

**Title: Affordable Cellular AMI for Small Systems**

Contact: Michele Harvey [mharvey@badgermeter.com](mailto:mharvey@badgermeter.com)

Cellular-based meter reading systems are an excellent solution for small populations and/or large service territories. As cellular-based systems are typically hosted and do not require a large investment in software or servers, they are very scalable which is ideal for small populations. For large service areas, cellular-based systems eliminate the need to drive to or drive by the meter to obtain readings as they come to you via cellular connection and hosted service.

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**Title: Water Loss Audit and Validation**

Contact: Tammy Elzinga [tammy@leduc-county.com](mailto:tammy@leduc-county.com)

Leduc County had a water loss audit conducted for 2015 and 2016. I would like to present the water loss audit procedure using the AWWA Water Audit Software. A brief overview of our water distribution system and the changes that we have implemented over the last several years to help reduce our water loss. Present the information that is needed to conduct the audit and how improvements in the information will improve the audit validity. I will be using our audit information and the recommendations from the Audit. Part of the presentation will be apparent loss vs real loss, the difference between the two and how to reduce them. I will also be discussing some of the data issues that have been discovered in our accounting software that has attributed to apparent losses. Along with this I will be touching on the validation process which involves data review validation, data mining validation and field investigation validation.

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**Title: The City of Wetaskiwin's Journey to Compliance**

Contact: Sue Howard [sue.howard@wetaskiwin.ca](mailto:sue.howard@wetaskiwin.ca)

Follow the City through its permit renewal process and see the challenges, learn from our mistakes, and see the opportunities that are being explored to ensure Wetaskiwin's wastewater system is compliant with AEP requirements.

In preparation for the City's wastewater permit renewal in 2017 the City began to get prepared in 2016 by starting a Water Quality Based Effluent Study that was completed by Hutchinson Environmental. This report was presented here at this conference in 2017. Throughout 2017, the City and its consultant M2 Engineering Ltd. Were busy looking for solutions, knowing that meeting AEP best practice limits were going to be a challenge.

The team partnered with GE to run a pilot project in 2017. GE had MABR technology that had a proven history in warmer climates however, it had not been tested in the colder climates and what better place than a cold Alberta City to test your product. The pilot ran for 6 months and for all intents and purposes it was successful. The challenge for this team was how large of a system would be needed to fight the cold winters and make this technology feasible.

By the time the permit was up for renewal the team knew they were nowhere near ready to present a solution to AEP and asked for a 1 year extension of the existing permit, that was granted. The team is going to be busy over the next few months completing a feasibility study and working towards renewal.

This presentation will take you through the last year of ups and downs and hopefully give you a head start on your renewal and let you learn from our journey to compliance.

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**Title: Smart Water Plant**

Contact: Laurent Cataye [LCataye@ra.rockwell.com](mailto:LCataye@ra.rockwell.com)

Even the most curious people can find it difficult to keep up with new technologies. The world we live in today is evolving faster than ever, and this pace is going to accelerate even more. So here is your opportunity to catch up on what is already available today and what to expect in the years to come.

Innovations like the Internet of Things, Mobility, Big Data and Analytics have already begun to change the world. Several early adopters in the water industry have already obtained benefits that are difficult to ignore: the access to real time information, from anywhere, at any time, helps operators take the best proactive decisions. This results in better operational performance, better efficiency and costs reduction.

Sooner than later, the digital transformation will become an imperative because of the advanced possibilities enabled by these technologies along with even more stringent regulatory requirements. Like any profound change, there are also obstacles and confusion but there are already several ways to address those.

It is not too late to embrace digital technology. This presentation is for operators who need to better understand the impact of new technologies on operations and for managers who don't want to miss out on the latest opportunities to improve existing plants and start a journey towards Smart Water Plants.

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**Title: Thermal Chemical Hydrolysis**

Contact: Jerod Swanson [jerod.swanson@centrisys.us](mailto:jerod.swanson@centrisys.us)

PONDUS thermochemical hydrolysis process (TCHP) is an innovative anaerobic pre-treatment technology. Kenosha Wastewater Treatment Plant (WWTP) implemented a PONDUS TCHP in 2015 as a key upgrade of its Energy Optimized Resource Recovery Project. The objective of this presentation is to demonstrate the main benefits of the PONDUS TCHP based on the Kenosha installation, including digester volume saving, enhanced biogas production, higher sludge dewaterability, and easy operation and maintenance.

Sludge viscosity reduction allows better mixing and higher solids loading in anaerobic digesters in Kenosha WWTP. In average, PONDUS achieves 80% reduction of TWAS viscosity. The implementation of PONDUS enables the plant reduces six operating mesophilic digesters to three, realizing significant saving of digester heating, pump maintenance, and laboratory monitoring costs.

PONDUS TCHP enhances biogas production at the Kenosha WWTP by 20% - 27%. The enhanced biogas production improves the energy production through combined heat and power system. As a result, the plant produced sufficient electricity and hot water for the operation of PONDUS TCHP, anaerobic digester, thickening and dewatering centrifuges, and a Klein belt dryer. Volatile solids reduction ratio increases from 60% to 65%, even with shortened SRT by reducing six digesters to three. The improved volatile solids reduction ratio, together with higher biogas production, demonstrates PONDUS as an effective anaerobic treatment process.

Another benefit of implementing PONDUS in Kenosha WWTP is improved sludge dewaterability. After three months of PONDUS start-up, the cake total solids increased from 25% to above 27% with highest achieved TS of 31%. The higher cake dryness benefits the operation of the following Klein belt dryer by reducing hot water consumption by 10%. While with higher cake solids, polymer consumption is maintained at previously level with >99.5% solids capture ratio.

The stand-alone configuration of PONDUS TCHP allows easy installation and operation. The PONDUS system occupies part of a basement with 40' by 30' footprint in Kenosha WWTP (current flow 22 mgd). The PONDUS TCHP includes a hydrolysis reactor, a heat exchanger, a recirculation pump, and temperature sensors. PONDUS TCHP is operated with atmospheric pressure and moderate heat (150 F - 170 F), a safe working environment requiring no specialized certification. Operation cost mainly consist the NaOH consumption (20 lb NaOH/dry-ton sludge). Hot water is supplied from the exhaust heat of two combined heat and power units. Required operator time is less than 0.5 hours/day.

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**Title: Bio-solid reduction and management methods and case study analysis**

Contact: Jonathan Lee [jonathan@actizyme.com](mailto:jonathan@actizyme.com)

Operators and Municipalities are facing increased pressure to manage bio-solids. Acceptable solutions must be environmentally responsible and economically feasible. This presentation will focus on bio-solids reduction and management in wastewater lagoons as well as large scale digester systems. Specific topics will include the various methods of bio-solid reduction, the economics of bio-solid management and real world challenges faced by operators and municipalities when dealing with bio-solids in their wastewater lagoons and large scale city digester systems. Discussion will include the processes of dredging, bio-augmentation and anaerobic digestion. Numerous contemporary methods of bio-solid management and reduction will be reviewed and case studies analyzed.

