

# Operators Conference Opening Session

## Welcome Operators

**Presenter:** **Jay Irby**  
**Title:** President of the Southwest Idaho Operators Section of the PNCWA  
 Shift Supervisor at Lander Street Water Renewal Facility  
 Operations Coordinator for Operations Management and Consulting Services  
**Organization:** City of Boise  
**Email:** [jirby@cityofboise.org](mailto:jirby@cityofboise.org)

**Professional Background:** Jay Irby is an expert in the water renewal industry as an operator for Operational Management and Consulting services. He has served in the water renewal industry for 10 years with the City of Boise at both the West Boise and Lander Street Water Renewal Facilities. He currently holds his Class IV Wastewater and Collections certifications. He joined the Operational Management and Consulting Service's team in February of 2016. He graduated from Nampa Christian in 2002. He currently holds an Idaho Wastewater Treatment Class 4 and an Idaho Wastewater Collections Class 4 license. He is serving a term on the Southwest Idaho Operators Section which is a non-profit group that provides industry related education opportunities for maintaining licensure. He served on the Idaho Operator's Conference Committee as a planner in 2016. He is an avid fisherman and has a tremendous sense of pride in protecting Idaho's natural resources and citizens.

## The Importance of Operators to Our Water

**Presenter:** **John Tippetts**  
**Title:** Director of DEQ  
**Organization:** Idaho Department of Environmental Quality  
**Email:** [john.tippetts@deq.idaho.gov](mailto:john.tippetts@deq.idaho.gov)

**Professional Background:** John Tippetts was appointed to the director of the Idaho Department of Environmental Quality by Governor C.L. "Butch" Otter in July 2015 during his third term in the Idaho Senate. His career has also included serving six terms in the Idaho House of Representatives and working for Agrium as a public affairs manager. He received his master's degree in human resources management from Utah State University.

## Keynote Presentation: The Evolving Operations Environment in the Water Industry: What is the Operator's Role Moving Forward?

Water and wastewater operators serve society by protecting public health and the environment. Depending on the type and size of treatment facility plant, and the regulatory requirements, the job duties of an operator can vary significantly. In small facilities, there may be only one operator responsible for all operations, laboratory analysis, maintenance, source control, and collection systems. In large plants, there may be multiple operators, specialists in a wide range of operational systems. But operational schemes are evolving quickly. Looking into the future, the way operations are executed will look very different than today. What then will be the operator's role moving forward? Much is uncertain about what the operator's role will be, the degree and type of training that will be required, and what the breadth of the "market" will be for those interested in pursuing careers in the water/wastewater industry. Are

opportunities expanding or shrinking? Additionally, facilities need to plan as the aging workforce and the realities this poses to the industry. This presentation will overview these important issues.

### Presenters: Art Umble,

**Presenter:** Art Umble, PhD, P.E.  
**Title:** Global Practice Leader for Treatment  
**Organization:** Stantec  
**Email:** [arthur.umble@stantec.com](mailto:arthur.umble@stantec.com)

**Professional Background:** Dr. Art Umble is a certified wastewater operator and has managed a publicly owned water and wastewater utility. Dr. Umble's experience also covers many aspects of engineering practice. He began developing his engineering career in private development and municipal civil engineering in areas throughout the southwestern United States, specializing in hydraulics and water resources. After completing a Ph.D. in biological waste treatment at the University of Notre Dame, he added to his experience nearly a decade municipal water and wastewater utilities management and operations for the City of Elkhart, IN, a city of 50,000. In this capacity he was responsible for strategic master planning, day-to-day treatment plant operations, regulatory compliance, facility planning, preliminary and final design of civil/sanitary systems, asset management and maintenance of the drinking water and wastewater treatment systems. During this time, Dr. Umble has also served as Adjunct Professor of Civil Engineering at the University of Notre Dame.

As the global lead for wastewater practice at Stantec, Art's position involves developing strategies and providing solutions for complex wastewater treatment challenges. He is also responsible for pushing scientific research that enables technology adoption in the worldwide marketplace.

With almost 30 years of experience, Art is considered a champion on the global stage of wastewater treatment. He is helping to change the paradigms of the wastewater industry by transitioning from disposal facilities to resource recovery and product factories. According to Art, "the future of municipal utilities requires a great degree of sustainability and resiliency," and that is achievable by embracing new ways of thinking about treatment and adopting new technology.

