City of London, says improper disposal of single-use items carries a heavy price tag. Between 2010 and 2018, the City of Toronto logged nearly 10,000 calls per year from residences due to sewer service line-blocks relating to factors such as disposal of non-flushable materials down household toilets.

The Municipal Enforcement Sewer Use Group estimates Canadian municipalities collectively spend \$250 million annually to remove blockages from their systems due in large measure to wipes and other non-flushable materials.

"Many of these wipes also contain synthetic fibres, including plastics, which

can make their way into waterways, harming water systems and wildlife," the study says. "This occurs most often when clogged municipal infrastructure leads to overflows and spillage into local waterways."

Orr says that despite the fact many Canadian municipalities have spent time, money, and resources developing and delivering educational programs detailing what is and isn't flushable, the problem may be related to a lack of awareness on the part of the general public. The study recommends an increase in public awareness of appropriate disposal methods, which may result in consumers taking more care when disposing of these products in order to prevent blockages in their homes.

The study also recommends the word flushable be eliminated from consumer products. Orr says, "Manufacturers need to be regulated to properly label products, so that residents can make informed decisions that can save money and protect infrastructure and the environment by prop-

erly disposing of wipes in the garbage."

The study says many of the products tested were manufactured outside of North America, arguing a global definition is needed for a flushable product.

"Defining flushability for sewer use clearly highlights the need for a legislated standard definition around the term flushable, that ensures a product is safe to be disposed of down the toilet," Orr says. "This will in turn lead to imposing stricter regulations for the labelling of products. The current practice is misleading consumers and creating harm on so many levels. This study is an important step towards regulating manufacturers to change their packaging."

The study recommends the development of a methodology to collect the information in a more systematic and easy way on the causes of blockages in order to better understand this issue and aid in developing effective control alternatives. It also recommends further research to test other products, such as feminine hygiene products, kitty litter, and dental floss.



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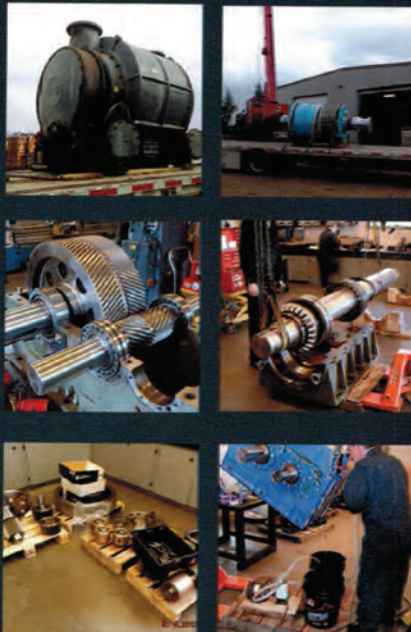
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Believe in yourself, jump in, don't look back



Valérie Michaud is a water and sewer operator for the City of Dieppe.

Operator: Valérie Michaud
Water and Sewer Operator

Q. Where do you work?

A. City of Dieppe

Q. How long have you worked in the industry?

A. Eight years.

Q. When did you join MPWWA? What are the advantages of being a member?

A. I joined in 2012. There are such great courses and workshops available to learn new skills and improve yourself.

Q. What's the biggest challenge in your job?

A. There are many different challenging situations, but I'd rather switch the word challenge for opportunity to grow. It keeps me motivated to learn and be better at what I do. "A smooth sea never made a skillful sailor."

Q. What is your favourite part of the job?

A. Solving issues and concerns for the citizens.

Q. What is your less favourite parts of the job?

A. The on-call part. I hate having calls in the middle of the night.

Q. How did you first become involved in the industry?

A. Back in college, when I did an internship at a wastewater treatment plant.

Q. What's the least understood part of your job? What else should the public

know about what you do?

What they see is only the point of the iceberg. There is so much more stuff involved.

Q. What's something everyone knows about you?

A. I'm a generous person.

Q. What's something almost no one knows about you?

A. I can drive transport trucks.

Q. What is your proudest professional accomplishment?

A. Obtaining my PTech certification.

Q. What is your proudest personal accomplishment?

A. My little boy.

Q. What's your best advice to a fellow industry member, or someone looking to join the industry?

A. Believe in yourself, jump in, and don't look back.

Stratford approves tender for new wastewater system

■ BY ANDY WALKER

For the mayor of P.E.I.'s third largest municipality, putting an end to the obnoxious odour coming from the town's lagoon system was job one.

Steve Ogden, who had previously served on council before winning the mayor's chair in 2018, says the odour problem was the main topic of discussion all candidates heard on the campaign trail. The current council isn't the first to tackle the issue, but the mayor believes they've found a permanent and affordable solution that will be in place by the end of next year.

The solution is the same as one put to tender twice before: build a delivery system that will allow wastewater to be shipped across the Hillsborough Bridge where it will be dealt with by the Charlottetown Area Pollution Control plant. On the previous two occasions, all the tenders significantly exceeded the budget for the project, which will be funded by the three levels of government.

