

# AWWOA Water Week 2018

## Technical Session Synopsis

**Wednesday Nov 14, 2018**

### **Session 1: Fisheries Act Compliance and Chlorinated Water (Drinking Water)**

Did you know that ordinary chlorinated tap water is as lethal to fish as crude oil? Did you know that releasing chlorinated tap water into a natural waterbody – either intentionally or simply by failing to promptly mitigate or repair a water line break - can be a violation of federal environmental law?

The *Fisheries Act* is among the oldest pieces of legislation in Canada, and has specific provisions prohibiting the deposit or release of substances deleterious (harmful) to fish into fish-bearing waters or any place where the substance can enter those waters. It also has provisions concerning reporting of releases, and cleanup and mitigation. These “pollution prevention provisions” are enforced by officers at Environment and Climate Change Canada (ECCC), while Fisheries and Oceans Canada (DFO) remains responsible for the remainder of the Act, including habitat. This presentation will cover the “pollution prevention provisions” of the *Fisheries Act* in the context of chlorinated water, including both superchlorinated water used in construction and ordinary tap water.

Presenters:

Ryan Shannon - [ryan.shannon@canada.ca](mailto:ryan.shannon@canada.ca)

Deanna Cymbaluk - [deanna.cymbaluk@canada.ca](mailto:deanna.cymbaluk@canada.ca)

### **Session 2: The *Fisheries Act* and the Wastewater Systems Effluent Regulations (WSER)**

Do you know your municipal wastewater system is subject to not only your provincial approval or code of practice, but to a relatively new federal regulation? The Wastewater Systems Effluent Regulations (WSER) were registered in 2012, and mandate baseline standards for water quality and federal reporting for wastewater systems across Canada that discharge to fish-bearing water, or places where the effluent may reach fish-bearing water.

While municipal wastewater systems have always been subject to the *Fisheries Act* and its provisions prohibiting the release of substances harmful to fish into these places, WSER now serves as a less-demanding exception to these more stringent provisions by providing clear limits for water quality and mandating certain sampling and reporting requirements. Failure to comply with WSER conditions, however, can make a system once again subject to the general prohibition of the Act. This presentation will explain how WSER relates to the *Fisheries Act*, which municipal wastewater systems it applies to, and the federal compliance and enforcement expectations now in place for municipal wastewater treatment.

Presenters:

Ryan Shannon

Erin Eacott - [erin.eacott@ppsc-sppc.gc.ca](mailto:erin.eacott@ppsc-sppc.gc.ca)

### **Technical Session Wednesday 2:15pm to 4:30**

#### **Session A - SIBROM - Biological Systems for Hard to Treat Waters**

Biological water treatment systems offer an effective alternative to traditional systems such as manganese greensand. Biological systems use naturally occurring bacteria, rather than chemicals, to remove contaminants like Iron, Manganese, Arsenic and Ammonia from drinking water supplies. Utilizing nature minimizes environmental impact by reducing byproducts such as treatment residuals and contaminated concentrate streams. The use of biological treatment versus manganese greensand also removes the need for chemical feeds such as potassium permanganate and sodium bisulfite. The Filtralite media used in our biological systems does not need to be regenerated and has a lifetime of over 20 years!

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Alone, biological filtration using Sapphire Water's Filtralite ceramic media may be all that is needed to produce clean water that meets or exceeds the Canadian Drinking Water Quality Guidelines. For more contaminated raw water, biological filtration can be used as pretreatment for membrane systems. Biological pretreatment significantly extends membrane lifetime, lowers operating costs and reduces or removes the need for membrane cleanings.

With over a decade of operating experience, biological pretreatment systems have proven to be a safe, simple and effective solution for communities facing tough water challenges and are now being used in over 20 locations in Western Canada to provide high quality drinking water to thousands of people.

Presenter:

Michael Harkin, Sapphire Water - [mharkin@sapphire-water.ca](mailto:mharkin@sapphire-water.ca)

### **Session B - The Benefits of Biological Additives in Wastewater Collection and Treatment**

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

What are Biological Additives? I 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, I will uncover some of the taboos and myths surrounding biological additives. I 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 I will 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. I will 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. I 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.