Dr. Umble has been a leader in community initiatives involving the promotion of environmental stewardship, such as watershed planning and pollution prevention. He serves in numerous state and national forums and stakeholder work groups related to environmental rules, regulations and environmental legislation, and emerging treatment technologies. His focus has been in technical support for the environmental policy areas of water quality standards, treatment technology, water reuse, biosolids and residuals management, stormwater management, watershed planning, affordability for water environment program implementation, developing frameworks for stakeholder coalitions in environmental policy, and implementation of environmental management systems. He is active on numerous committees with the Water Environment Federation, and serves as a technical advisor/reviewer for Water Environment Research Foundation and the Water Reuse Foundation collaborative research projects.

# Phosphorus Mass Balance and Struvite

## Abstract

This presentation will cover issues associated with phosphorus in wastewater treatment and how struvite can form. It will then go through a mass balance of phosphorus around a wastewater treatment plant and how that mass balance impacts the potential for struvite to form in different systems. The presentation will then finish with a description of the different types of struvite removal technologies available on the market today and how those technologies impact the potential for struvite formation in biosolids processing systems.

## Presenter: Rick Kelly

**Presenter:** Rick Kelly  
**Title:** Senior Process Engineer  
**Organization:** Brown and Caldwell  
**Email:** [rkelly@brwncald.com](mailto:rkelly@brwncald.com)

**Professional Background:** Rick Kelly is a senior process engineer with experience in municipal and industrial wastewater treatment and wastewater treatment process upset. Rick has specific experience in process modeling of biological treatment systems; nitrification, denitrification, and phosphorus removal; methods for control of foaming and bulking filamentous organisms; process upset investigations through plant-, pilot-, and laboratory-scale testing; wastewater treatment plant (WWTP) design; and plant capacity assessments through the use of computer simulation tools, solids mass balances, stress testing of clarifiers and solids thickening and dewatering equipment, and hydraulic profiling. Rick also has special interest in struvite control and mitigation in digestion and dewatering systems.

# Operational Troubleshooting of Biological Nutrient Removal Systems

## Abstract

Given the relatively complicated mechanisms for nutrient removal (Enhanced Biological Phosphorus Removal [EBPR] and Total Nitrogen [TN]) to occur in a secondary treatment process, several items are required to provide a well-operating system. The top six prerequisites identified are:

- Feed the PAOs (Carbon Management)
- Protect the anaerobic zone
- Maximize P uptake in the aerobic zone
- Maximize solids capture
- Minimize recycle loads
- Minimize competition

System-wide performance results are measured against these prerequisites, helping identify some of the areas where the optimization efforts can be focused. A few case studies will be presented, showing how facilities have addressed these.

## Presenter: William Leaf

**Presenter:** William Leaf  
**Title:** Principal Technologist  
**Organization:** Jacobs Engineering, Inc.  
**Email:** [William.Leaf@jacobs.com](mailto:William.Leaf@jacobs.com)

**Professional Background:** William Leaf/Principal Technologist, Jacobs Engineering, Inc. William has worked over 25 years in the wastewater treatment industry, focusing on nutrient removal on at municipal facilities. He has worked in the planning, design, services during construction, commissioning, and optimization aspects of projects.

# Optimization of Biological Nitrogen Removal: Practical Considerations

## Abstract

Nitrogen removal processes in wastewater treatment plants can be tricky because, unlike phosphorus removal in which phosphorus is taken up by the sludge and goes out with the sludge, the nitrogen cycle relies on a series of interconnected chemical reactions. Not only that, but nitrification and denitrification require that the same sludge be used in different stages of the liquid stream to perform parts of the reactions. Operational tweaks play a super important role in nitrogen removal; things like RAS flow, internal mixed liquor return (IMLR) flow, presence or absence of phosphorus accumulating organisms (PAOs), and DO setpoints all matter when it comes to nitrogen removal. This presentation will discuss why and how these operational tweaks affect nitrogen removal, and will utilize some real world examples to illustrate the principles in play.