This time additional changes were made to the design to reduce cost, and the provincial work that's required to stabilize the embankment and upgrade the structure were included in a combined tender. Birch Hill Construction was awarded the \$17,590,642.82 tender, beating out Dexter Construction

(\$20,042,458.74) and Island Coastal Services Ltd. (\$20,054,559.05).

The unanimous vote to award the tender was greeted with applause from around the table. Work is expected to begin soon, and the project is scheduled to be complete by the end of 2020. The town's portion of the project is \$10.9 million, and Ogden says it's one of the biggest projects the town of 9,000 has ever embarked on.

He served notice residents can expect an increase in their water and sewer bills to help pay for the improvements. The tenders include \$8.6 million in municipal funding, with the remainder used to help with cost of decommissioning the lagoon system and turning the area into green space.

"We are extremely happy to be moving forward on this important project," Ogden says. "There has been a great deal of time spent by staff and both the current and previous councils to get us to this point."

Currently, sewage from the town is sent to the lagoon by a series of 29 pumping stations, according to Jeremy Crosby, deputy CAO and the director of infrastructure for the town. Crosby has told council a new triplex pumping station with dual-forced mains will be installed to carry the wastewater along the highway, under the Hillsborough Bridge, and back up along the highway to the Charlottetown plant.



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National Pollutant Release Inventory compiles fact sheet for wastewater operators

■ BY ANDY WALKER

The federal government's National Pollutant Release Inventory has released a fact sheet of substances found in wastewater and pollutant trends between 2009 and 2017.

Businesses, institutions, and municipalities must report their releases and disposals of pollutants to air, water, and land annually to the inventory. There are more than 2,000 wastewater facilities officially registered under the Wastewater Systems Effluent Regulations, which are in or around populated areas and built near rivers, lakes, or oceans.

Reporting to the NPRI depends on several criteria, including the size of the facility. For 2017, 171 Canadian wastewater facilities (the majority of which are owned and/or operated by municipalities) reported on 87 substances to the NPRI.

The inventory tracks pollutants harmful to the environment, including nutrients such as nitrogen (found in nitrate ion and ammonia) and phosphorus that may over-fertilize waters and alter the local ecosystem. It also tracks chlorine that may be

toxic to aquatic invertebrates, algae, and fish, and metals such as mercury, lead, cadmium, chromium, arsenic, and zinc.

The inventory doesn't track pollutants and substances of concern such as organic matter that uses up dissolved oxygen in water, or bacteria and viruses that may pollute beaches and contaminate aquatic life (i.e. shellfish). While the inventory does track nonylphenols and ethylene glycol found in such products as microplastics, pharmaceuticals, and personal care products, other substances found in these products are not reported.

"These pollutants are emerging as fields of study and we still have little knowledge about them and their impacts," the fact sheet notes. "The vast majority of wastewater facilities were not designed to remove or treat these substances."

In 2017, the inventory document notes 89 per cent of releases to water reported to the NPRI came from the wastewater sector and were mostly comprised of ammonia, nitrate ion, and phosphorus. To reduce the harmful impacts of ammonia, the report notes many facilities now transform it into nitrate ion through advanced treatment processes.

That has resulted in a 10 per cent drop

in ammonia since 2009. At the same time, releases of nitrate ion, which is a less harmful pollutant, have increased by nearly 45 per cent.

Released in excessive amounts, phosphorus may over-fertilize waters, causing algae to grow faster than the ecosystem can handle. According to data collected by the inventory, wastewater facilities release more than 4,000 tonnes of phosphorus each year.

The Wastewater Systems Effluent Regulations require larger wastewater facilities to have an average concentration of total residual chlorine of 0.02 mg/L, as of Jan. 1, 2015. The fact sheet notes, "For a number of facilities, the final step before releasing wastewater is to remove germs. Chlorine is an effective yet toxic disinfectant and most facilities using chlorine report no releases as it's either removed before release or they don't meet reporting thresholds."

Metals, such as zinc, manganese, copper, arsenic, and lead, may also be found in wastewater. Municipalities can use sewer by-laws to control the amount of metals sent to wastewater treatment facilities from industries and communities. The inventory document notes a fraction

of these metals can be separated from the wastewater and found in the sludge.

According to the Canadian Council of Ministers of the Environment, more than 660,000 dry tonnes of biosolids are produced per year by wastewater treatment across the country. As requirements for wastewater treatment become stricter, this number is expected to increase. Biosolids can be disposed of or recycled.

The fact sheet suggests wastewater facility owners and operators can use inventory data to better understand what types of pollutants are being sent to their facility and where the pollutants come from.

Despite efforts to prevent pollution, the inventory fact sheet notes contaminants such as pharmaceuticals and microplastics are still found in wastewater and the environment. It offers some examples of technologies that can be put in place to enhance existing treatment, including

integrated fixed film activated sludge (IFAS), where wastewater passes through a fixed film to which some pollutants will stick and be transformed by bacteria; and aerobic granular sludge (AGS), where in one aerated tank, bacteria remove organic matter, nitrogen, phosphorous, and other pollutants from the wastewater.

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