
NOVEMBER 12 • TUESDAY

1:00pm – 4:30pm

W Pre-Conference Workshop #1 - Understanding and Assessing Risks to Drinking Water Sources using The Healthy River Ecosystem Assessment System™ (THREATS)

Speakers: Stephanie Neufeld, Adam Norris, Alec Carrigy Double Tree by Hilton (16615 109th Avenue North West, Edmonton, Alberta,)

A 3-hour workshop on the use of an online tool (The Healthy River Ecosystem Assessment System™ (THREATS)) to assist drinking water providers and local decision makers in Alberta to understand and assess risks to their drinking water sources.

The main purpose of the workshop is to showcase an initial release of the THREATS platform targeted towards addressing and reducing the resources needed to undertake source water protection (SWP) planning/ Drinking Water Safety Plans (DWSPs).

THREATS is a secure, web-based data visualization and analysis platform. It incorporates both spatial and time series data sets as well as predictive and scenario models. It is designed to be modular and customizable with the intent to make data access, analysis and visualization quick and convenient. The tool amalgamates publicly available data province-wide in a single interface.

The tool can be used to increase the efficiency of watershed management planning and reporting tasks, as many tasks are automated, and datasets are readily available. THREATS includes a selection of summary functions that would otherwise require knowledge of GIS and data processing to perform.

The workshop will include an overview of source water protection and the THREATS tool, but the focus will be to demonstrate and receive hands-on experience with modules and data sets within the platform that aid in the development of SWP plans, DWSPs, and other watershed management plans. Datasets and functionality include land use, water quality, and water quantity, and other data that allows assessment of current and future source water risks.

Water and wastewater operators, as well as those involved in water safety, may be interested in the workshop to learn about the data and information compiled by the tool which may save time or effort in their day-to-day tasks, or how they may add data to the tool for their own or others' use. As a central repository for data and information, the tool is also relevant in enabling and facilitating greater collaboration between drinking water providers and stakeholders. Use of the tool may also help ensure alignment with local priorities, statutory and non-statutory watershed management initiatives, and regional plans.

1:00pm – 4:30pm

W **Pre-Conference Workshop #2 - Purpose and Benefits of Alarm Rationalization**

Speakers: Dawn Kuechle

Double Tree by Hilton (16615 109th Avenue North West, Edmonton, Alberta,)

In today's world, we are inundated with information in all ways, shapes, and forms; from our cell phones, televisions, and computers, isolating information and presenting what information requires action has become essential. Standardized DeltaV DCS and SCADA alarm systems are powerful tools that can be utilized in this process. It is imperative to provide warnings about developing situations so Operators can take corrective action in a timely manner.

As we all know, alarms can be interruptive by nature and must be carefully managed to minimize the number of nuisance alarm activations. Unnecessary alarm activations can significantly drain operational staff resources in terms of staff time, after-hours call-outs, and workload in each plant's control room.

ISA (International Society of Automation) 18.2 describes systematically reviewing and documenting alarms to help diagnose and respond to abnormal situations. The City of Calgary has chosen to use the ANSI/ISA-18.2-2016 standard as the framework for its alarm management program. The ISA-18.2 alarm management standard was published in 2009 and was updated and re-issued in 2016. The standard outlines mandatory and recommended practices for a lifecycle approach to alarm management. Standardized work processes are used to design, implement, maintain, and monitor the alarm system.

The City of Calgary has created a lifecycle of standard work processes based on the ISA-18.2 alarm management standard, reflecting their specific needs. These lifecycle stages for the alarm management program will be presented with some typical scenarios showing how alarm rationalization was implemented.

By implementing these standards, alarms have been reduced by approximately 47%. Operators are presented with corrective actions and possible outcomes if those actions are not taken. Providing this information has resulted in quick decisions and actions to resolve abnormal situations as they arose.

1:00pm – 4:30pm

W **Pre-Conference Workshop #3 - Chloramines (Total Chlorine) Boosting**

Speakers: Emily Liu, Win Tun, Simon Patterson

Double Tree by Hilton (16615 109th Avenue North West, Edmonton, Alberta,)

Acceleration in climate change (warmer weather) in recent years, operational glitches in disinfection process and other factors, such as improperly maintained reservoirs and distributions, longer regional water lines, fewer water usages in smaller municipalities, aging municipal infrastructures have contributed into treated water chlorine residual loss and challenges in maintaining adequate levels of residuals in distribution systems. Such issue has been recently experienced in several regional treated water customers' communities and operators are facing with daunting task - boosting chlorine, especially Total Chlorine (chloramines).

Since boosting Total Chlorine (chloramines) is not as simple as boosting "Free Chlorine", this workshop will assist the attendees in understanding ammonia-N complications, provide options to boost chloramines and demonstrate (hands-on approach) how to undertake these boosting strategies as follows:

- Measurement of Total Chlorine, Free Chlorine, Monochloramine, Free Ammonia-N, Total Ammonia-N using HACH DR900 or similar instruments
 - Performing "Jars Test for Breakpoint-chlorination" to identify the optimal breakpoint chlorination ratio between Chlorine and Total Ammonia-N, including detailed calculations for Jars-Test setup
 - Understanding in boosting Total Chlorine using "free available ammonia-N" in treated water by measuring "free available ammonia-N and monochloramine" with HACH "indophenol method" and associated NaOCl dosage calculation with using proper ratio between chlorine and free available ammonia-N
 - Calculating required NaOCl volume to perform free chlorine residual transfer (from total chlorine) for a slug dosing, using proper ratio between chlorine and total ammonia-N
 - NaOCl dosage calculation for total chlorine boosting and transferring into free chlorine continuously, and associated NaOCl dosing pump setup, and
 - Will have an ample of time to ask and discuss for clarifications, difficulties in particular situations and environmental restrictions interfering with such initiations and how to overcome.
- It has been challenging past year for several Alberta communities which are facing with this issue and AEPA' DWOS (Drinking Water Operations Specialist) has been assisting to address this issue to the communities, and many stories to tell.

NOVEMBER 13 • WEDNESDAY

8:00am – 4:00pm
 R
Registration Desk
Double Tree by Hilton (16615 109th Avenue North West, Edmonton, Alberta,)
Registration Desk: Pick up your delegate package if you have registered online **prior** to the Conference. Onsite registration is also available (extra fees apply).