Presenter:

Norm Grexton, Wastego - [normgrexton@shaw.ca](mailto:normgrexton@shaw.ca)

### **Session C - Simple Solutions to Resolve Water Distribution System Problems**

Safe, secure drinking water has been one of the main goals of the 2009 Water for Life program initiated by the Alberta Government. With this program and the multi-barrier source-to-tap approach, vast improvements in the source protection and treatment aspect were seen.

Unfortunately, a key component of the multi-barrier approach, water distribution network, has been overlooked and under-funded.

The DWSP was developed in 2012 as a tool to assess risks, real or perceived, associated with the drinking water supply by undertaking a comprehensive assessment of the source, treatment, network and consumer components. Surprisingly, or not surprisingly, risks associated with the distribution network were rated amongst the highest. Several reasons for these network risks were

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related to aging infrastructure, lack of as-built plans or knowledge of system, inadequate repair procedures, mal-functioning or lack of isolation valves, inadequate flushing locations, lack of operation and maintenance, etc.

Water leaks or breaks presents one of the highest risks facing water utilities. Inability to isolate the affected area can result in water shutdown to a large segment of the system. The loss of water and pressure can cause an imminent health potential that may require pre-cautionary boil advisories, extensive flushing and bacteriological sampling.

New technology and procedures are available that allow hot tapping or valve insertions into a pressurized main without disrupting the water quantity or quality. This presentation will highlight how these simple solutions can resolve some of the distribution problems being faced by municipalities.

Presenter:

Alvin Beier, EnReach Hot Tap Services - [abeier@enreach.ca](mailto:abeier@enreach.ca)

### **Session A - Position Your Community for Successful Water and Wastewater Projects**

Municipal project delivery is changing. Traditionally, projects have been delivered using the Design-Bid-Build method and municipal engineers never gave it a second thought. However, the pressures we face today have increased exponentially.

Tighter budgets. Higher risks. Arbitrary deadlines driven by politics. These are just some the challenges we now encounter. As owners, project managers, engineers and construction experts, we need to take a step back, and take an objective view of our water and wastewater projects and their unique challenges before deciding on a course of action that will lead to project success.

This session will highlight some of the key aspects, advantages and disadvantages of each project delivery methodology including: Design-Build, Design-Bid-Build, Construction Management, Construction Management at Risk and Integrated Project Delivery (IPD).

Attendees will not only walk away with a better understanding of how to determine which method works best in certain situations, but also a framework to help determine which risks you are exposing your municipality to based on the method chosen.

Presenter: Doug Simpson, Colliers Project Leaders - [doug.simpson@colliersprojectleaders.com](mailto:doug.simpson@colliersprojectleaders.com)

### **Session B - Extend the Life of your Lagoon with BioCord Treatment and Geotube Sludge**

As lagoons age, and populations increase, most municipalities struggle with meeting their current wastewater discharge limits, and are unable to afford expensive upgrades to their wastewater treatment plants.

BioCord™ has been proven to be an efficient, low-cost biological treatment alternative capable of drastically reducing contaminants such as ammonia and BOD, enabling systems to achieve their discharge limits.

In conjunction with this, sludge management and disposal using Geotube technology, is also used as an integral part of maximizing the available treatment capacity of the lagoons. Through both of these processes, Municipalities are able to reliably meet their wastewater treatment limits, extending the life and capacity of their lagoon systems.

Presenter: Don Burgess, DWG Process Supply - [don.burgess@dwg-process-supply.com](mailto:don.burgess@dwg-process-supply.com)

### **Session C - Phased Assessment Strategy for Sewers**

Here you'll learn about a new workflow; one that will save your department money, help optimize resource utilization, and allow your inspection crews to focus their attention on the sewer assets that need it most.