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**Title: AIR/VAC RELEASE VALVES**

Contact: Dave Brewer [dbrewer@usccanada.com](mailto:dbrewer@usccanada.com)

Replace your old "traditional" air/vac release valves with "innovative" maintenance friendly air release valves.

Air Release valves play an important role in a water/wastewater system. They can extend a piping systems life by helping in avoiding the following:

- 1- Air in pipeline leads to increasing pressure and reducing flow rate periodically.
- 2- Air trapped in pipelines increase corrosion and provide a place for bacterial activities on pipeline coating
- 3- Air pockets in pipelines sometimes move along pipeline that results in transmission pressures in pipeline and affects pump efficiency
- 4- Air Aggregation in pipeline connections increase the possibility of pipeline failures.
- 5- Due to a very lower density of air rather than water, air rapidly exits from gaps and air valves. This leads to increasing Acceleration of water column behind air pockets and accruing high pressures.

With these factors needing to be considered and accounted for in a piping system-it is crucial that maintenance of the air valves be maintained in a regular manner. Not doing so can potentially lead to failures that at the very least interrupt a customer's service or in a worst-case scenario contribute to a catastrophic failure due to air accumulation.

When considering an air/vac release valve, options are available that can make maintenance much simpler for the operator.

Using materials such as 316 Stainless steel in the construction of the air release valve provides excellent corrosion resistance in most environments seen in a water/waste water system. As well having easy access to the air release valve without the maintenance being performed within a "confined space" reduces risk to the operator.

The H Tec air release valve offers a product that allows for easy access from above ground, making a proper maintenance routine much easier for the utility to implement on a regular basis, thus extending the life of the asset.

These types of air release valves are available and will be discussed in detail as well as other innovative designs from H-Tec that make it easier for the owner/operator to choose the proper air release valve for their system.

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**Title: Optimize active biomass concentrations with premium MBBR carriers**

Contact: Ray Menard [ray@algacontrol.ca](mailto:ray@algacontrol.ca)

Examine the factors that impact the efficiency of a Moving Bed Biofilm Reactor (MBBR) and understand how these factors impact wastewater treatment plant performance and operating costs.

1. Surface area to volume ratio of the carrier
2. Diffusion depth

3. Buffered/protected active surfaces
4. Carrier mixing energy requirements
5. Durability

In this session operators will learn why their current or planned MBBR systems could benefit from utilizing premium MBBR carriers over standard MBBR media. Specifically, the Mutag BioChip 25™ premium MBBR offers distinct advantages over the other MBBR products on the market.

1. Explanation of product
  - a. Drastic improvement in surface area to volume
    - i. Over 4500m<sup>2</sup> /m<sup>3</sup> - 3.5 to 12 times that of other carriers
  - b. Optimized diffusion depth to prevent build up of non-active biomass
    - i. Optimized to 0.5mm to ensure oxygen and nutrients are sufficiently supplied to all of the biomass
  - c. Protected active surface to prevent shearing of active biomass
    - i. Active biomass is not abraded
  - d. Reduced mixing energy requirements
    - i. Lightweight with an innovative shape for easy suspension
  - e. High durability for reduced maintenance costs
2. Applications
  - a. Good for new builds of easy to retrofit or upgrade existing systems
    - i. Moving Bed Biofilm Reactor (MBBR)
    - ii. Integrated Fixed Film Activated Sludge (IFAS)
    - iii. Anaerobic Ammonium Oxidation (ANAMMOX)
  - b. Complete process support for calculations, start-up and operation
3. Performance comparison of Mutag BioChip 25™ to other carriers in the market

Algae Control Canada is Mutag's western Canadian distributor. Algae Control Canada provides water management solutions for industry, government and private owners with a single guiding principle: deliver solutions that are effective, sustainable and a good value. At Algae Control Canada we collaborate with our clients to correctly diagnose problems and identify cost effective solutions to them.

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**Title: Current and Future Challenges for Municipalities to Achieve their Final Effluent Limits**

Contact: Bradley Young, [bradley.young@veolia.com](mailto:bradley.young@veolia.com) & Chris Howorth, [chris.howorth@veolia.com](mailto:chris.howorth@veolia.com)

The federal government of Canada has implemented the Wastewater Systems Effluent Regulations (WSER) as part of the Fisheries Act. This regulation is designed to achieve a minimum level of wastewater treatment required to protect the aquatic environment. Provinces, and specifically Alberta, have introduced even more stringent regulations.

Municipalities are faced with difficult choices to upgrade their treatment facilities. Both passive and mechanical treatment facilities face challenges due to capacity limits or fundamental limitations of their

current treatment technology (e.g. ammonia removal from lagoons). This presentation will address the challenges faced by communities of all sizes and present potential options to achieve increasingly stringent final effluent limits. A particular focus will be given to leveraging existing infrastructure, withstanding the coldest temperatures, and minimising mechanical complexity, while remaining simple to operate and robust. Recent Albertan project examples will be presented.

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**Title: Fish Creek Wastewater Treatment Plant – CIPP Lining Overcomes Difficult Circumstances**

Contact: Dave Machado, Advanced Trenchless Inc., an Aquatera Company, [dave@advancedtrenchless.ca](mailto:dave@advancedtrenchless.ca)

Cured-in-Place-Pipe (CIPP) lining has been an increasingly popular method for the rehabilitation of municipal sewer systems for more than thirty years, but its use has not been adopted in industrial and plant settings at anywhere near the municipal rate.

This is not because CIPP lining methods are not as applicable in these settings, but rather because many companies that offer this service are not willing to take the necessary “think outside the box” approach that potential projects in these settings can require.

In February of 2017 a general contractor was looking for a solution to repair a carbon steel clarifier drain pipe at the Fish Creek Wastewater Treatment Plant in Calgary. The 450mm diameter pipe had four to eight litres of water infiltrating into it at 7m of head pressure through a 30mm hole right on an elbow. With the defective elbow at this depth, and also located under the clarifier wall next to a pump house, excavation was not a viable option.

Lining through (and specifically on a 45 degree elbow) and active water infiltration are two factors that greatly complicate a lining project, to the point that this client had been told by multiple contractors that CIPP could not be used. Despite these challenges, Advanced Trenchless Inc. was able to devise a methodology to suit the situation.

First, using a custom solution that we designed in-house, we installed a short, tight-fitting sectional repair at the elbow. This liner included a special hydrophobic membrane designed to stop the active infiltration. After we had confirmed that this repair was a success via CCTV inspection, we installed a more conventional liner through the full length of the drain pipe so that it would see an extended lifespan just as the recently overhauled clarifier would.

The end product turned out perfectly and the project was a complete success. The client saw a huge savings in cost and time as the system was able to be put back into use immediately upon completion of the lining.

This project proved that with the correct approach CIPP lining can address far more complex issues than deteriorating municipal sewer pipes.

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**Title: Is UV a Viable Strategy for Reducing DBP's**

Contact: Phyllis Butler Posy, [phyllisp@atlantium.com](mailto:phyllisp@atlantium.com)

Disinfection By-Product (DBP) formation, a side effect of chemical disinfection when chemicals react with naturally present organic matter in the water, endanger public health.