Information Counter: Ask your questions about the Conference and the events for the week here.

8:30am – 12:00pm
 W
Pre-Conference Workshop #4 - Optimizing Wastewater Biology with Bioaugmentation: The Truth about Bacterial and Enzyme Supplements
Double Tree by Hilton (16615 109th Avenue North West, Edmonton, Alberta,)
Speakers: Raymond Menard

In the evolving field of wastewater treatment, bioaugmentation has emerged as a promising strategy to enhance the biological processes critical to maintaining efficient and effective operations. This presentation aims to provide wastewater operators with a thorough understanding of bioaugmentation, focusing on the application and impact of bacterial and enzyme supplements.

We will begin with an overview of the biological processes in wastewater treatment, emphasizing the roles of bacteria and enzymes. This foundational knowledge will allow a deeper exploration of bacterial and enzyme supplements, explaining how they are created and what makes them effective. Attendees will learn about the different types of bacterial products, their mechanisms of action, and the specific conditions required for their optimal performance. We will also cover enzyme supplements, highlighting their applications and how they complement bacterial processes.

The presentation will address common issues encountered in wastewater treatment, such as fats, oils, and grease (FOGs), loss of nitrification, high ammonia levels, midge flies, and sludge accumulation. We will discuss the underlying biological challenges for each issue and how targeted bioaugmentation can provide solutions.

Practical considerations for selecting and using bacterial and enzyme products will be provided. We will provide tools and methods for product selection and evaluating product effectiveness, including microfilament analysis and origins testing, sludge surveys, influent/effluent monitoring, and screening tests. Attendees will gain insights into pilot and small-scale long-term studies that can help predict full-scale performance.

We will present detailed case studies to illustrate the real-world application of these concepts. Each case study will provide valuable lessons and best practices that operators can apply to their facilities.

Finally, we will conclude with a wrap-up and a Q&A session, allowing attendees to engage with the material and address specific questions or concerns.

By the end of this presentation, wastewater operators will be equipped with the knowledge and tools necessary to make informed decisions about using bacterial and enzyme supplements in their treatment processes, ultimately enhancing their operations' efficiency and effectiveness.

8:30am – 12:00pm

W **Pre-Conference Workshop #5 - Water Analysis Basics**

Speakers: Ryan Morasse

Double Tree by Hilton (16615 109th Avenue North West, Edmonton, Alberta,)

In the Water Analysis Basics workshop, the participants will learn and understand the following:

Proper Sampling and Sampling Techniques, which include:

- Sampling and Sample Preservation
- Sample Preparation
- Use of Standards
- Procedure
- Calculations and Interpretations

Theory and Application of Colorimetrics:

- Colorimetry Theory
- How Does the Spectrophotometer Read a Sample?
- How Can I be Sure that the Instrument is Reading Correctly?

Theory of pH:

- Introduction to pH and electrochemistry
- Understanding pH
- Measuring pH
- Probe care and maintenance

Aquatech has over 40 years of proven and trusted experience in the water treatment industry, and takes pride in ensuring the continued success of safe water for the world. It is our pleasure to share some of the knowledge we learned over our tenure.

8:30am – 12:00pm

W **Pre-Conference Workshop #6 - Robotics Assistance for Operators**

Speakers: Cody Wildgust

Double Tree by Hilton (16615 109th Avenue North West, Edmonton, Alberta,)

This is the workshop where you will get an overview of field proven ground, aerial and submersible robotic solutions that are enhancing operators efficiencies while providing safer working conditions for everyone. Several municipalities have started to implement these types of technologies mostly because it makes sense from a financial and safety perspective.

Drones are becoming more mainstream and they are now being used for multiple applications such as confined space inspections for example. You no longer have to send people into these hazardous areas because you can get the job done with a drone. You will learn what drones can do today and what is legally required to operate a drone in Canada.

Submersible Remotely Operated Vehicles can help you see and understand what is happening in underground pipes without having to spend a lot of money excavating blindly. There are multiple options available and you will see what others are using to accurately pinpoint issues in underground pipes, or in difficult to access underwater areas.

Ground robotic solutions allow operators to autonomously collect stranded data. When these data are collected autonomously, it gives more time to the operators and they can therefore focus on making more important decisions to protect and optimize their critical assets. You will learn how SPOT, the robot dog, is changing the way we work.

When you put these outstanding technologies in the hands of your operators, you open up a wide range of possibilities from safer workplace to optimized operations, but with many other options in between that are only limited by your imagination. And to be completely transparent, operators also have more fun doing their job with these amazing tools while getting serious results.

PINNED

11:45am – 12:30pm

L **Lunch - Conference Official Opening**

Sponsors: Waste Go Canada

Double Tree by Hilton (16615 109th Avenue North West, Edmonton, Alberta,)

PINNED
12:30pm – 1:30pm

S New Leaders for a Changing World

Double Tree by Hilton (16615 109th Avenue North West, Edmonton, Alberta,)

Speakers: Brenda Robinson

What does it take to be a leader in our challenging and changing times? How has re-structuring and re-engineering affected the roles of leaders?

Leadership today is an investment. Leaders must be mentors, coaches, coordinators, initiators, motivators and finely tuned communicators. They must be responsive, flexible, creative, analytical and team players. They must be able to teach, train and develop the people they work with. They must be capable of getting good work repeated, poor work corrected, and dead-end performance turned around.

Leaders in today's world must be change-skilled. They must be adaptive and productive. They must be ready to challenge existing policies and procedures and respond quickly to needed review and changes. They must become less structural and more functional. They must be solution-seekers and not just problem-solvers. They must be able to balance "people" and "things" within their areas. Finally, they must be responsible, accountable, honest, sincere and always respectful of the people with whom they work.

Leaders Must Lead With the Concept of Synergy – Working Together for Results!