## Presenter: Tyson Schlect

<b>Presenter:</b>	<b>Tyson Schlect</b>
Title:	Wastewater Process Engineer
Organization:	HDR Inc.
Email:	<a href="mailto:Tyson.schlect@hdrinc.com">Tyson.schlect@hdrinc.com</a>

Professional Background: Tyson Schlect is a wastewater process engineer at HDR in Boise, Idaho and loves the idea of clean water as a product of controlled processes. He enjoys third wave coffee, cidermaking, and playing duplos with his young daughter.

## Tips from a Roadie to Tune Up Your O&M Manuals

### Abstract

Textbooks and O&M manuals are welcome resources for wastewater operators. They serve as sheet music for the operator to follow while operating wastewater treatment plants. However, what happens when you find that your O&M manual is vague, or your plant does not follow specific standards found in various academic textbooks? Operators need to be active conductors so they can provide the correct time & rhythm required to produce a sound quality effluent. This presentation will examine three common operational challenges, observed through the eyes of a roving technical assistance provider, which can lead to an un-tuned facility.

### Presenter: Andy O'Neil

**Presenter:** Andy O'Neil  
**Title:** Wastewater Operator Outreach  
Water Quality, ERO/CRO  
**Organization:** Washington State Department of Ecology  
**Email:** [AONE461@ECY.WA.GOV](mailto:AONE461@ECY.WA.GOV)

**Professional Background:** Andy O'Neill, a resident of Lewiston, Idaho, provides technical assistance to municipal wastewater facilities. He is a specialist in wastewater certification training, process control, asset management, and regulatory compliance reporting. His education, field work, and managerial experiences continue to forge alliances, inspire shared visions, and turn details into deliverables. Mr. O'Neill's background includes serving in various roles such as a wastewater treatment plant operator, facilities manager, board member for the State of Washington's Wastewater Certification Advisory Committee, past president of the Water Environment Federation (WEF) member association Pacific Northwest Clean Water Association (PNCWA), and he currently serves as a member of the Association of Boards of Certification (ABC) Wastewater Scheme Committee. Mr. O'Neill earned his Master's degree from Gonzaga University in Organizational Leadership and is ABC certified in the states of Washington, Idaho, and Oregon as a Level IV wastewater treatment plant operator.

# Nutrient Recovery Using Advanced Biological Nutrient Recovery (ABNR)

## Abstract

While phosphorus and nitrogen (nutrients) are natural parts of aquatic ecosystems supporting the growth of algae and other aquatic plants, when excessive amounts of nutrients enter the environment through wastewater discharge (or agricultural runoff), the receiving waters become polluted. This pollution results in serious environmental, economic and human health concerns. These impacts have prompted the U.S. Environmental Protection Agency (EPA) to accelerate planning efforts with individual states on the implementation of water quality requirements and nutrient discharge standards.

Advanced Biological Nutrient Recovery (ABNR) delivers a simple, sustainable and highly modular approach to tertiary nutrient recovery. Like upstream activated sludge processes, it is a suspended growth treatment platform which operates in a continuous and controlled environment. The technology leverages naturally occurring biology (microalgae, et al) to consume excess nutrients prior to discharge.

Various municipalities across Wisconsin, Minnesota and Illinois engaged CLEARAS Water Recovery (CWR) throughout 2017 and 2018 to conduct onsite technology demonstrations of their ABNR systems using their mobile treatment unit to vet its tertiary treatment capabilities for meeting future regulatory limits on phosphorus in effluent. Over the mobile tour, the pilot demonstrations primary objective was the recovery of phosphorus from secondary effluent from levels as high as 8 mg/L Total Phosphorus (TP) to levels at or below 0.04 mg/L. ABNR was selected for these demonstrations based on its ability to sustainably achieve low-level TP results while positively impacting other, high-priority contaminants in secondary effluent such as nitrogen, biochemical oxygen demand (BOD), and total suspended solids (TSS). The consistent success of the technology in out-performing chemical/mechanical competitors at every facility visited was confirmed and results will be shared, including those of a unique cold-weather demonstration in winter wastewater environments with no degradation of system performance. These pilot demonstrations successfully confirmed the capacity of ABNR to achieve the targeted phosphorus requirements in the Great Lakes Region, with broadly applicable lessons for the wastewater industry regarding the technology's various applications.