For water suppliers using chemical disinfection DBPs can be a problem, especially as public awareness and rules change to reflect various factors. DBP formation is exacerbated by high temperatures, making the balance between chemical use and water chemistry/temperature profile more complicated to achieve as seasonal changes push extremes. More systems need DBP reduction on their agenda.

There are different approaches to DBP reduction including precursor removal, DBP removal after formation, or modification of treatment & disinfection practices to minimize DBP formation. These strategies require balancing the cost & meeting regulatory and water quality objectives against the risk of forming regulated and non-regulated DBPs.

UV disinfection is a new strategy to control DBPs that can be cost effective for some systems. We will discuss the factors to consider for using UV successfully to reduce DBPs, and illustrate a case study of how a small system succeeded in reducing DBPs using UV at a substantial cost savings compared to traditional methods, that could serve as a lesson/model for Canadian water suppliers.

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**Title: Patches and Tin Cans: The City of Calgary's In House Trenchless Sewer Pipe Rehabilitation Toolkit**

Contact: Frank Flaviano & Joanne Barrett, [joanne.barrett@calgary.ca](mailto:joanne.barrett@calgary.ca)

The City of Calgary Water Services operates and maintains more than 4,000 km of sanitary collection sewer mains and more than 300,000 residential laterals. Operations recently acquired technologies that allow for pipe defects to be rehabilitated trenchlessly on both sanitary mains and laterals.

The traditional method of repairing broken mains and laterals is open-cut excavation and replacement of the damaged pipe. In recent years, escalating excavation costs and budget constraints combined with aging and failing infrastructure has necessitated exploration of less expensive methods. Advances in CCTV and robotics technology have made trenchless repairs a viable alternative.

In 2010 the mainline video operation added the Rausch QuickLock Pipe Point Repair system to its fleet of CCTV units. This enabled CCTV crews to install Rausch QuickLock mechanical point repairs (referred to by City employees as "tin cans") inside defective sanitary mains. This repair method has proven to be an effective alternative to excavation repairs and has also enabled expansion of the capital CIPP rehabilitation program to include more severe defects.

In 2016 Water Services started using the Fernco PipePatch Point Repair system to address defective laterals. These repairs compliment Calgary's capital lateral CIPP programs, such as cost shares and installing CIPP liners over the entire public-side of the lateral.

Candidate selection for the various corrective programs relies heavily on condition assessment data collected by Water Services CCTV operators. Ensuring assets meet the criteria for trenchless rehabilitation requires video details of the defect, as well as access and location considerations. A large part of Calgary's success in implementing in-house trenchless methods was due to incorporating this work with the existing condition assessment crews.

This presentation will share Water Services' journey to include in-house trenchless tools to their O&M toolkit. It will highlight some challenges, successes and learnings to date.

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**Title: Eliminating Confined Space Entry in AR Valve Chambers**

Contact: Derek Traquair, [dtraquair@martechdss.com](mailto:dtraquair@martechdss.com)

Alberta Public Works departments face a constant struggle with managing operations budgets, time, and safety throughout the province. One of the most prevalent conditions that need to be addressed in both these aspects are confined space entry requirements and procedures – specifically in air release valve chambers. Costly and time consuming operations to perform maintenance on these valves has led manufacturers to look at methods of increasing operator safety while alleviating budget costs.

In 2005, the first self-contained combination air release and vacuum breaking valves were released in North America. This design has since been utilized throughout the continent and especially in Western Canada to eliminate confined space entry in both existing and new construction installations. There are now over 2000 installations in this province.

Recently, local municipal operators have conducted inspections of some of the earliest installations of replacing traditional water and wastewater air release valves with self contained combination air release and vacuum air release valves. This progress and the results are discussed in a series of case studies in Alberta municipalities.

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**Title: User Friendly Sanitary Pump Stations**

Contact: Suchit Kaila, [suchit.kaila@stantec.com](mailto:suchit.kaila@stantec.com)

Wastewater management and sanitary transmission in residential neighbourhoods is usually a routine engineering exercise that produces standard and mundane infrastructure mainly because the outcome is focused more on practicality and cost savings and not aesthetics or making it operationally friendly. These pump stations are necessary infrastructure but often ignored when it comes to O&M and regular preventive maintenance because they are not pleasant environments, equipment regularly fails, access is difficult and maintenance procedures are labour intensive.

Over the last five years, sanitary pump stations designed by our team went through a lessons learned exercise while gathering input from the operations and maintenance teams. With the strong desire to be innovative and improve upon the designs rather than standardizing to a typical sanitary pump station, subtle design features emphasized user friendly aspects of it. The design features can create a

sanitary pump station which is user friendly and less of a burden to maintain and operate by the operations team.

This presentation will focus on some of the key and subtle aspects of sanitary pump station designs such as:

- Deep wetwell access and cleaning
- Solids mitigation and preventing pump clogging
- Design for safety
- HVAC and its controls including backup power generation improvements
- Odour mitigation
- Instrumentation and controls with remote monitoring
- Backup operation in case of station failure
- Building aesthetics and integration into the adjacent neighbourhood

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**Title: Taber Industrial Lagoon and Effluent Irrigation System Upgrades: Maintaining Lagoon Operation during Construction**

Contact: Kyle Lohrenz and Zac Kostek , [klohrenz@mpe.ca](mailto:klohrenz@mpe.ca)

After an assessment of the Town of Taber's existing industrial lagoon and effluent irrigation system it was determined that upgrades were required. The lagoon's aeration equipment (blowers, piping, and aerators) were in poor condition and required replacement. Desludging of four (4) lagoon cells was also required to replace the existing aerators. The existing aeration building electrical service was 4160 VAC which is uncommon and inconveniently requires a specially trained, non-local electrician to perform maintenance. The electrical service was converted to a more common 575 VAC. Treated effluent is discharged by an irrigation system that operates out of a pump station building on the lagoon site. The pumps and piping were in poor condition and replaced as part of the upgrades.

The industrial lagoon system is the Town's only method of treating industrial wastewater which requires it to remain operational throughout the construction phase. It was clear before design started that detailed construction coordination would be required to keep the industrial lagoon system operating while upgrades were being completed. The biggest challenge during construction was keeping continuous aeration to the lagoon cells during the aeration equipment and blower replacements, desludging, and the electrical service change-over. Minimal coordination was required to keep the irrigation system operational since the effluent irrigation system is only in operation during the irrigation season (May – September). The upgrades to the irrigation system will be completed during the non-irrigation season.

This presentation reviews the challenges of keeping an aerated lagoon wastewater treatment system operational during the construction phase.

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**Title: Pump and Pipe coatings and the risk of Volatile Organic Compound Formation**

Contact: Darren Diprose, [ddiprose@epcor.com](mailto:ddiprose@epcor.com)

This presentation will discuss the risk of forming Volatile Organic Compounds during the rehabilitation of pumps, pipes and valves as well as methods to reduce or eliminate them.

If released into the water system VOC's can have significant adverse health effects. We will briefly discuss the possible health effects of these substances and the limits for them under NSF 61, Canadian drinking water guideline's and EPCOR's internal limits.