PINNED
1:30pm – 2:00pm

S Alberta Environment and Protected Areas - Audits, Inspections and Investigations

Double Tree by Hilton (16615 109th Avenue North West, Edmonton, Alberta,)

Speakers: Michael Conboy

PINNED
2:00pm – 2:15pm

C Coffee Break

Double Tree by Hilton (16615 109th Avenue North West, Edmonton, Alberta,)

2:15pm – 2:45pm

T Session A - FNIHB EPHS - Drinking Water Safety Program in First Nation Communities

Double Tree by Hilton (16615 109th Avenue North West, Edmonton, Alberta,)

Speakers: Kyle Wonsiak

Environmental Public Health Services (EPHS) works to identify and prevent environmental public health risks that could adversely impact the health of a community and its citizens. Environmental Public Health Officers (EPHOs) provide advice, guidance, education, public health inspections and recommendations to First Nations and their leadership to assist them manage public health risks associated with the environment. Drinking water safety, one of eight core program areas of EPHS, is a shared responsibility between EPHS, First Nation communities and other key government partners (TSAG – Technical Services Advisory Group, Regional Operations, Indigenous Services Canada). Through a collaborative approach, EPHS mandate is to implement and oversee a drinking water monitoring program in First Nation (FN) communities across Canada (the final barrier in the multi-barrier approach). The monitoring program aims to ensure the safety of drinking water supplies through routine collection, submission and analysis of water samples, the success of which hinges on the dedication and hard work of community-based water monitors and water treatment plant operators. The monitoring program extends to not only community or public drinking water systems, but to semi-public systems, and private drinking water systems as well. The presentation will provide an overview of EPHS programming, sampling protocol for the multiple drinking water systems, data collection and management, and process for issuing and tracking drinking water advisories in First Nation communities. Regional data will be used to demonstrate trends in sampling and advisories. It will also look at underlying causes of drinking water advisories in First Nation Communities across Alberta and next steps for the drinking water safety program.

2:15pm – 2:45pm

T Session B - Basic Ways to Assess your SCADA Systems Security

Double Tree by Hilton (16615 109th Avenue North West, Edmonton, Alberta,)

Speakers: Malkolm Alburquenque

Operational Technologies (OT) networks, particularly SCADA systems, are increasingly vulnerable to modern cyber threats, risking both public safety and financial stability.

This presentation explores ways to assess your SCADA systems security and how migrating SCADA networks to the cloud can address these challenges by enhancing security and improving operational efficiency. Cloud SCADA solutions offer robust protection for critical assets and enable secure, flexible access to SCADA and Historian clients from various devices, including smartphones, tablets, and laptops.

Municipalities utilizing the Cloud SCADA platform have reported enhanced communication uptime by adopting cellular and fiber networks as the backbone for their Cloud SCADA systems. This session will provide an overview of the secure implementation of Cloud SCADA solutions and their benefits for municipal applications.

2:15pm – 2:45pm

T Session C - Expedited Repairs For Critical Watermains

Double Tree by Hilton (16615 109th Avenue North West, Edmonton, Alberta,)

Speakers: Dave Brewer

With recent events in the City of Calgary, there's a valuable lesson to be learned in being prepared to the best of a utilities ability. Having identified the critical parts of your piping infrastructure, you can then choose what best suits the pipe for a long-term repair of the pipe. New methods are available from traditional means of allowing for a repair to be done right the first time and last the expected life of the pipe.

T Session A - Optimizing Freshwater Quality through Advanced Oxygenation Techniques

Speakers: Dhaval Vaghasiya, Raymond Menard Double Tree by Hilton (16615 109th Avenue North West, Edmonton, Alberta,)

Oxygen plays a pivotal role in maintaining and improving the quality of freshwater bodies. This session is designed to equip municipal water operators with a thorough understanding of oxygen dynamics in aquatic environments and practical strategies for managing and enhancing water quality.

Participants will begin with an introduction to the fundamental concepts of oxygenation, including oxidation and redox processes, sediment oxygen demand, and water column oxygen demand. These processes are critical for understanding how oxygen levels influence water quality, such as organic sediment accumulation, iron levels, manganese management, algae blooms and foul odours.

The session will then delve into the primary management tools used to enhance oxygen levels in freshwater bodies. Before focusing on specific technologies, we will review various oxygenation techniques. These include mechanical axial pumping, partial air-lift systems, Hypolimnetic aeration systems, direct gas sparging methods like full air-lift/destratification and oxygen injection for deeper water bodies, side-stream saturation, and nanobubble technology.

Following this overview, we will explore the most commonly used aeration method, Bottom-Diffused Aeration (BDA), and the most promising new technology, Oxygen Supersaturation Technology (OST), focusing on their mechanisms, benefits, and specific applications in raw water reservoirs and stormwater basins. Attendees will learn how these technologies can mitigate common water quality issues, including nutrient release from sediments, harmful algae blooms (HABs), and taste and odour problems caused by low dissolved oxygen levels. Water quality monitoring is a critical component of effective oxygen management. The workshop will emphasize the importance of pre-and post-project monitoring to ensure the implemented solutions achieve the desired outcomes. Key monitoring parameters and methods for accurate and consistent monitoring will be discussed to provide operators with the tools for effective water quality management.

Several case studies will be reviewed to illustrate BDA and OST's practical applications and benefits. These case studies will highlight the successful implementation of these technologies in various freshwater bodies, showcasing improvements in water quality and the cost-effectiveness of the solutions.

The session will conclude with a discussion on determining the most appropriate oxygenation strategy for different waterbodies. Factors such as the specific water quality issues, economic considerations, and feasibility of different technologies will be examined. Operators will gain insights into conducting a cost-benefit analysis to select the most effective and efficient solutions for their needs.

By the end of this session, participants will have a comprehensive understanding of oxygen's role in freshwater management, practical knowledge of advanced oxygenation technologies, and the skills to implement and monitor these solutions effectively. This knowledge will empower municipal water operators to enhance the quality and sustainability of their water bodies.

T Session B - Photoionization: A Superior Odor Control Technology for Wastewater Lift Stations and Treatment Facilities in Challenging Canadian Climates

Speakers: Dave Van Vliet

Double Tree by Hilton (16615 109th Avenue North West, Edmonton, Alberta,)

Traditional odor control technologies in wastewater management include biofilters, carbon filters, scrubbers, and photoionization (PI). The performance of most of these technologies is highly dependent on air temperature and humidity. However, Photoionization is specifically designed to perform effectively in Canadian weather conditions, where temperature and humidity can vary significantly. PI is a UV-based technology that operates without the need for water or chemicals, and the temperature and humidity of the inlet air stream have minimal impact on its odour removal efficiency.