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Sewer inspection is critical to the wellbeing of our wastewater infrastructure, our communities and the environment. Benefits of a well-rounded inspection program include (EPA, April 2010):

- Reduced sources of infiltration and inflow (I/I).
- Avoided emergency repair costs.
- Avoided restoration costs due to environmental and property damage from a catastrophic failure.
- Avoided public health costs (i.e., injury, death, disease transmission) from catastrophic failure.
- Improved planning and prioritization of rehabilitation.
- Improved customer satisfaction and fewer complaints.

These benefits are the goal of every sewer department, but given today's budgets, a new approach is needed—one that maintains the goal of comprehensive assessment, but which increases productivity and reduces costs.

The most exhaustive approach is seldom the most practical. CCTV crawlers gather the most detailed information from a pipe, allowing an operator to pan, tilt and zoom in on pipe features. They are the most commonly used inspection tool in our industry, and the most detailed method for inspecting the internal condition of a sewer. However, they are also the most time-consuming and labor-intensive to operate.

While CCTV crawler inspection is an essential tool in any condition assessment program, many lines don't need the level of scrutiny a crawler offers. Rapid assessment tools like zoom cameras and video nozzles are ideal front-line tools for screening out such lines. If municipalities incorporate these tools into a three-phase approach to inspection, they can save significant time and money, and maintain more updated information about pipe condition.

If you are trying to meet increasing demands for infrastructure inspection with the same old workflows and technology, you're fighting a losing battle. The evolving challenges of sewer inspection require adapting new technologies and methodologies to gain greater efficiencies and better data. Doing so can allow inspectors to prioritize system-wide which lines need the most attention, and to shorten the interval it takes to perform a complete system assessment.

Presenters:

Patrick Bourgeois, Joe Johnson Equipment and Jerry Schroeder, Envirosight – [info@jjei.com](mailto:info@jjei.com)

### **Session A - Accessing Funding for Rural and Small Community Water and Wastewater**

Improving drinking water and wastewater infrastructure in rural communities and small municipalities within a reasonable timeframe remains a challenge. The pathway to success includes ensuring funding is secured and that project planning considerations are made both before and after the receipt of funding.

In several earlier instances, community water system installations have been unnecessarily expensive, over-designed relative to risk factors and difficult to maintain. It is critical that costs be easily maintained with the operating budget available to each community.

In this session, we will present on best practices to support rural communities and small municipalities to be better positioned to secure infrastructure funds, how to expedite the funding process, and the stages of project planning relative to funding. Additionally, we will present examples

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of effective, existing larger-scale water infrastructure projects across the country.

Presenter:

Kevin Sim, Colliers Project Leaders - [kevin.sim@colliersprojectleaders.com](mailto:kevin.sim@colliersprojectleaders.com)

### **Session B - Squamish WWTP Automation Upgrade - Case Study**

The District of Squamish WWTP was originally constructed 1996 and has undergone significant additions and modification over its life. The original control system for the facility had been expanded and augmented over the years, but was rapidly approaching end of life. Faced with the prospect of ordering spare parts off the Internet, the District began planning for a replacement of the control system prior to 2015. In the summer of 2017 the District issued an RFP for the design and programming of a new automation system. Collaboration between the District, MPE Engineering and a local electrical contractor saw the project go from concept to completion in an extremely short time frame. This case study will discuss the following topics:

- Pre-migration control system architecture
- Drivers for migration
- Preliminary work undertaken by the district
- Selection of an engineering consultant
- Design considerations & process
- Selection of an electrical contractor
- Migrating the control system during continuous operation of the WWTP
- Dealing with a major equipment failure mid-commissioning
- Final control system architecture
- Operations staff adjustment to new system
- Benefits to final systems for operators, managers and support staff

Attendees will gain knowledge related to upgrading or migrating a process control in an operational facility. The case study will include input from operations and maintenance staff into the issues with the legacy control system, the migration process and the benefits realized after the migration was completed.

Presenters:

Zane Spencer & Dave Meindertma, MPE Engineering Ltd. - [zspencer@mpe.ca](mailto:zspencer@mpe.ca)

### **Session C - Water Loss Audit and Validation**

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.