We will focus on events that occurred at 2 EPCOR treated water field reservoirs during equipment rehabilitation, the lessons learned and the changes made as a result of these events

The rehabilitation of pumps, piping and valves is common practice in our industry. Coatings are used for corrosion protection, material rehabilitation and cavitation resistance to name a few.

Fully understanding the coating materials involved and how to apply them according to NSF 61 standards are key to eliminating the risk of VOC contamination and ensuring the proper coatings and application procedures are used.

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**Title: Operations & Maintenance Considerations For Chemical, Biological and Activated Carbon Odour Control Systems**

Contact: Sean Trainor, [sean.trainor@evoqua.com](mailto:sean.trainor@evoqua.com)

The choice between chemical, biological and activated carbon odour control systems for municipal sewage treatment processes is largely a financial one. All three technologies can be effective, but the capital and operating costs can vary widely depending on the volume of air and concentration of odours being treated. O&M considerations also play an important role in appropriate technology selection.

Biological systems generally have the lowest operating cost, especially when treating higher odour concentrations, but their installed capital cost can be expensive when large air flow rates are required. Chemical scrubber systems are more expensive to operate, largely due to the cost of chemicals, but can be more efficient, less sensitive to fluctuations in odour levels, and will have lower installed cost when treating large air volumes. Activated carbon systems can be cost effective treating low odour concentrations, but quickly become too expensive if the carbon media needs to be replaced too often. Therefore a life cycle cost evaluation is needed to properly compare the relative cost of ownership of these odour control technologies, taking into account the installed capital cost, operating cost, and maintenance requirements for a range of air flow rates and odour concentrations.

A side by side life cycle cost comparison between chemical scrubbers, bio-trickling scrubbers and activated carbon filters is presented for a range of air flow rates and odour concentrations. It is seen that each technology has its niche, with certain applications where it is more favourable.

Other important factors must also be considered, including level of operator input and maintenance hours required, available space, types of odorous compounds, fluctuating odour concentrations, intermittent operation, and uncertainties in the current and future design requirements. Some general “rules of thumb” for odour control system design and selection are presented.

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**Title: Optimizing complex groundwater with (almost) no budget – a case study**

Contact: Neil MacDonald, Chad Moore and Aaron Janzen, [aaron.janzen@gov.ab.ca](mailto:aaron.janzen@gov.ab.ca)

Drinking water systems that treat groundwater are typically considered simple and easy to operate. Groundwater chemistry is usually consistent and easy for an operator to deal with, but what happens when a groundwater source has consistently complex chemistry that is hard to treat?

This presentation will discuss the findings of one year of optimization:

- Simple housekeeping can improve the operation of a drinking water system. Simple fixes such as minimizing leaks, reducing humidity, improving lighting and electrical connections are often overlooked, but can dramatically improve the workability of a water system and reduce electrical and corrosion related failures.
  - Understanding source water chemistry can lead to simple operational improvements. The operator can predict chlorine demand, dosing and residuals when the analytical results are compared to jar testing. Understanding the source water chemistry can lead to operational improvements such as recirculation, flushing and optimizing chlorine dosing.
  - Information and records management is key. It took a lot of effort to update Standard Operating Procedures (SOPS), daily and weekly checklists, excel reporting files, systems maps and Drinking Water Safety Plans (DWSP) but having this information centralized and consolidated helped the improve operations. Some examples of available information management resources will be discussed. We will give examples of how the DWSP Action Summary was used to prioritize the spending to balance risks and budgets.
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**Title: Drinking Water Electronic Reporting Changes & Mandatory Contact Details**

Contact: Kathleen Pongar, [kathleen.pongar@gov.ab.ca](mailto:kathleen.pongar@gov.ab.ca)

Electronic Reporting of Drinking Water data (to satisfy monitoring requirements) has been in effect since 2003. There are some changes to the Data Entry forms, in particular, the Contact Details Information tab, that will be very important to operators.

This talk will explain the importance of the Contact Details Information (for the Bacteriological Protocol & Emergency contact) tab, and the move, to this component of DW electronic reporting, to become MANDATORY. There will be further mention of acceptable sample identification, critical for file based data, for both Contract Laboratory and Provincial Laboratory analyses. Handout(s) will be available.

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**Title: Operational challenges to achieve drinking water quality**

Contact: Grant Dixon and Abubakar Waraich, [waraicha@ae.ca](mailto:waraicha@ae.ca)

The presentation describes the operational challenges of Kehewin Cree Nation, an indigenous community located in Northern Alberta. Their water treatment plant (WTP) was not meeting the Canadian drinking water quality standards. As such the community was placed under boil water advisory to protect the community. Raw water for the WTP is drawn from the Kehewin Lake that experiences severe algal blooms and high levels of natural organics. In addition, the water system is challenged by aging infrastructure and equipment at the WTP and numerous operational issues related to the transmission system. Water quality data from Health Canada in addition to bench-scale tests were utilized in determining the WTP upgrade strategy. Side-by-side pilot testing played an important role in determining the suitable process scheme given the financial considerations and to demonstrate that the proposed scheme could meet the water quality standards. The presentation includes the operational challenges, pilot testing and process selection.

The presentation would benefit small water treatment plant operators in identifying the operational challenges that hinder treatment, decision that are factored around capital budget and importance of piloting for verifying the proposed upgrade.

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**Title: Town of Banff WWTP Aeration System Upgrades – Selecting Equipment to Provide Energy Savings**

Contact: Sarah Bruce, [bruces@ae.ca](mailto:bruces@ae.ca)

The Town of Banff (the Town) is one of Canada's major tourist centers, with a small permanent population and a larger transient population. The Town operates a biological nutrient removal (BNR) wastewater treatment plant that was originally built in 1988 as a conventional activated sludge plant. Until recently, the plant was using multistage centrifugal blowers to supply process air to the bioreactors. The blowers were installed during the original construction of the plant and were coming to the end of their serviceable life. Only two of the three blowers had been functional, leaving the plant without standby capacity during peak conditions.

The Town decided to proceed with a blower upgrade to provide increased resiliency and improve energy efficiency. An assessment of blower upgrade options was completed, evaluating different blower technologies, after review of the plant's current and future demands. The blower types reviewed were: multistage centrifugal, turbo, positive displacement and hybrid (rotary lobe/screw) blowers. A multicriteria evaluation was completed to determine the best option for the Town. Concurrently with the blower review, potential aeration diffuser alternatives were evaluated for energy efficiency improvements.

To date, the project has been delivered from the study phase, to design, construction, commissioning and one year of operation. This paper will discuss the blower selection process, identify key points to consider during an aeration system upgrade to reduce energy consumption, while still planning for

future plant flow projections. Process aeration and mixing requirements for the biological nutrient removal process will be discussed, with some key points on Banff's experience. Challenges faced with retrofitting an existing plant in a protected area will also be highlighted. Energy savings from the new blowers and diffusers will be presented for the upgraded aeration system.

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**Title: Selenium Removal and Operational Challenges**

Contact: Marco Braat, [mbraat@epcor.com](mailto:mbraat@epcor.com)

This presentation is prepared based on our operational experience at TECK West Line Creek (WLC) selenium active water treatment plant in Elk Valley.