While relatively new in North America, with over fifty installations in the past two decades, PI has been well-established in Europe for over 25 years and has installations on every continent except Antarctica. Compared to other odor control technologies, PI offers several advantages, including:

- A compact footprint,
- Lower maintenance requirements,
- Reduced operating costs,
- Lower energy consumption,
- Exceptional capability in handling sewage off-gases and pollutants, particularly reduced sulfur compounds, and
- High reliability under dynamic loading conditions, effectively managing spike loads.

2:50pm – 3:35pm

T Session C - Condition Assessment of Cast and Ductile Iron Pipe Watermains, Where to Start?

Speakers: Sam Ghosn

Double Tree by Hilton (16615 109th Avenue North West, Edmonton, Alberta.)

Every year, thousands of miles of waterlines are installed in North America through new projects and replacement of aging infrastructure. Decisions on prioritizing pipeline replacement projects are based on the age of the water network and its performance. In addition, decisions on which materials to use for replacing aging infrastructure are based on relative performance and cost.

Since the initial cost does not represent the true value of the water pipeline, asset managers give preference to strength, durability, and life cycle cost of their water and wastewater pipelines.

DIPRA's extensive research in corrosion protection led to a comprehensive risk-based model, which identifies several asset management strategies presently in use in North America, dealing with the potential for external and internal corrosion of buried Cast Iron and Ductile iron pipelines.

While cast iron and ductile iron pipes are similar there are significant differences in physical properties and failure modes that differentiate the two. For proper asset management, it is important that the iron pipe in a system be correctly identified.

In this Presentation, we will discuss the significant benefits that could be derived by utility owners if they consider to design, operate and maintain their infrastructure using these strategies, ultimately resulting in fewer unplanned repairs, and in the long term, a lower total cost of operation

3:40pm – 4:10pm

T Session A - Athabasca River's Shifting Waters: Monitoring Changes in Wood Buffalo's Source Water

Speakers: David Graham

Double Tree by Hilton (16615 109th Avenue North West, Edmonton, Alberta.)

Environmental Change (Climate change) is driving significant shifts in the Athabasca Watershed, and this presentation will explore these dynamic changes and their effects on the Regional Municipality of Wood Buffalo's Urban Water Treatment Plant.

We will analyze historical laboratory data to identify trends and patterns associated with significant environmental events affecting the Athabasca River. Our focus will include the river's response to disturbances such as the 2020 flood, a high-water event from June/July 2023. We will also investigate any noticeable impacts affecting the Athabasca River from the 2016 Horse River Wildfire, which notably impacted Fort McMurray and look for any water quality impacts related to the 2024 Japer wildfire.

Our discussion will cover practical methods for monitoring water treatment facilities and tracking changes in water quality. We will highlight practical techniques for performing simple tests to ensure ongoing oversight of source water. Additionally, we will examine the impact of significant floods and high-water events on source water quality, addressing the challenges these conditions pose to water treatment processes and their limited advantages.

By understanding the interplay between ecological disturbances and water quality management, this presentation aims to provide practical insights for refining water treatment strategies in response to evolving watershed conditions.

The session will conclude with a discussion on emerging issues related to environmental changes, offering a broader perspective on the implications for water treatment and management. This presentation seeks to provide valuable guidance for adapting water treatment practices to the changing environmental landscape.

3:40pm – 4:10pm

T Session B - Control System Standardization

Double Tree by Hilton (16615 109th Avenue North West, Edmonton, Alberta.)

Speakers: Dave Meindertsma, Zane Spencer

Control systems are commonplace within Water and Wastewater treatment facilities. During the 1990's, automation of new facilities was commonplace and has continued over the last three decades. Over those decades, technology related to control systems has evolved rapidly and the marketplace has seen many alternatives become available across the spectrum of a typical control system. Utilities who have not enforced a concept of standardization are often challenged with maintaining various components, from various manufacturers, of various life cycle phases, which were installed / implemented by various contractors. This presentation will discuss how to avoid and recover from a scenario such as this through implementation of control system standardization documents.

Attendees will learn the value of implementing control system standards.

This presentation will discuss the following topics:

- Control Panel Equipment
- PLC Platform Standards
- OT / Networking Standards
- SCADA Software & Computer Standards
- Programming / Implementation Standards.
- Control Philosophy Formats

3:40pm – 4:10pm	T Session C - Curbstop and Line Repair - Innovative Solutions <i>Speakers: Warren Rosland, Wayne Isaac, Brian Brost</i> Double Tree by Hilton (16615 109th Avenue North West, Edmonton, Alberta,) Across Alberta we have had great success and cost savings with some innovation in the way we repair curbstops and small line issues. We currently utilize a small trench cage called EasyDig to dig down for repairs. Our main reasons for utilizing this new way of fixing repairs is: cost saving from shorter repair time, less repair to the surface due to the smaller excavation and a super safe clean area to work in. We can haul the shoring to site with a pickup since it is modular. We then use a hydrovac to dig it down. I'd love to talk with you on how we utilize and what the benefits are!
4:15pm – 4:45pm	T Session A - Some Like it Hot! Actions to Address Algae Issues <i>Speakers: Dorte Koster</i> Double Tree by Hilton (16615 109th Avenue North West, Edmonton, Alberta,) Algae are essential to our waters but can create challenges, such as toxins, taste and odour, changes to pH, and aesthetics. Reports of algae issues in lakes, drinking water reservoirs, storm ponds and wastewater lagoons, along with available treatment options, have recently increased. But an understanding of the cause and the different types of algae that are present is key to identifying the most effective solutions. This presentation will provide an overview of the common types of algae, their biology and related issues for water and wastewater treatment. We will then discuss conditions that promote algae, such as climate, water quality and mixing patterns. Then, most importantly, we show how essential the understanding of algae is to assess risk and inform the right mitigation actions. Using case studies, we will demonstrate techniques to investigate algae issues and select the most appropriate solution for your type of algae.
4:15pm – 4:45pm	T Session B - Corrosion Control in Municipal Collection Systems <i>Speakers: David Speed</i> Double Tree by Hilton (16615 109th Avenue North West, Edmonton, Alberta,)
4:15pm – 4:45pm	T Session C - Modern Disinfection Methods, with a Focus on Chlorine: Critical Do's and Don'ts <i>Speakers: Conor Heeney</i> Double Tree by Hilton (16615 109th Avenue North West, Edmonton, Alberta,) Disinfection is an important parameter in water and wastewater treatment. As it is a critical measurement point it is paramount to understand how to effectively implement modern disinfection techniques. Modern disinfection methods focus on limiting the environmental impact, by utilizing equipment and approaches that conserve water and decrease chemical consumption. These environmentally friendly disinfection methodologies still provide maximum disinfection power. This lecture will focus on illustrating the significance of free chlorine and total chlorine as key disinfection agents. We will explore the advantages and disadvantages of amperometric and colourmetric measurement principles. We will also explore the impact of the digital sensors on chlorine measurements. The introduction of digital sensors has transformed instrumentation. Digital sensors allow for the calibration to be completed at a separate location, away from the measurement point. As well, it is possible to store calibration data within the sensors. These two properties allow for significant enhancements to calibration and preventative maintenance programs. Other disinfection agents and techniques will also be explored, and best practices will be discussed.
PINNED 7:00pm – 10:00pm	N Pub Networking Night - 7:00pm to 10:00pm - Sponsored by: ACC Water Solutions & Klearwater Equipment & Technologies Double Tree by Hilton (16615 109th Avenue North West, Edmonton, Alberta,) <i>Sponsors: ACC Water Solutions, Klearwater Equipment & Technologies</i> Connect with fellow operators and other industry professionals at Pub Night! Join us as we transform the Silver Birch area of the DoubleTree Hotel into a lively pub with complimentary drinks and appetizers. All delegates of the 2024 Water Week Conference are welcome to attend.