Presenter:

Tammy Elzinga, Leduc County - [tammy@leduc-county.com](mailto:tammy@leduc-county.com)

### **Session A - Overview of Water Valves**

David Berton [daveb@awcsolutions.ca](mailto:daveb@awcsolutions.ca)

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### **Session B - How Much Grit can the Best Pre-Treatment Technologies Remove? It All Depends How you Measure It..**

Grit removal is a key pre-treatment step in many wastewater treatment plants, and is generally considered essential in mechanical plants. Historical design standards for grit were based on assumptions that have proven to be inadequate. Definitions of grit have evolved recently to more closely reflect real world conditions, and modern grit removal technologies based on this understanding demonstrate significantly improved performance. A key issue that remains in this area is how performance is measured and expressed. Various academic institutions and industry associations (including the Water Environment Federation's Grit Task Force) are working to improve understanding and practice in this area.

This presentation reviews grit removal practice, definitions, test methods, performance expectations, removal technologies, research findings and efforts towards standardisation. It discusses the available technologies with consideration of their application in different contexts (plant size, flow variations, hydraulic gradients etc.). It reviews the O&M requirements of common technologies, and things to be aware of based on experience from various sites.

Presenter:

Chris Howorth, Veolia Water Technologies Canada Inc. - [chris.howorth@veolia.com](mailto:chris.howorth@veolia.com)

### **Session C - Are we Asset Wise?**

In a perfect world, we can tell when exactly a particular asset is going to fail but nothing is perfect, and we need to predict the time when that asset will fail or reduce the level of service as expected. The level of service (LoS) is the key indicator of how municipality (service provider) is performing to provide satisfactory services to the client/and or tax payers. One of the most important factors contributing highest level of service is the condition of our assets. Continuous availability of the state of our linear and non-linear assets will help us predict the potential reduction in level of service and minimize emergency repair. For every utilities company minimizing emergency repair should be the main goal which otherwise results in compromising social, economic and environmental impact beyond their capacity to manage without interruption of services in a short time. Out of Sight – Out of Mind perception doesn't fit to the utilities service providers. Our motto should always be "Out of Sight? – Then Make Sure It is Right". All the assets that are out of sight (underground) need attention (understand) by regular inspections so that preventative maintenance can be done before the disaster can happen. There are a number of ways to do inspection. One of the key inspection methods for wastewater pipelines is CCTV inspections and proper coding.

In this presentation, experience of an operator (City of St Albert) on pipeline inspection (CCTV), coding, analysis of results with likelihood of failure (LoF), Consequence of failure (CoF) and rating of wastewater linear assets will be shared. CCTV inspection of these assets can be a key component in decision making and support in asset management.

Presenter:

Khem Aryal, City of St. Albert - [KAryal@stalbert.ca](mailto:KAryal@stalbert.ca)

### **Session A - Beyond the Source: Best Practices for Protecting Drinking Water in Alberta**

In Alberta, SWP is occurring across geographical areas, using several approaches, and spearheaded by diverse groups such as governments, Indigenous Peoples, and watershed organizations. Despite this, there is no guidance on how to integrate SWP planning with other water and land use management approaches. Fundamentals of SWP exist in policies, legislation, and planning processes that are administered by various levels and types of governments. However, a more integrated approach that considers upstream and downstream users is required to address issues and plan for

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the future.

The Alberta Water Council (AWC) established a project team earlier in 2018 to provide guidance for protecting public, private, and individual drinking water sources across the province. This work is intended to advance outcomes of the *Water for Life Strategy*, the *Our Water, Our Future; A Plan for Action*, applicable regional plans, and other pertinent initiatives.

This project is documenting source water protection (SWP) practices, processes, risks to drinking water sources, and complementary source water-related initiatives in Alberta. With the help of a consultant, a jurisdictional scan is being undertaken to examine SWP approaches in selected areas. Using the information gathered, preliminary findings on successes, challenges, and lessons learned in protecting drinking water sources are being synthesized. With these findings, a draft list of best practices is being compiled as part of a guidance document for protecting public, private, and individual drinking water sources in Alberta.