### Learning Objectives:

1. Sustainable approach to ultra-low-level phosphorus recovery.
2. Recovery of nutrients, turning waste into value and enabling the circular economy.
3. A greater understanding of the rapid advances in biological solutions to nutrient recovery such as ABNR.
4. A framework to explore how and when ABNR may be an appropriate solution for their nutrient challenges.
5. Understanding of real-world examples where ABNR has been successful and why.

### Presenter: Brian Richichi and Kevin McGraw

**Presenter:** Brian Richichi  
**Title:** Sales Executive  
**Organization:** CLEARAS Water Recovery  
**Email:** [brichichi@clearaswater.com](mailto:brichichi@clearaswater.com)

**Professional Background:** As a member of the initial core team, Brian's involvement with CLEARAS began in 2009 where he supervised daily operation of a 50,000 GPD Advanced Biological Nutrient Recovery (ABNR™) facility. Brian is now part of the commercial development team at CLEARAS and is currently focused on delivering wastewater treatment solutions across the United States. He manages regional representative relationships, customer outreach, and technology education initiatives for regulators and engineers. Brian also provides technical analysis and design support for ABNR installations, optimizing CLEARAS' technoeconomic model to meet the needs of facility operators and their engineering partners.

Brian received his B.S. in Business Administration with a Minor in Economics from Arizona State University. In his spare time, he enjoys mountain biking, fly fishing, deer and elk hunting, and playing golf.

**Presenter:** **Kevin McGraw**  
**Title:** Operations Manager & Co-Founder  
**Organization:** CLEARAS Water Recovery  
**Address:** 1500 Clark Fork Ln., Missoula, MT 59808  
**Email:** [kmcgraw@clearaswater.com](mailto:kmcgraw@clearaswater.com)

**Professional Background:** Kevin blends his military background and industry expertise with over 20 years of leadership and entrepreneurial experience to lead the operations team for CLEARAS. His skills in solving complex problem and finding innovative solutions, at the intersection of technological and biological systems performance, are at the heart of Clearas' operations.

Prior to co-founding CLEARAS, Kevin built a successful residential land development business in California, which he later expanded into Montana. Earlier in his career, he studied navigation, graduating from the California Maritime Academy, and spent eight years sailing as a Navigational Officer for Master Mates and Pilots.

Kevin served four years as a United States Marine and completed his obligation with an honorable discharge.

## Harmful Algal Blooms: Management Options for Water Utilities

### Abstract

Warming temperatures and increasing nutrients in surface water sources are leading to an increase in the frequency and severity of algae blooms throughout North America and the world. Algal species such as cyanobacteria or blue-green algae can disrupt existing treatment works, increasing maintenance and reducing efficiency to drive up costs. Algal organisms and their byproducts can also cause objectionable taste and odor for the drinking water consumer. On a more serious level, some algal species create toxins with serious human health risks, making the utility's product unfit for human consumption. Potential factors contributing to Harmful Algal Blooms will be reviewed along with corresponding impacts on sources and treatment works. Potential human health impacts will also be summarized. Options for managing Harmful Algal Blooms will be presented, including basic and advanced management options for the source and intake, and various treatment options ranging from basic to advanced treatment barriers. Finally, several example case studies will be reviewed, including a source control system implemented by a community in Florida, pretreatment barrier additions by the City of Bellingham, Washington and Waco, Texas, and treatment system modifications by the City of Penticton, BC (Canada) and Anderson, South Carolina.

### Presenter: Stephanie Smith

**Presenter:** Stephanie Smith, Ph.D.  
**Title:** Product Segment Manager - Outdoor Water Quality  
**Organization:** Xylem Inc.  
**Email:** [stephanie.smith@xyleminc.com](mailto:stephanie.smith@xyleminc.com)

**Professional Background:** Dr. Stephanie A. Smith has been working with blue-green and other algae for 20 years, beginning with her doctoral program in Microbiology at The Ohio State University. Dr. Smith's experience with algae has spanned the study of photosynthetic microbiology and carbon fixation bioenergy, the causes and impacts of harmful algal blooms, and using blue-green algae to make high-value products that have included algal toxin reference standards for research and monitoring. At Xylem Dr. Smith manages the Outdoor Water Quality product line, and frequently advises source water managers on the water quality principles that lead or respond to the growth of algae. She has advised plant operators on management and monitoring strategies for HABs for the last 10 years.