NOVEMBER 14 • THURSDAY

8:00am – 4:00pm	R Registration Desk Double Tree by Hilton (16615 109th Avenue North West, Edmonton, Alberta.) Registration Desk: Pick up your delegate package if you have registered online <u>prior</u> to the Conference. Onsite registration is also available (extra fees apply). Information Counter: Ask your questions about the Conference and the events for the week here.
8:30am – 9:00am	T Session A - PFAS Monitoring and Management at The City of Calgary Double Tree by Hilton (16615 109th Avenue North West, Edmonton, Alberta.) <i>Speakers: Victoria Arnold</i> Per- and polyfluoroalkyl substances (PFAS) are an increasingly hot topic in the water industry, and for good reason. The same properties that make these fluorinated organic chemicals so useful in a vast array of consumer products also make them extremely environmentally persistent and difficult to treat. Increasing evidence of human health effects at very low levels of exposure has led to drinking water guidelines in the parts per trillion range. Although progress is being made towards managing PFAS federally, it will take years to enact more stringent source control measures. In the meantime, water utilities are grappling with how to evaluate and act on the risks posed by this complex class of chemicals in the face of increasing public awareness and scrutiny. PFAS chemicals have an impact on every facet of the water industry – drinking water, wastewater, biosolids, even stormwater. An important first step in evaluating risk is monitoring. The City of Calgary has been conducting testing for PFAS in biosolids and drinking water since the early 2010s. Since this time, we have increased the scope and frequency of our testing. We have also investigated ways to protect our drinking water from PFAS under our Source Water Protection Plan and have started characterizing potential sources of PFAS to our wastewater. In this presentation, a high-level overview of our testing program and management strategies will be provided with reference to the evolving Canadian regulations. Testing considerations, key risks, and insights will also be provided, as well as some plans.
8:30am – 9:00am	T Session B - Tackling H2S and FOG in Your Sewer! Town of Diamond Valley Project Review Double Tree by Hilton (16615 109th Avenue North West, Edmonton, Alberta.) <i>Speakers: Jonathan Lee</i> Getting dirty is part of the job description for wastewater operators but dealing with potentially dangerous levels of H2S, enclosed entries, and fat, oil and grease build up are ones to be avoided. These common issues are faced by most wastewater operators. Even with great educational programs promoting proper disposal of FOG many towns are facing increasing issues. With major operational impacts on budgets, worker safety, pump performance not to mention unpleasant to handle. For these reasons the Town of Diamond Valley followed the protocols by ActiZyme to utilize its LS7 bio-technology to demonstrate impacts on sewer performance and operational maintenance. In 2022, a project was carried out for two years following all protocols and tracking changes sewer management. This was part of a larger project started by the West End Regional Water Commission before the consolidation of Black Diamond and Turner Valley. This presentation will review historical issues, project results observed and reported by Diamond Valley staff with supporting data, maps, charts and reports. The summary of these results are as follows: • Reduction of FOG. Visibility noticeable reductions of FOG build up throughout the system was achieved and less manual cleaning and flushing of lines and Lift stations were required. • Pump Improvements. Pumps cycles have increased compared to historical. Improving performance and flow. Historically pump reversals were required weekly due to FOG build up. Now after using LS7 there are significantly less problems and less reversals. At the BD Transfer station, the last pump before the treatment plant, historical planned reversals every Monday, are no longer required. • Decreased of H2S and chemicals agents. The usage of Bioxide (a chemical to reduce H2S) prior to lagoon treatment have decreased each season compared to the previous. It was estimated that in 2023 operations decreased the use of Bioxide by 20,000 L a \$40,000 savings. • Easy of Use. Compared to all other options that have been tried in the past, ActiZyme LS7 were reported as easiest to use. Requiring little operational hours with no pre-mixing, a huge time and cost savings in the application.

8:30am – 9:00am

T Session C - Maximizing Your Variable Speed Pumping Reliability

Speakers: Paul Wright

Double Tree by Hilton (16615 109th Avenue North West, Edmonton, Alberta,)

Some pumping installations have VFD reliability issues causing the VFD to trip or sometimes become damaged by avoidable issues.

This short 1/2-hour presentation provides a discussion of some of the Utility and Site installed power quality issues that may cause nuisance tripping or damage to the VFD pumping system.

The presentation will discuss several utility and site induced issues and recommend a mitigation path to prevent damage or tripping of the VFD pump system.

A detailed paper discussing all of the VFD issues can be requested via an email or by visiting our Booth #54.