Presenter:

Anuja Ramgoolam, Alberta Water Council - [aramgoolam@awc-casa.ca](mailto:aramgoolam@awc-casa.ca)

### **Session B - Lagoon Upgrades to Meet (Almost) Any Effluent Criteria, WITHOUT Increasing Complexity**

Lagoons are a popular choice in Alberta as they provide simple low cost wastewater treatment, and land is readily available. Due to their long retention time and large surface area however, they are subject to low winter temperatures, which can limit their ability to meet recent federal ammonia effluent targets (under the Wastewater System Effluent Regulations). Increasingly stringent Provincial regulations can also present challenges to lagoons, for example with respect to suspended solids (TSS) and phosphorus (TP). A related trend is increasing interest in wastewater reuse, driven by limitations on the abstraction of water from the environment, and the desire for sustainability. Reuse also demands low levels of suspended solids/turbidity. With this federal and provincial context the question many communities are facing is how to achieve their goals without having to abandon their lagoons and implement costly, complex mechanical treatment plants.

Treatment technologies are increasingly rising to this challenge. One example is the LagoonGuard™ process, which removes ammonia from lagoon effluent, even at temperatures below 1 degree Celsius. Another example is cloth media filtration (also known as discfilter technology), which can be used for tertiary treatment to meet very low TSS/TP targets, and/or for reuse. Both technologies are compact, making them easy to add to an existing lagoon, and their ease of O&M means you get the performance benefits of mechanical treatment, without the complexity.

Communities can continue to benefit from their investment in lagoons, and their operators can achieve increasingly stringent effluent goals without having to adapt to complex fully mechanical plants. This means wastewater treatment can continue to be both environmentally and economically sustainable for all.

Presenter:

Chris Howorth, Veolia Water Technologies Canada Inc. - [chris.howorth@veolia.com](mailto:chris.howorth@veolia.com)

### **Session C - Large and Critical Valve Condition Assessment and Repair**

Over the past 20 years, advances in large diameter pipeline condition assessment and inspection tools have made pipeline asset management programs more exciting and effective, yet water distribution systems are still plagued with chronic valve problems. Unfortunately, the valve problems are often realized prior to planned pipeline inspections and during unplanned and reactive maintenance events. Whether performing planned and routine maintenance, or responding to reactive maintenance and catastrophic failure, the success of any pipeline project of any pipeline size, is largely dependent on the health and reliability of control valves. Unreliable valves are the leading factor in change orders, cost over-runs, extensive collateral damage, or even cancelation of

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important pipeline condition assessment projects. All of these problems and symptoms can be avoided by prioritizing the role of control valves and ensuring specific maintenance tasks occur before, during, and after pipeline shutdowns and inspections occur. The presentation will highlight the root causes of valve failures and detail the recommended and necessary maintenance practices to prevent large and critical valve failures.

Presenter:

Justin Hebner, Pure Technologies - [justin.hebner@puretechltd.com](mailto:justin.hebner@puretechltd.com)

### **Session A - UV101 - Compliance with Reduced Chemicals - Is it the right Solution?**

Learn the fundamentals of UV – what makes it work and how can you determine if it will work in your situation? What do the different standards mean and how do they translate into real operations? Will it work for viruses? What about hardness and fouling?

Learn the terminology of UV disinfection so you can understand what the various configurations will provide and what they won't. What to do if you need a residual and what technologies make the best partners with UV. How to deal with emerging contaminants and when Advanced Oxidation(AOP) is called for...

Using UV can be best way to achieve 4-log virus disinfection before the first customer, crypto and giardia protection, avoid the danger of DBPs and chemical taste & odor, the expense of re-pumping, and combat threats from algae, pseudomonas, molds – but sometimes it is not. Hear about how to tell the difference.

Presenter:

Phyllis Butler Posy, Atlantium Technologies Ltd. – [phyllisp@atlantium.com](mailto:phyllisp@atlantium.com)

### **Session B - Recreational Water Operations & Sewage Treatment in Central Alberta**

Two Central Alberta lakeshore developments experience with potable water and sewage treatment.