# Nitrate Removal in Water and Wastewater Applications

## Abstract

- What are nitrates and why are they a concern
- Treatment standards for nitrates in both water and wastewater applications
- Non-treatment options for nitrate reduction
- Typical treatment methods for nitrate removal:
  - Physical
  - Chemical
  - Biological
- Water treatment:
  - Ion Exchange
  - Reverse Osmosis
  - Biological Systems
- Wastewater treatment:
  - Secondary biological systems
  - Tertiary denitrification
    - Continuous backwash sand filters
- Operational considerations and challenges
- Case Studies and Lessons Learned

## Presenter: Adrian Williams

**Presenter:** Adrian Williams  
**Title:** Western Regional Sales Manager  
**Organization:** WesTech Engineering  
**Email:** [awilliams@westech-inc.com](mailto:awilliams@westech-inc.com)

**Professional Background:** Adrian Williams has been working in the water and wastewater treatment industry for nearly 10 years with WesTech Engineering. He has served in applications engineering roles for a bulk of that time focusing on sedimentation and biological product offerings. In his current role as Western Regional Sales Manager, Adrian has assisted consulting engineers and municipalities in product-based problem solving for over 2 years. He received his bachelor's degree in Mechanical Engineering from Brigham Young University and his master's degree in Environmental Engineering from the University of Utah and is a Professional Engineer registered in the State of Utah.

# UV Disinfection: From Wastewater to Water Reuse and Beyond

## Abstract

UV technologies have been widely applied in disinfection for wastewater disposal. The current trend is moving from wastewater discharge towards water reuse, either non-potable reuse or potable reuse, to maximize the potential of all available water resources. With the interests in reuse, it is a natural reaction for most treatment facilities implementing UV or currently operating UV systems to explore the option for UV in reuse application. This imposes challenges on how to implement UV to fit in future reuse plan; or how to upgrade or expand the currently installed UV systems, which were originally sized for effluent disposal, to meet the requirements for reuse. This presentation will focus on how to prepare a wastewater discharge plant today while bearing the potential capability of future implementation of UV for reuse.

- Regulatory and practice challenges: Regulatory challenges and practice challenges we are facing in finding viable and cost-effective approaches to keep the facility in compliance with reuse requirements.
- Technology updates: fast advancing UV technologies that possess the disinfection effectiveness and capability for reuse.
- Implementation approach: system upgrade or facility planning needs to consider the difference of UV implementation in terms of treatment target and design criteria for reuse.

What operators will learn:

- Regulatory challenges and practice challenges we are facing when implement UV disinfection.
- Updates of UV technologies that are available today and their applicability.
- Advancement and trend of UV technologies.
- What is the difference of UV for wastewater disposal and water reuse.
- What happen to UV, from UV-disinfection to UV-AOP
- Key elements in UV implementation: how to get the UV system you want.

## Presenter: June Leng

**Presenter:** June Leng, Ph.D., P.E.  
**Title:** Wastewater Disinfection Lead  
**Organization:** HDR  
**Email:** [June.Leng@hdrinc.com](mailto:June.Leng@hdrinc.com)

**Professional Background:** Dr. June Leng is the disinfection practice lead at HDR Folsom California office. June has more than 25 years of water and wastewater engineering experience in United States and internationally. In the past 17 years, her experience is focusing on disinfection process implementation in wastewater treatment and water reuse, including innovative technology evaluation, bench-scale and pilot-scale disinfection studies, and large-scale chlorination/dechlorination, UV disinfection and advanced oxidation process (AOP) systems design, commissioning, and optimization. She has provided evaluation, design and implementation for over 60 disinfection projects nationwide.

**Education:**  
 B.S., Civil Engineering  
 M.S., Environmental Engineering  
 Ph.D., Civil Engineering

She is also an adjunct faculty member with California State University.