9:05am – 9:50am

T Session A - Powdered Activated Carbon - Options for Organics Removal

Speakers: Hashanth Sasitharan, Brett Smith

Double Tree by Hilton (16615 109th Avenue North West, Edmonton, Alberta,)

In Alberta, the raw water sources can vary in water quality that could include high organic content, specifically in the northern part of the province.

High organic loading in the water supply, can result in taste and odor issues as well as the formation of undesirable disinfection by-products that can be created during the purification process.

Powdered Activated Carbon (PAC) is an available treatment additive used in water clarifying to mitigate the effects of high organics, however, PAC has several challenges, both operational and design related, that should be considered when selecting this option.

This abstract is intended to give an overview of powdered activated carbon systems that discusses the following:

- Applications whereby PAC can be considered and integrated into the treatment process,
- Design considerations for the chemical system,
- Operational challenges and considerations,
- Available options for PAC systems.

9:05am – 9:50am

T Session B - Asset Creation from a Liquid Liability: Is the Evaplant Technology Appropriate for Alberta Wastewater Applications?

Double Tree by Hilton (16615 109th Avenue North West, Edmonton, Alberta,)

Speakers: John Lavery

Capitalizing on cost recovery opportunities in wastewater treatment becomes more important as wastewater treatment or looming capital expenditures become more expensive. Evaplant technology is a patent-pending zero-discharge system designed to utilize effluent in hybrid willow irrigation and evapotranspiration. Evaplant produces only water vapour, woody biomass, litterfall, and below ground organic matter. It has been developed over a 15-year period, and the Evaplant system is now used to manage effluent/leachate at 3 landfills and one mine site in Quebec but is new to Western Canada. Similar systems have been piloted in Alberta at Whitecourt and Camrose County for over 10 years. Willows grow well when irrigated with treated effluent.

Evaplant addresses the challenge of increasing treatment costs by providing a cost-recovery mechanism in lieu of traditional discharge. Applied to a lagoon system or a small biological treatment plant, a well designed Evaplant system can promote complete evapotranspiration of effluent from May through to October, while supporting the growth of an intensively managed willow plantation. The system can also prolong the operational life of a lagoon system by increasing the amount of discharge that may be permitted in a season or year. Evapotranspiration of the effluent permits full capture of nutrients, trace elements, and residual biology from the effluent.

Willows are a coppicing species, which means they grow back from their base after each harvest. Biomass is harvested every 2 years and we will explain the cost recovery, ecosystem services, and potential operational life extensions that Evaplant can provide to a wastewater treatment plant. These attributes are not available through traditional discharge or soakage mechanisms. Examples of existing and developing economic uses for the willow will be provided, including:

- Biomass for municipal organics composting
- Production of a mulch for sale to home gardeners and commercial landscapers
- Use of whips in the production of fences and sound barriers
- A renewable alternative to peat moss for commercial greenhouses and nurseries
- Engineered wood products.

The presentation will provide several examples of cases where Evaplant may extend WWTP life or achieve cost recovery through the production of a valuable product – biomass.

9:05am – 9:50am

T Session C - Changes to the Information Flow of Bacteriological Sampling Results

Speakers: Deborah Crominski

Double Tree by Hilton (16615 109th Avenue North West, Edmonton, Alberta,)

An update on the changes in how bacteriological sampling results are shared with facility owners and operators and actions that operators can take to access the routine bacteriological sampling results through EPA's Drinking Water Web Application form.

PINNED 9:45am – 2:30pm	D Trade Show - 9:45pm to 2:30pm	Double Tree by Hilton (16615 109th Avenue North West, Edmonton, Alberta,)
PINNED 12:00pm – 1:00pm	L Lunch	Double Tree by Hilton (16615 109th Avenue North West, Edmonton, Alberta,)
PINNED 2:30pm – 2:45pm	C Coffee Break	Double Tree by Hilton (16615 109th Avenue North West, Edmonton, Alberta,)
2:45pm – 3:15pm	T Session A - Risk Management Across Canadian Provinces: Perspectives from Operators to Regulators <i>Speakers: Emma Wells</i>	Double Tree by Hilton (16615 109th Avenue North West, Edmonton, Alberta,) Drinking water utilities work diligently to provide safe water to their communities. Increasingly, they are challenged by a changing regulatory and natural environment, workforce and financial limitations, and aging infrastructure. In response, utilities implement a range of risk management practices, from water safety plan implementation to fencing around wellheads to ensuring backup power is available in the case of an outage. The University of Colorado, in collaboration with Dalhousie University, is conducting research with utilities and operators across Canada to understand the different risk management approaches that utilities take to keep their water safe despite constantly changing challenges. We will highlight findings from interviews with regulators and utility management on how the different approaches to regulation across Canadian provinces may influence risk management practices and what they think are ways to know how a utility manages risk. For example, when asked about using regulatory compliance to indicate successful risk management, many respondents felt it could only paint part of the picture. However, reasoning for this answer varied across provinces, with unclear standards mentioned most frequently by respondents in British Columbia and lack of context specificity mentioned most frequently in Alberta. Emphasis on the importance of staff capacity by utility management in interview findings ties into the survey component of our work. We will outline the theory behind and present preliminary findings from our surveys with operations staff on how regulations, prior experience, and utility resources and culture influence their perceptions of risk and actions they regularly take to manage risk (ex., checking in-line chlorine analyzer with a hand-held analyzer). As part of this presentation, we will engage the audience in feedback and interpretation of how these findings can be further grounded in the experience of operators based in Alberta.
2:45pm – 3:15pm	T Session B - Targeted WBS: Moving Upstream of the WWTP <i>Speakers: Michael Bosdet</i>	Double Tree by Hilton (16615 109th Avenue North West, Edmonton, Alberta,) Wastewater Based Surveillance (WBS) is an inexpensive, nonintrusive way to obtain near-real time data on community substance use, providing health and safety officials with the most relevant data to structure educational programs and tailored harm reduction strategies. Two programs related to WBS for substances of potential abuse (SoPA) will be reported. A wastewater monitoring program was conducted at a homeless shelter over a three-year period. A portable autosampler was installed and samples were collected bi-weekly. A panel of 48 different drugs and contaminants, including cocaine, opiates, amphetamines, benzodiazepines, psychedelics, fentanyl, and drug poisoning agents were analyzed. This data was then correlated with facility overdose data. Regular wastewater analysis provided insight to the prevalence of polysubstance use at the shelter. Naloxone was also monitored and data was compared against overdose incidences at the facility. From the data, it was evident that the relative use of opioids and amphetamines changed over time, and that the toxicity of the substances also changed. Xylazine, a known drug poisoning agent, increased in frequency over the duration of the project. To understand the importance of WBE at the source, wastewater samples from the shelter were compared to samples taken at the downstream wastewater treatment plant (WWTP). Samples taken at the shelter showed high concentrations of xylazine, while no detectable amounts were identified from samples at the WWTP. A remote worksite including multiple dormitories was monitored over six months. Compact autosamplers were installed at sanitary access points with bi-weekly collection; 104 samples were collected in total. The comprehensive analysis included 48 different drugs and contaminants, such as cocaine, opiates, amphetamines, benzodiazepines, psychedelics, fentanyl, and various other substances. Regular wastewater analysis provided insight to the prevalence of polysubstance use at the remote worksite. Priority substances of concern with highest frequency were methamphetamine and cocaine. Several fentanyl, opiates, alcohol and drug poisoning agents were detected. Wastewater analysis provided new and valuable insights into emerging risks and the well-being of the workforce. In addition to heightened awareness, analysis data also informed on the effectiveness of current prevention initiatives. In both studies, targeted WBS identified emerging SoPA-related trends.
2:45pm – 3:15pm	T Session C - Responding to Emergencies <i>Speakers: Kevin Johnson, Jay Wray</i>	Double Tree by Hilton (16615 109th Avenue North West, Edmonton, Alberta,) What happens when the routine is broken by an emergency situation? This presentation will highlight key points that an operator can use to successfully deal with an unplanned event. We will have real world examples from both the senior and junior perspective.