Selenium is an essential micronutrient for human beings and animals. However, it can accumulate in the bodies and cause chronic or acute toxic impacts if the concentration is getting too high. The maximum acceptable concentration (MAC) for total selenium in drinking water is 50 ug/L (Health Canada, 2014).

BC water quality guidelines (WQG) recommend <2 ug/L total selenium in freshwater and marine to protect aquatic life.

It has been noticed that selenium is naturally abundant in rocks at some coal mines in BC. When selenium-rich rocks are disturbed during mining processes, selenium can be released as water percolates through the rock mass causing elevated selenium levels in mining affected water bodies.

Nitrate is left over residue from dynamite used to blast through the rock to reach the coal seams. This also needs to be removed from the water streams.

In this presentation, we would like to provide an introduction of what selenium is, where the nitrate comes from, why it is an issue, and how it is being removed from the water streams; then, an overview of the treatment process at the TECK WLC plant, and lastly, major operational challenges that we found as well as our experiences learned from those challenges will be shared.

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**Title: Winning the War Against Wipes**

Contact: Kailey Habermann, [kaileyh@jwce.com](mailto:kaileyh@jwce.com)

In 2013 JWC Environmental took up the challenge of eliminating wipes related sewage pump clogs. The goal was to stop forcing operators to spend hours unclogging and rebuilding wipes plagued pumps that have broken down, only to have this problem repeat itself in a few weeks or even days. The research involved understanding the different types of disposable wipes and how they react to grinders as well as how they behave within collections systems. The investigation also looked at the phenomenon of reweaving where cut and shredded wipes can reform into balls and long ropes when combined with FOG and hair.

The research led to the development and 2014 release of JWC's Wipes Ready® technologies for its Muffin Monster and Channel Monster products. Through the research, JWC was able to develop its

serrated cutter design that could cut wipe and rag products in 2-directions. This breakthrough meant that wipes would be in small enough pieces to not reweave and remain in suspension – thus preventing pump clogs. This patent pending technology was recognized with a WEF Innovative Technology Award in 2017.

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**Title: Role of Smart Tanks in Distribution Water Quality Management**

Contact: Gary Schaeffer, [gschaeffer@ugsicorp.com](mailto:gschaeffer@ugsicorp.com)

With the promulgation of the EPA's Stage 1 and Stage 2 Disinfection Byproduct Rules, water treatment operators and utilities scrambled to ensure their plants were in compliance with THM limits and more carefully monitored chlorine dosing – or switched to the more persistent (long-lived) chloramine as a secondary disinfectant – which had a much lower propensity to form THM's.

However, a new problem then became more apparent - residual chlorine (and other disinfectants) may also react further within the distribution network forming DBP's –both by further reactions with dissolved naturally occurring organic matter and with biofilms present in pipes and tanks. In addition to being highly influenced by the types of organic matter in source water, species and concentrations of DBPs vary according to the type of disinfectant used, the dose of disinfectant, the concentration of natural organic matter and bromide/iodide, the time since dosing (i.e. water age) and temperature.

The emergence of "smart tank" design and operations now provides utilities with the ability to utilize water storage tanks as water quality intervention points. Tanks provide the perfect intervention point to solve THM spikes and low disinfectant residuals, but it all starts with powerful mixing. By revisiting water storage resources as intervention points, overall treatment can be optimized with the added potential for reducing treatment plant costs as they relate to THM reduction and disinfectant residual levels.

This presentation will examine the under-utilized water storage tank as an asset that can be used to improve distribution water quality with several methodologies. Several cases studies that illustrate "smart tank" technology improving chlorine residuals, reducing THM's and maintaining chloramine residuals will be included in the presentation.

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**Title: The Benefits of Biological Additives in Wastewater Collection and Treatment**

Contact: Colin Brushett, <mailto:colin@bio-pro.ca> and Norm Grexton, [normgrexton@shaw.ca](mailto:normgrexton@shaw.ca)

Our technical session will focus on the benefits of biological additives in wastewater collection and treatment. We will explain what Biological Additives are, how they impact waste water collection and treatment, the environment and the municipalities that use them.

What are Biological Additives?

We will explore this area in detail and attempt to inform operators on the simple science behind the additives available to them today. Covering what these additives are typically made of and why some components are more effective than others, we will uncover some of the taboos and myths surrounding

biological additives. We will explain the risks to infrastructure, mechanics and operator safety regarding additives, as well as how they affect the environment we live in.

What are the Benefits of using Biological Additives?

In this section we'll start by highlighting the benefits of Operator Safety and how biological additives eliminate the risks of using chemicals and subjecting themselves to other potential bodily harms. We'll explain the cost savings by comparing biological additives to mechanical cleaning and/or infrastructure additions. The last part of this section will cover the performance benefits of reducing grease, sludge, ammonia, hydrogen sulfide and corrosion.

Biological Additive Application Points and Expected Outcomes

This section will explain what to expect in the field when applying biological additives to the different areas of wastewater collection and treatment. We will touch on gravity sewer mains, lift stations, force mains, treatment plants and lagoons. Operators will be educated in the points of application and walk away with an understanding of what the results should be when applying a quality biological additive correctly.

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**Title: Bio-Electrochemical Anaerobic Sewage Treatment (BEAST) Technology Offering Promising and Cost-effective Results for Wastewater Systems**

Contact: [jbesinger@countygp.ab.ca](mailto:jbesinger@countygp.ab.ca) / [rhewko@elkanenviro.com](mailto:rhewko@elkanenviro.com)

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Smaller, northern municipal wastewater lagoons and other wastewater systems may not be able to effectively biodegrade sewage waste, causing human and ecological health concerns. Waste effluent discharge also often contains large amounts of nutrients, causing eutrophication of receiving waters.

This presentation describes a simple and economical wastewater treatment technology, suitable for small and/or remote northern communities, which uses a bio-electrochemical anaerobic sewage treatment (BEAST) technology developed by the National Research Council of Canada (NRC).

The technology is based on enhanced biodegradation of organic carbon through a combination of anaerobic methanogenic and microbial electrochemical (bioelectrochemical) degradation processes, leading to biomethane production. The bio-electrochemical degradation is achieved in a membraneless, flow-through anode-cathode setup (Microbial Electrolysis Cell), operating at a low voltage - below the water electrolysis threshold. While previous patents and technologies using bio-electrochemical anaerobic processes focus on biohydrogen production, this technology focuses on improved effluent quality.

The application of this technology can be well-suited to residential wastewater treatment systems as well as to work camps. It can also be easily scaled for small to mid-sized communities. Its very modest

power requirements make it remarkably suitable in remote areas, where off-grid power comes at a very high cost. In colder climates, where lagoon operation becomes a challenge, this BEAST technology shows promise in meeting effluent requirements even at colder temperatures. While operation is simple and requires minimal training, capital and operational costs are expected to be lower than conventional mechanical treatment systems.

A variety of results will be reviewed and presented, using varying reactor sizes and configurations, retention times, and wastewater strengths. Biomethane measurements will also be reported where measured. Future direction and tests will be discussed.