Presenters: Norval Horner, CWSI; Mark Ruault, HMR Engineering  
[norval1@shaw.ca](mailto:norval1@shaw.ca)

### **Session C - The Path to Water and Wastewater Innovation**

Municipal Operators of lift stations everywhere face similar challenges specific to monitoring of ambient air for hazardous gasses inside these stations. These hazardous gases can be explosive as in the case of methane, or toxic as with accumulations of H<sub>2</sub>S, CO or NO<sub>x</sub>. Accumulations of hazardous gas in confined spaces can sometimes create conditions of oxygen deficiency as well, thus presenting potential for asphyxiation.

Traditional gas detection systems can be effective safeguards providing early warning of potential gas hazards, however gas detectors typically require regular routine calibration and/or maintenance often involving work in confined spaces, particularly for detectors positioned in wet wells for example. Unless a municipality conscientiously specifies gas detector manufacturer and models, as well as a consistent strategy for sensor placement, these selections typically fall under the scope of the contractor. This results in a lack of consistency with respect to detector manufacturer, models, sensor placements, etc. in lift stations, and so ultimately Operators must become familiar with any number of detectors, detection technologies and associated maintenance practices recommended by disparate manufacturers.

Tundra Process Solutions offers a standardized suite of gas detection technologies and gas sampling Flow Panels designed specifically to minimize and simplify routine maintenance, while significantly improving overall performance and reliability of lift station gas detection systems. The latest MSA X5000 universal dual-sensor transmitters coupled with enhanced XCell digital sensors result in significant capital and operational cost savings for the life of the gas detection system, while at the same time optimizing system safety overall. These MSA systems can be easily adapted to the specific needs of any sanitary or storm water lift station, and so can readily be specified by the municipality to contractors in order to achieve optimal consistency of system design, technology and with minimal

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cost to deploy and maintain.

Presenters:

Matt Stevenson Tundra Process and Richard Balt, MSA Safety

[matts@tundrasolutions.ca](mailto:matts@tundrasolutions.ca)

### **Session A - RO by the Numbers: Data Management and Interpretation**

Like many advanced processes, an operating reverse osmosis (RO) system generates a wide variety of numbers. In RO, this includes values for flow volumes, pressures, and conductivity. Depending on the complexity of the system, this data is recorded by operators in a log book, are manually entered into an Excel® spreadsheet, or they are tracked and trended automatically on some type of Human-Machine Interface (HMI). The values are usually trended as raw data or they're normalized to produce a snapshot of the true condition of the system at any given time.

Regardless of the format, managing these numbers and knowing what they mean can be a challenge for even the most experienced operator. What is a "normal" number as it relates to RO? This can be a difficult question to answer because regardless of the application, it requires a thorough understanding of the process configuration, equipment design, and overall system operation. All three of these variables contribute to the data profile on a daily and long term basis. In situations where these are not fully understood, the role of data management becomes even more critical in overall system awareness. The RO process data is the basis for all analytical and troubleshooting strategies and the key identifier in the early detection of changes in membrane performance. It is also the best defense in maximizing productive membrane life.

This presentation will focus on how and why data management is used in RO processes under both typical and unusual operating conditions. It also includes relevant case studies where operators effectively differentiated between a good and a bad number and how they used that information to detect and correct early performance declines.

Presenter:

Ken Robinson, Avista Technologies Inc. - [krobinson@avistatech.com](mailto:krobinson@avistatech.com)

### **Session B - Flood Detection Systems**

Throughout the Province's history, large-scale floods have been known to devastate communities across Alberta. The floods that began in June of 2013, for example, affected more than 100,000 Albertans in 30 communities. While environmental factors have a major role to play in the occurrence and severity of floods, there are preventative measures that can be taken to guarantee immediate notification for emergency responders, drainage and utilities companies, public works personnel and the traveling public.

During high rainfall periods it is not uncommon for underpasses in large urban settings to be at risk for flooding. Blocked drainage systems or unusually heavy rainstorms are some of the most common causes of underpass flooding. Due to the structure of many underpasses, flooding presents significant risks for drivers. These situations often result in personal property and infrastructure damage, or in some cases, serious injury or fatality.