3:20pm – 4:05pm

T Session A - Predictive Maintenance in the Digital World

Speakers: Keith Berriman

Double Tree by Hilton (16615 109th Avenue North West, Edmonton, Alberta,)

Technology allows us to monitor our equipment in real time more effectively than before. Digital connectivity allows our data sources to be combined and analyzed to give earlier warning of developing faults. How do we determine what to measure, how to connect data streams and how to present this information to our operations to drive effective decision making?

In this presentation we will discuss the foundations of this digital Predictive Maintenance integration and what companies are doing to collect, analyze and present data to improve operational effectiveness.

3:20pm – 4:05pm

T Session B - Occurrence of 6PPD-quinone in Environmental Waters

Speakers: Desiree Hui

Double Tree by Hilton (16615 109th Avenue North West, Edmonton, Alberta,)

6PPD-quinone, a degradation product of the widely used tire rubber antioxidant 6-phenyl-1,3,5-triazine-2,4-dione (6PPD), has recently garnered significant attention due to its environmental prevalence and toxicity. Initially discovered in the late 20th century, 6PPD reacts with ozone and other oxidative agents, leading to the breakdown of the original compound in the environment and formation of 6PPD-quinone. Toxicity studies have revealed that 6PPD-quinone poses significant risks to aquatic organisms. It is highly toxic to coho salmon (*Oncorhynchus kisutch*), causing acute mortality at low concentrations (LC50= 0.8 µg/L). The toxicity level has raised substantial concerns about the broader ecological impacts on other fish species and aquatic life. 6PPD-quinone is relatively stable in aqueous environments, leading to its persistence in water bodies. Its hydrophobic nature suggests particulate matter and sediments can adsorb it, potentially leading to long-term environmental contamination and bioaccumulation in aquatic organisms. Preliminary findings led to recognition of 6PPD-quinone as a ubiquitous pollutant in aquatic ecosystems and identification of its link with "urban runoff mortality syndrome". To assess the environmental occurrence, fate, and transportation of 6PPD-quinone, we developed an analytical method with liquid chromatography-tandem mass spectrometry (LC-MS/MS) in 2021 long before publication of USEPA draft method 1634 in December 2023. Our method allows precise quantification of 6PPD-quinone at concentrations 400x lower than its LC50 value in environmental waters while meeting with QA/QC acceptance criteria of USEPA method. Here, we present this sensitive, robust, and quick measurement method along with its application to monitor urban runoff. Our preliminary results and occurrence data in the literature indicate that the concentration of 6PPD-quinone may reach at levels higher than its LC50 value for coho salmon especially in regions with high vehicular traffic.

3:20pm – 4:05pm

T Session C - Artificial Intelligence Solution to Reduce Water Loss (Non-Revenue Water)

Speakers: Helio Samora

Double Tree by Hilton (16615 109th Avenue North West, Edmonton, Alberta,)

Water loss is one of the most significant challenges that water utilities face in water distribution. It harms operational efficiency, compromises the quality of distributed water, increases operating costs, reduces operating revenues, can cause an imbalance between the supply and demand of water, and requires increasingly high investments to maintain the distribution & production systems.

SmartAcqua platform uses Artificial Intelligence and Machine Learning Algorithms and connects with the Utility billing and water production/SCADA systems and offers the ability to quantify the losses, prioritize field activities, and georeference the losses, helping the Field Services teams accelerate the leak detection and the apparent/commercial losses, via reports and heatmaps. Allowing the Utility to prioritize every investment related to water loss reduction and minimizing CAPEX/OPEX related to water loss activities.

The use of AI/ML will immediately increase leak detection efficiency, water meter replacement results, and fraud detection, reducing the overall Water Loss and impacting the community with a better drinking water supply.

We will show:

- How an AI/ML-based solution can help Water Utilities identify, quantify, and prioritize the investments to reduce water losses (non-revenue water) accelerating leak detection and apparent loss reduction?
- How AI/ML can maximize the return on investment, CAPEX/OPEX to reduce water loss?
- How to prioritize leak detection, and water meter installation/replacement to maximize water conservation and revenue
- We will present success cases.

4:10pm – 4:40pm

T Session A - Machine Learning for Multiparameter Coagulation Optimization in Western Canada

Speakers: Tyler Bennett

Double Tree by Hilton (16615 109th Avenue North West, Edmonton, Alberta,)

Coagulation chemistry is a complex process impacted by several variables and is regarded as “the single most important factor affecting treatment plant performance” (AWWA M37). Machine learning is a subset of artificial intelligence that has the potential to ‘learn’ complex chemical processes.