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**Title: Control System Assessments – First Steps towards Modernization**

Contact: Zane Spencer, [zspencer@mpe.ca](mailto:zspencer@mpe.ca)

Process controls systems are ubiquitous with water and wastewater infrastructure. As an important component of this critical infrastructure, control systems are subject to deterioration just like other components such as pumps, valves and pipes. As control system components approach obsolescence, infrastructure systems are left vulnerable to partial or total failures. The first step in planning for a control system modernization is to complete a control system assessment. This presentation will discuss the requirements for and typical process followed to complete a control system assessment. Topics will include:

- Control System Fundamentals – Levels of the control system
- Hardware Life Cycles – Examples of recently discontinued equipment
- Software Life Cycles – Examples from various vendors
- Industry Best Practices & Standards – Recently released & revised
- Control System Cyber Security – Trends & considerations
- Requesting a Control System Assessment – RFP considerations
- Typical Control System Assessment Workflow

Attendees will gain knowledge related to the construction of a typical process control system and the typical life-cycles of both hardware and software platforms. A review of recently released and updated industry standards and cyber security considerations will highlight why new features may have to be added during the next system upgrade. Finally, there will be some discussion about issuing RFPs to complete projects of this nature, as well as what to expect along the way as the assessment is completed.

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**Title: You Found WHAT in my Water? A Guide to Proper Sampling**

Contact: Blair Easton, [blair.easton@alsglobal.com](mailto:blair.easton@alsglobal.com)

Sampling is a basic and necessary part of all water treatment processes, and it is something that seems to be straight forward and simple. However, analytical results are only as good as the sample that is taken and submitted for analysis. ISO 17025 Accreditation for the testing of specific analytes only ensures that the sample as received is processed and results reported in a defensible manner – and

ultimately the results are only as good as the sample that was provided to the laboratory for testing. In some high profile cases, improper sampling/handling errors have had major (or disastrous) impacts on processes, people and the Environment. For any analytical test, there are specific containers, preservatives and/or protocols to sample taking that must be followed to ensure data integrity. Poor sampling technique or improper containers can result in false positive detection of target compounds or false negative results – and improper decisions could follow based upon the tainted measurements. This presentation will journey through the sample acquisition process as an integral part of your overall Quality System and decision-making tree. It will touch on the development of a defensible sampling Plan, and review the best practices/pitfalls associated with sampling for Regulatory compliance. Information about proper containers, preservatives, storage and handling techniques will be reviewed in detail, and the talk will address Quality Control and the determination of data validity based upon the analytical report provided by an ISO 17025 Accredited Laboratory.

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**Title: A Novel Test Method for Measurement of MIC in a Wastewater Collection System**

Contact: Justin Stewart, [justin.stewart@evoqua.com](mailto:justin.stewart@evoqua.com)

Microbial Induced Corrosion (MIC) in wastewater collection and treatment systems is a severe and on-going problem in North America. A 1991 US EPA report to congress cites a national cost, in 1991 dollars, for sewer rehabilitation at \$6 billion.

**Goals and Objectives**

The goal of the study was to quantify the amount of concrete degradation over time as it directly relates to atmospheric sulfide concentration. The objectives over the two-year study were to measure weight and compressive strength of concrete samples exposed to high and low atmospheric hydrogen sulfide concentrations and to compare the results. The secondary objective of the test was to determine if the methods used could validate the further use of the test as an indicator for corrosion protection of a wastewater collection system. Two sites were chosen with similar hydrogen sulfide generation profiles. Hydrogen sulfide was untreated in the first exposure site. Hydrogen sulfide was treated as part of an odour control treatment program in the second site to less than 5 ppmv in the manhole vapor space.

**The Results**

Two sets of (8) identical concrete compression samples were deployed one set at a location where the two-year average hydrogen sulfide concentration was 68.5 ppmv, and the other where the average was 3.6 ppmv. All of the samples were initially weighed, and a small subset was tested for compressive strength in order to establish a baseline for the study. At six month intervals the samples were retrieved, washed, weighed, and tested for compressive strength.

The samples deployed at the site where no hydrogen sulfide control was in place showed a net loss in material, of 5.4% by weight. Furthermore, the compressive strength of these samples was reduced by 13%.

The samples deployed in the collection system where hydrogen sulfide was controlled with chemical treatment showed a loss of material of 0.2%, and no decrease in compressive strength. This test shows promise as an indicator of corrosion control on concrete surfaces for critical infrastructure.

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**Title: The Benefits Automatic Flushing Provide Towards Managing Water Quality Efficiency**

Contact: Dale Robertson, [drobertson@muellercanada.com](mailto:drobertson@muellercanada.com)

Water utilities throughout Canada, the U.S. ,and abroad, are achieving operational excellence by implementing a proactive approach to advancing their operations as early adopters of the latest in system monitoring and flush management technology.

The utilization of either traditional flushing products or a SMART Flushing System provide water utility management teams the ability to improve their water quality conditions without having to send field crews to areas in the distribution network that routinely have lower chlorine levels or are consistently generating customer complaints.

Flushing Systems enable a utility to place a device in a critical or problematic area so that the water lines in that area can be flushed periodically to reduce stagnation, biofilm build-up, and to better manage Trihalomethanes (THMs) and Haloacetic acids (HAA5). Portable hydrant-based flushing devices or permanent devices, which install on a branch of a water line, are far more effective in successfully turning water over every 72 to 120 hours than sending a crew to a hydrant periodically.

Distribution monitoring is geared to give management teams' the ability to reduce operational expenses, better utilize personnel and enhance the overall management of the operation.

As part of Mueller's presentation we will provide detailed return on investment estimations; typical flow rates for these flushing devices; flush duration calculations; and more.

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**Title: EPCOR Regina Wastewater Plant Upgrade Project**

Contact: Shauna Karakochuk, [SKarakochuk@epcor.com](mailto:SKarakochuk@epcor.com)

EPCOR Saskatchewan Water Partners was awarded the Public Private Partnership to Design-Build-Operation-Maintain and Finance a new world class wastewater treatment plant in Regina Saskatchewan in May 2014. This \$170 M project entails the expansion and upgrading of the existing WWTP to meet the effluent permit requirements that came into effect December 31, 2016. This project is the largest of its kind in North America. The winning team includes EPCOR, Stantec, and a construction team consisting of Graham Construction and AECON.

The focus of this paper will be on the project from an operations perspective. It will review the existing facility and the upgrades completed to the plant. Discussed will be the challenges that were encountered with construction, start up and commissioning of a new state of the art facility while needing to maintain full operation of the existing facility while meeting all effluent parameters for the duration of the project. Due to the nature of the P3 project, the team did not have the luxury of a

complete Greenfield that most projects of this size would have. The paper will also discuss the high level of planning, careful scheduling and process optimization that was required to allow retrofitting of the existing infrastructure and integration of the new process with the existing all while maintaining full plant operations and meeting all effluent permit requirements.

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**Title: Low Cost Monitoring and Alarm Functionality for Small Water Operations**

Contact: Gary Houston, [gary.houston@remoteprocess.tech](mailto:gary.houston@remoteprocess.tech)

The ability to remotely monitor and control processes has been available for decades and has been typically used by large operations to manage factories, production platforms, refineries and utilities. In the past, these SCADA (Supervisory Control and Data Acquisition) systems have been based on expensive equipment and communication systems and have been designed by engineering firms by skilled engineers.