By implementing systems for early detection and automated response, municipalities can prevent extensive flood damage and injury. Detection and alerts can warn drivers who may be at risk, while allowing emergency response staff ample time to deploy appropriate countermeasures. The ultimate goal is always to prevent any loss of property or serious injuries during these incidents.

Presenter:

Wade Robichaud, ATS Traffic – [wader@atstraffic.ca](mailto:wader@atstraffic.ca)

### **Session C - Magnetic Flow Meter Installation and Best Practices**

Magnetic Flow Meters are one of the most widely used flow meters in the Water and Wastewater

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Industry. As long as the process fluid is conductive, the magnetic flowmeter is the right solution for your application. There is more to it than just matching the pipe size to the meter size and installing the meter in the closest available section in the pipe. Despite the large volume of meters out in the field, water consultants and end-users continue to face the challenge of poor installations, incorrectly sized meters and other issues.

This paper will discuss common magnetic flow meter application problems and how they may be overcome.

Sizing a magnetic flow meter is more than selecting a meter based on the adjacent pipe size. The various flow rates must be considered to determine the meter size. We will look at this and other factors.

Where to install the magnetic flow meter can be a tough decision and will affect the operating performance of the meter. A major consideration is the required upstream and downstream piping conditions and that is dependent on what is upstream and downstream of the proposed meter location. We will look at some of the most common installation problems and possible solutions.

The process fluid has an impact on the selection of liner, electrode, grounding, and sometimes the sizing of the flow meter. We will look at some of these dynamics and how they affect the materials of construction.

Presenter:

Ken Burnett of ABB – [ken.a.burnett@ca.abb.com](mailto:ken.a.burnett@ca.abb.com)

### **Session A - Options in Restraint Technologies**

As new technologies are emerging in terms of restraint devices in both water and wastewater, the options for operators are ever increasing. This paper will review some of the applications of these restraints and their uses in bends, valve connections, tie ins and more. It will also review operator safety concerns as well as time constraints and the abilities of each of these restraint technologies with Case Studies provided.

Presenter:

Derek Traquair – Martech Inc – [dtraquair@martechdss.com](mailto:dtraquair@martechdss.com)

### **Session B - Municipal Lagoons - Wastewater into Revenue**

Municipal wastewater treatment facilities around the world are facing challenges with respect to capacity, structural integrity, and environmental compliance due to aging infrastructure, population growth, increasingly obsolete technologies, and external factors. In Alberta alone, more than 400 lagoons will require upgrades or repairs within the next 5 years. The conventional lagoon upgrade devices, including mixers, aerators, and biofilm units, are typically marred by high CAPEX, inconsistent effluent quality, and/or high footprint.

The Swirltex Lagoon Unit (SLU) is a portable, housed unit that consists of a micro-diffuser and a tubular membrane. Wastewater contaminants are encapsulated in air, increasing their buoyancy, while the centrifugal force of the vortex flow in the membrane tubes ensures the contaminants are contained in the centre of the membrane. This greatly reduces fouling, maintenance costs, and down-time. Another advantage of the SLU is the recovery of a clean effluent stream, which can be sold to industry to offset their fresh water consumption. The air and flow pattern also serve to mix and hyper-oxygenate the wastewater, enhancing bacterial activity of the stream returning to the lagoon.

Swirltex has demonstrated the efficacy of its technology in multiple field demonstrations, two of which in Alberta. In these demonstrations, the SLU exceeded expectations in terms of TSS and BOD removal, as well as power consumption.

Swirltex would like to partner with Albertan municipalities whose lagoons are at capacity, struggling to meet environmental regulations, or where water is an increasingly scarce resource. The partnership would be low-risk to the community, as Swirltex assumes full responsibility for the

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maintenance and operation of its units, and charges per volume of treated wastewater rather than the cost of an entire SLU. Swirltex is poised to deliver long-term value in its communities of practice, by triggering economic development through wastewater re-use opportunities, and collaborating with educational institutions to develop lagoon operator courses. Swirltex takes great pride in the fact that its technology reduces wastewater discharge into the environment, reduces water diversion from sensitive ecosystems, and promotes water re-use in a world where water is an increasingly scarce resource.