The City of Lethbridge Water Treatment Plant has used machine learning modelling of the coagulation process as an operational support tool since February 2023. The tool provides recommendations to operators in real time based on raw water characteristics and treatment system conditions to achieve multiparameter optimization. In the first year of implementation this tool has helped operational staff optimize treatment during both stable and rapidly changing raw water conditions, resulting in a reduction in coagulant and polymer usage by approximately 21% while exceeding treatment objectives.

Over the last year assessments have been completed at several other conventional water treatment plants in both Alberta and Saskatchewan to assess the transferability of the technology. The assessments have included WTPs with varying source waters, coagulants, clarification technologies, and levels of instrumentation.

This presentation will provide an overview of coagulation, machine learning, and the results of the WTP evaluations. Specific challenges related to data gathering, exploratory data analysis, and modelling will be highlighted, as well as how the technology has successfully been integrated into water treatment plants operations to provide dosing recommendations to the operator. Potential challenges and benefits of the technology will be discussed, and the overall results of the assessments will be shared.

4:10pm – 4:40pm

T Session B - The Wastewater Treatment Plant is on Fire – From Emergency Response to Recovery

Speakers: Tom Marstaller

Double Tree by Hilton (16615 109th Avenue North West, Edmonton, Alberta,)

November 1, 2023, was a relatively normal day at the City of Red Deer’s wastewater treatment plant (WWTP). A portion of the WWTP was shut down to upgrade electrical components that were at the end of their service life.

Following completion of the work, as electrical loads were being reconnected a fire occurred in the yet to be replaced main electrical switchgear. Red Deer Emergency Services responded quickly and put out the fire.

Within an hour of the fire being put out, a meeting of all WWTP staff on site was convened to evaluate the operational impacts to the WWTP. While the plant has back up power, most of it is routed through the switchgear where the fire occurred. As a result, a large portion of the plant was without power including the aeration blowers for 50% of the available plant bioreactor capacity and most of the solids handling processes. Further, the loss of the switchgear impacted the laboratory, administration building and the plant entrance gates.

A list of operational priorities and a series of supporting tactics to accomplish the priorities were developed. The highest priority was getting the aeration and pumping systems for the bioreactors and secondary clarifiers back on-line. The contractor that was upgrading the electrical components had a mobile switchgear on site that they had been using while components were upgraded. Fortunately, the contractor allowed us to use their mobile switchgear until the contractor was able to complete a permanent replacement of the burnt-up switchgear.

While the repairs were underway, the operations staff contacted our regional customers to try and limit the amount of wastewater they were discharging. A portion of the wastewater flow was diverted to three on-site equalization lagoons to avoid overloading the bioreactors that were not impacted by the fire. A more robust monitoring program including increased nutrient testing frequency and microscopic observation of the biomass was carried out for the first week after the fire.

Thanks to the efforts of plant electrical and instrumentation staff and the electrical contractor, aeration was restored in 17 hours and the bioreactor and clarifier mechanical systems were fully operational in 27 hours. All electrical systems were back on-line within 48 hours. Thanks to the operators and lab staff, the WWTP came through the event with minimal impact on treatment and very minor reporting violations under our Alberta Environment and Protected Areas operating approval.

The presentation will discuss in greater detail the cause of the fire, the response steps taken and how the recovery went.

4:10pm – 4:40pm

T Session C - Droning

Double Tree by Hilton (16615 109th Avenue North West, Edmonton, Alberta,)

Speakers: Michael Kurys

We will discuss the use of drones in our operations, that offer aerial CCTV monitoring of storm and sanitary lagoons, as well as site and building surveys. This technology enhances our ability to capture real-time video and valuable data, improving operational efficiency and decision-making. The insights gathered help ensure infrastructure safety, streamline assessments, and reduce the need for manual inspections in hard-to-reach areas. We will also discuss drone usage that is compliant with all legal regulations, ensuring safe and responsible operation in designated locations.

N Networking Event - Rec Room Games Night

WEM Rec Room (16615 109 Avenue NW)

Enjoy the sights, sounds and games of an arcade! Join us at The Rec Room for a night of fun and friendly competition. Meet us inside at “**The Garage**” where you will be provided a free game wristband, snacks, and drink. Prizes will also be drawn at the end of the night.

Can I Bring Guests?

Family members (partner and children) of conference delegates are welcome to attend. A maximum of two game wristbands will be provided per family. A minimum of one conference delegate must be present per group.

Guests that are not immediate family members are not allowed to attend.

How Do I Get There?

Shuttle - Board the AWWOA shuttle with pick up and return to the DoubleTree by Hilton Hotel West Edmonton.

Departure

DoubleTree to Rec Room - **Board at 6:35 PM, Departs at 6:45 PM**

DoubleTree to Rec Room - **Board at 7:20 PM, Departs at 7:30 PM**

Return

Rec Room to DoubleTree - **Board at 10:00 pm, Depart at 10:15 PM**

Drive - The Rec Room West Edmonton Mall is a 10-minute drive from the DoubleTree Hotel. Free parking is available directly outside the venue or in other mall parking lots.

The Rec Room is located on the second floor of West Edmonton Mall. It can be accessed from an outside entrance near 87 Ave and 170th Street NW or from inside the mall. The closest mall entrance is 31.

Location: The Rec Room, West Edmonton Mall

8882 170 St NW, #2065, Edmonton, AB

The Rec Room is a 54,000 square foot space with over 80 arcade games to choose from, including classic video games like Pac Man, racing games like Mario Kart, first-person shooters, roller coaster simulations and more.

NOVEMBER 15 • FRIDAY

8:00am – 10:00am **R** **Registration Desk** Double Tree by Hilton (16615 109th Avenue North West, Edmonton, Alberta.)
Registration Desk: Pick up your delegate package if you have registered online **prior** to the Conference. Onsite registration is also available (extra fees apply).

Information Counter: Ask your questions about the Conference and the events for the week here.

PINNED **S** **Working Towards Resilient Infrastructure - A System Operator's Guide**
8:30am – 11:45am *Speakers: Kendra Rukundo, Tim Yli, Grant Dixon,* Double Tree by Hilton (16615 109th Avenue North West, Edmonton, Alberta.)
Jen Beverly, Owen James