Today, technology has advanced so that monitoring and control of a typical house can be achieved using retail thermostats, automatic locks, cameras and motion sensors. Indeed, this technology is being mass produced and is plug and play so that a moderately capable homeowner can set up a system to monitor/control the home through an internet connection.

The small water operation falls in between these two worlds – until now. Remote Process Technologies has developed a monitoring system specially designed for the small water operator to bring big industry performance at a fraction of the cost. In addition, RPT provides full technical support from installation through the operating life so that the operator can focus on operations.

This paper will present a case study of the application of this technology to a small rural water treatment and distribution operation, highlighting the many advantages for the operator, including:

- Configuration and installation by the manufacturer for compatibility with existing instrumentation.
- Operations data stored securely on remote servers and accessible by the operator on-line from anywhere or downloaded to a computer for more detailed analysis and to easily fulfill reporting requirements.
- Easy-to-use graphical interface provides insight into the operation, allowing the operator to see the whole picture and spot trends to improve the operation and identify potential problems before they happen.
- Operator can set alarms and have them sent to multiple recipients by SMS, email or phone.

This technology will not only help the small operator to comply with Alberta water guidelines for operator presence and data collection, it will also give peace of mind that comes with having a finger on the pulse of the operation with the convenience of a smart phone.

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## **AWWOA 43<sup>rd</sup> Annual Operators Seminar Technical Session Abstracts, Mar. 2018**

### **Title: Keeping your Control System Secure**

Contact: Adam McCardle, [adam.mccardle@eramosa.com](mailto:adam.mccardle@eramosa.com)

Protecting critical infrastructure assets within a municipal water and wastewater facility is becoming an increasing priority.

This presentation will start by explaining cyber security and IT buzz words in easy to understand terms. We will explain how control systems will be covered, as there as many simple steps individuals can take... and shouldn't take! We will then cover some statistics of threats followed by some examples of how control systems have been compromised in the recent past and what the impact was.

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### **Title: Improve Plant Efficiency with Modern Instrumentation Communications**

Contact: Dean Rudd, [dean.rudd@ca.endress.com](mailto:dean.rudd@ca.endress.com)

The future of instrumentation is all about the way we connect and get information. In the past all companies have fumbled with different protocols and/or proprietary software and hardware. As we move to the IIoT (industrial internet of things) generation, we need to move to commonly used, commonly accessible software and hardware. HART is the most common digital protocol used in instrumentation today and the very common in the water/wastewater equipment. It is a good protocol but somewhat limited in what it can provide but it requires special hardware and software.

This paper will introduce the participants to the new communications being used. New to the instrument world but common in the everyday world. The devices we use every day, smartphones, tablets and laptops are easy to get and easy to use. We will focus on three new communication technologies for instrumentation: webservers, WLAN networks and Apps using Bluetooth.

We will focus on four benefits of modern instrument communications:

Better maintenance scheduling - How to use instrument information to better maintain instrumentation. Make sure we have the right spares before we go.

Employee Safety - Some of the most dangerous aspects of the water/wastewater industry is driving to remote sights and dealing with confined spaces. We will show how new communications systems can remove or minimize these hazards.

Life Cycle Management - understand what instruments you have, when instruments need service by looking at key information and how to better plan for upgrades and obsolescence.

Instrument verification - how to do it remotely and can it be used to extend manual maintenance.

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**Title: FUNDAMENTALS OF PUMPING**

Contact: Stefan Fediw, [sfediw@johnbrooks.ca](mailto:sfediw@johnbrooks.ca)

The presentation begins with the basic description of both Centrifugal and Positive Displacement pumps and their application. Specifically focused on Centrifugal Pumping – the concepts of impeller design (Open, Semi-Open and Enclosed) are discussed along with Volute design (Single, Double and Diffuser). A pump application is presented to illustrate a basic pump selection along with motor sizing and installation “good practices”.

The concept of Pump Trouble-Shooting is discussed in reference to Low-Flow, No-Flow and Noisy Operation. The latter allows for an in-depth presentation of Cavitation in which the 3-types (Suction, Recirculation and Discharge) are discussed and demonstrated (Glass-Face Pump). Actual pump components, that indicate the different types of cavitation, will be available for the attendees to inspect. The possible approaches to solving cavitation are also reviewed and applied to the Glass-Face pump demo.

Most of the pump hydraulic concepts discussed will be illustrated using the Glass-Face pump demo. Several “real world” examples will be applied to the Demo-Pump that will require the attendees to use gauge readings and pump curves to achieve a solution. We will also demonstrate the pump priming process and air-binding.

Finally, there will be several Pump cut-aways available for the attendees to inspect and ask questions. These cutaways allow for in depth and specific maintenance techniques to be reviewed (impeller clearance adjustment, removal of blockages, mechanical seal replacement etc).

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**Title: South Red Deer Regional Wastewater Pipeline Odour Management Strategy**

Contact: Pervez Sunderani, [Pervez.Sunderani@gov.ab.ca](mailto:Pervez.Sunderani@gov.ab.ca)

This report describes the processes in place for Odour Management in the South Red Deer Regional Wastewater System.

This is a regional wastewater transmission main with lift stations in Olds, Bowden, Innisfail and Penhold, for the transmission of wastewater from these four facilities and the Counties of Mountainview and Red Deer to the City of Red Deer’s Biological Nutrient Removal type tertiary wastewater treatment plant.

Odour control occurs at each of the lift stations, with the main Odour management occurring at an odour management facility at the end of the line, prior to wastewater flowing through an invert siphon under the Red Deer River to the City of Red Deer’s Wastewater Treatment Plant.

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**Title: PipePatch Trenchless Point Repair Technology**

Contact: Michael O'Toole, [michael.otoole@fernco.com](mailto:michael.otoole@fernco.com)

Cities across Canada are constantly faced with stretching budget dollars to improve and repair the underground infrastructure. With an eye on the bottom line, new repair methods and technology are needed to increase work capacity and productivity each day.

Source One Environmental's (S1E) PipePatch offers a no-dig, trenchless pipe rehabilitation system for pipe diameters up to 72". An alternative to 'dig and replace' methods, the PipePatch product line challenges traditional pipe repair methods as an efficient long-lasting solution that meets NSF standards, ICC-EW-PMG standards, and is environmentally friendly.

PipePatch is a Cured-In-Place-Pipe (CIPP) sectional repair that eliminates the need for digging by creating a mechanical bond to the original pipe with minimal change to the original diameter, exceeding ASTM F1216 standards. When compared to digging or lining an entire pipe, PipePatch only repairs areas that require rehabilitation—saving time, investment, and labor.

Supplied in a kitted format, each PipePatch kit contains the necessary pre-measured items including resin, fiberglass mat, and other consumables, to carry out a successful trenchless repair. The precisely measured consumables ensure a simple and repeatable repair. This process eliminates the need for large storage areas, installation guess-work, and excess product waste.