Presenter:

Peter Christou, Swirltex - [pchristou@swirltex.com](mailto:pchristou@swirltex.com)

### **Session C - Smart Cities, Smart Water - How IoT Devices are Transforming the City of the Future**

As “smart cities” becomes a buzzword in the industry, many utilities want to know if this trend is just that, or if it will have any meaningful impact on their utilities and cities. This presentation will discuss the Smart Cities movement, what it is, and how it might be impacting your utility. It will also look at the technology around smart cities; IoT (or Internet of Things). We'll look at what constitutes an IoT device, what vendors are making them, how they interface with existing systems, and why you might want to consider them in your next purchase decision.

Presenter:

Michele Harvey, Badger Meter - [mharvey@badgermeter.com](mailto:mharvey@badgermeter.com)

### **Session A - Migrating to the Digital World of Instrumentation: Unlock the full Potential of your Assets**

Presenter:

Dean Rudd, Endress + Hauser Canada, [dean.rudd@ca.endress.com](mailto:dean.rudd@ca.endress.com)

### **Session B - Advanced Tertiary Filtration Helps Protect Canada's (Arguably) Most Beautiful National Park**

The Town of Banff is at the heart of the Banff National Park – arguably one of Canada’s best known, and most beautiful, parks. To help preserve this pristine natural environment, the Town’s wastewater treatment plant is required to meet both Alberta provincial, and Parks Canada Leadership Target, effluent quality goals. These include stringent targets for suspended solids (TSS) and phosphorus (TP). Tertiary sand filters installed in 2002 unfortunately didn’t live up to expectations, presenting both operational and effluent quality challenges. The Town therefore decided to retrofit one of their two filter basins with the latest cloth media “discfilter” technology. This project reflects a growing trend in Western Canada for tertiary filtration to reduce wastewater pollution impacts and to support wastewater reuse. Discfilters are liked by operators for their simplicity and low maintenance requirements. Key considerations for operators include media durability (e.g. chemical resistance, guaranteed life etc.), ability to be cleaned (including using chemicals when needed), and maintenance accessibility.

This presentation describes the project’s context, objectives, challenges, design, implementation and operational performance. It presents key O&M considerations for discfilters and how the equipment installed in Banff addresses these. It presents key learning points from the project, and will include direct feedback from the Town’s Project Manager.

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### **Session C - Understanding Correlation and Leak Detection**

It has been estimated that more than 20% of water is being lost due to leakage. To help identify and locate leakage from water pipelines this paper looks at a complete solution of leak acoustic signal correlator for leak detection.

Municipalities need to manage leakage in their water pipe networks. This requirement has become more urgent owing to water shortages caused by recent droughts, increasing demand, environmental, social and political pressures, escalating energy costs, and pending regulatory

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## Technical Session Synopsis

requirements.

Leakage management generally comprises four main elements: water audits; leak detection or monitoring; pressure control; and leak location and repair. This paper presents survey strategies that can be employed for leak detection using acoustic equipment.

Hidden or unreported leaks in water distribution networks can be detected by surveying pipes for the acoustic noise generated by water as it leaks from them under pressure. All areas of the pipe network are normally surveyed whether or not leakage is suspected. Strategies that can be used include manual acoustic surveys employing listening equipment or noise correlators, and automatic surveys using acoustic noise loggers. Adoption of a particular strategy depends on available resources (both financial and human), characteristics of the pipe network, and operating conditions.

A noise leak correlator used for leak detection and as a leak locator finds leaks in pressurized water lines. The sound data is processed through a mathematical algorithm which compares or correlates the two recordings to determine the difference in the times it takes noise to travel from the site of the leak to each of the sensors. If the distance between the sensors is known in advance, this timing information can be used to determine the location of the leak.

Presenter:

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