PipePatch utilizes a patented, non-hazardous resin that is odor-less, non-flammable, and doesn't contain any VOCs or Styrene. While it is beneficial to clean debris from the area of repair, the presence of water and infiltration does not limit the ability to complete a trenchless repair. The resin has outstanding bonding properties, with resistance to 63+ chemicals.

Through discussions with municipalities and contractors, cities across Canada are taking note of PipePatch's benefits to save money and time. By repairing and improving Canada's existing infrastructure, the country can strategize and budget for future asset management. PipePatch is the solution for Canada's stretched infrastructure budgets.

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**Title: Smart Infrastructure Means Superior Asset Management**

Contact: Rod Schnell, [rscnell@accuflo.com](mailto:rscnell@accuflo.com)

SmartCover® Systems provides leading Smart Infrastructure solutions enabling users to gain visibility into their water infrastructure. As part of the Internet of Things (IoT), remote sensors deliver real-time data via the high-reliability Iridium® Satellite system to secure servers where users have 24/7 access to data via any web browser device. This information provides essential management insights that enable informed and incisive decisions.

Range of Solutions:

SmartCover® Systems TM offers a range of monitoring and data solutions that provides true visibility of remote sites. Users gain valuable insight into their system's behavior enabling better operational and capital decisions.

SmartCover® Monitors are self-contained, turn-key solutions with a control, sensor, battery pack, antenna and housing. They are specifically designed for ongoing operations in harsh environments such as wastewater. The combination of two-year-plus battery packs and the exceptionally reliable Iridium Satellite System assures continuous operation and connectivity when most needed during the worst weather conditions.

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**Title: Options And Challenges When Designing A Small Potable Water System Using Surface Water Or Gudi**

Contact: Anita Gupta, [agupta@johnbrooks.ca](mailto:agupta@johnbrooks.ca)

This seminar is to familiarize attendees with various approaches and challenges in designing a small potable water system. This applies to

- Drinking Water
- Potable Water
- Domestic Water

This paper and the presentation focuses on options and challenges for designing a system, specifically using surface water or GUDI (ground water under the direct influence of Surface Water)

The raw water sources used to produce drinking water may contain impurities such as minerals, chemicals, salts, organics (vegetation), fertilizers and microorganisms. If these impurities are not removed before reaching the tap, they can pose health risks if consumed. Health Canada works with the provincial and territorial governments to develop guidelines that set out the maximum acceptable concentrations of these substances.

In addition to addressing physical characteristics, such as taste, odour and colour, the Guidelines for Canadian Drinking Water Quality deals with microbial, chemical and radiological contaminants.

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**Title: The Person, The Process, The Permit: A Dissection of Safety**

Contact: Curt Budden, [c\\_budden@hotmail.com](mailto:c_budden@hotmail.com)

As a certified Level III WWT operator, currently employed in a level IV facility here in Alberta, I feel it is my obligation to investigate and address any pertinent safety permitting programs in our workplace. To question how they are initiated, instructed, and applied. I wish to take an in depth look, at the importance of safety in the workplace, and its direct correlation with respect to past and active permitting systems.

My focus in particular, will be heavily sighted on the Gold Bar WWTP, owned and operated by EPCOR, and where I am currently employed. I wish to use published statistics, employee feedback, and personal

experience, to clarify why an effective permitting system in one's workplace is beyond important with regards to safety, as well as employee understanding and morale. I intend to use specific documents, as well as specific examples, on how workers from all levels, and from all organizations, can be affected by active permitting systems and policies. Any workplace individual from directors, foreman, senior managers, or project managers should know, understand, and apply the permitting system of the workplace itself.

I wish to emphasize that permits are not only used to analyze a task at hand, and provide safety, but also to protect and develop a company's security, process, respective environment, and business interests as a whole. The importance of training, and participation, by workers on all levels will prove crucial to safety, as well as any workplace's future.

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**Title: The Making of “The Clog”: The Alberta Capital Region Wastewater Commission Residential Awareness Campaign.**

Contact: Danielle Currie, [dcurrie@acrwc.ab.ca](mailto:dcurrie@acrwc.ab.ca)

In 2016, the Alberta Capital Region Wastewater Commission (ACRWC) Board put forth a communication objective to create a residential awareness campaign to address non-flushables: Wipes, fats, oils and grease (FOG) and personal care products. Non-flushables create problems in the sewer system as they do not degrade, therefore leading to clogs, damaged equipment and sewer backups. The campaign targets the residents within the Commission's 13 member municipalities, with the goal to bring awareness to non-flushables and the consequences of introducing them to the sewer system. The creative concept of the campaign parodies the horror film genre to focus on the costly consequences of non-flushables, using humour to depict “The Clog” as a classic monster terrorizing residents who have flushed non-flushables.

ACRWC worked collaboratively with it's members to decide which materials would be created as it would ultimately be the member's responsibilities to launch the campaign within their jurisdictions. A tool kit comprised of both print and digital material was developed which included Facebook and Twitter digital ads as well as print-ready files for brochures, bill stuffers, newspaper ads and more. A single page website was developed as the hub of the campaign, with all print and digital material directing residents to visit the site to learn more.

The presentation will be of interest to wastewater utilities who are faced with issues caused by non-flushables in their systems and those who may be interested in developing a residential awareness campaign of their own. It will provide insight into the challenges of launching a collaborative campaign with multiple members and how uptake of the campaign in the Capital Region was measured.

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**Title: City of Red Deer Water Utility Presentation**

Contact: Colin Molsberry, [colin.molsberry@reddeer.ca](mailto:colin.molsberry@reddeer.ca)

The City of Red Deer's Water Utility has a robust safety program in which has amounted in 20 plus years without a lost time incident. In 2001 the Water Treatment Plant contracted Work Abilities Ltd to help develop a physical demands assessment for operators. This helped to determine what tasks can be completed by anyone who is on modified work duties. Modified work duties include but are not limited to procedure revision and development, formal hazard identification and assessment, and development of an operations manual. The implementation of a modified duties program is a tool that The City of Red Deer uses to help reduce the occurrences of lost time incidents.

In 2012 OIS (Occupational Injury Service) was implemented which provides quick access to a doctor for assessment of any injured employee. The results of the assessment are shared with the employee's supervisor so they can implement duties that are acceptable for the injured employee to complete and continue to work every day.

Training and procedural development are cornerstones of the safety program. A designated training lead for the Water Utility will register employees for any required Safety Training courses along with refresher training as required. Also with the development of in house training programs for employees such as WHMIS, first aid, violence in the workplace, respectful workplace, and bacteriological testing.

Monthly worksite inspections are completed by both the Water treatment Plant, and Water Distribution sections. All inspection findings are discussed with the employees at safety meetings. Deficiencies identified in the inspection are assigned to an employee to be rectified within a designated time period.

Safe Work Procedures (SWP) are developed for all tasks and reviewed annually by employees. Any time there is an incident or any change to the process, the SWP will be re-evaluated and assurances made that it is still relevant and up to date.

Hazard Identification and Assessment process that identifies potential hazards for tasks performed under the water utility annually along with field level hazard assessments that are completed prior to performing tasks.

These are just some of the resources used to maintain a healthy safety program. We look forward to continued discussions at the annual operator's seminar.

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Thank you to all the presenters and volunteers that made these presentations possible!