# Operations and Energy

## Abstract

Sharing low and no cost energy saving examples, which don't sacrifice water quality is a goal of the presentation. The electrical utilities in the region, Idaho Power included, are keenly interested in assisting their water provider and wastewater treatment customers in obtaining more energy efficient systems. We will share some of the things we look for when we lead energy treasure hunts for water and wastewater systems. A panel of experienced water and wastewater operators who have successfully identified and implemented low and no cost opportunities in their systems will share their experiences. We look forward to and encourage your questions throughout our presentation.

### Learning Objectives:

- Common low and no cost energy savings opportunities for water and wastewater systems
- What Strategic Energy Management is and how they can start implementing ideas for their systems
- About incentives available from Idaho Power
- Who to contact if they have a potential energy saving project

## Presenters: Chellie Jensen and Wendy Waudby

**Presenter:** Chellie Jensen, P.E.  
**Title:** Commercial and Industrial Energy Efficiency Program  
 Custom Projects Senior Engineer  
**Organization:** Idaho Power  
**Email:** [cjensen@idahopower.com](mailto:cjensen@idahopower.com)

**Professional Background:** Chellie Jensen has been part of the Idaho Power Commercial and Industrial Energy Efficiency team since 2009 and currently manages the new strategic energy management offerings for Idaho Power, including the wastewater energy efficiency cohort and the water supply optimization cohort. Chellie has a vast background in mechanical engineering design and project management with 20 years of experience in mechanical systems, design and construction. Chellie graduated from Montana Tech in 1999 with a BS in Mechanical Engineering.

**Presenter:** Wendy Waudby, P.E.  
**Title:** Water/Wastewater Engineer  
**Organization:** Cascade Energy  
**Email:** [Wendy.Waudby@cascadeenergy.com](mailto:Wendy.Waudby@cascadeenergy.com)

**Professional Background:** Wendy Waudby works with water and wastewater facility owners, operators, and design engineers to identify energy efficiency projects and energy savings and help implement low and no cost opportunities. Prior to joining Cascade, Wendy worked as a regulator and a design engineer for water and wastewater projects. Wendy received her BS in Environmental Engineering and MS in Civil and Environmental Engineering from California Polytechnic State University, San Luis Obispo.

## Now Serving Unleaded Drinking Water

### Abstract

Got lead exceedances? Attendees will learn about issues and operations associated with lead and copper abatement and monitoring in public drinking water systems. Topics include sampling methods, origins of lead, and mitigation techniques. The presentation highlights lessons learned from the first two lead and copper projects in the state of Idaho: Castle Mountain Creeks and Wilderness Ranch.

### Presenters: Terry Tucker, Kenny Everhart, Emily Nicholas, and Derek Probst

**Presenter:** Terry Tucker  
**Title:** Drinking Water, Wastewater Collections, and Wastewater Operator  
**Organization:** Castle Mountain

**Professional Background:** Terry Tucker has been in the water industry for over 12 years and currently holds a Class I license for drinking water treatment, water distribution, wastewater collections systems, and wastewater treatment. Additionally, he is certified to inspect and maintain Bio-Microbics Wastewater Treatment systems. His work ranges throughout the Garden Valley Region and has included maintaining and replacing approximately \$25 million worth of aging infrastructure. As both the construction manager and operator in charge of the State of Idaho's first Lead and Copper Project, Mr. Tucker holds invaluable insight for overcoming challenges faced by small communities.

**Presenter:** Kenny Everhart  
**Title:** Operator in Charge  
**Organization:** Wilderness Ranch

**Professional Background:** Kenny Everhart is the operator in charge of 6 public drinking water systems and brings over 22 years of construction experience to the water industry. Mr. Everhart specializes in construction management, excavation, and infrastructure installation and repair. For the past 8 years, Mr. Everhart has been a Councilman for Idaho City and is a board member of the Association of Idaho Cities (AIC). The majority of his work involves operating and maintaining the Wilderness Ranch Public Water System which is spread over 20 miles of mountainous terrain to serve 275 homes. Wilderness Ranch recently completed Idaho's second Optimized Corrosion Control Treatment Study and Mr. Everhart is leading the charge into implementing operational and treatment techniques targeting lead and copper mitigation.

**Presenter:** Emily Nicholas, E.I.T.  
**Title:** Project Engineer  
**Organization:** Mountain Waterworks  
**Email:** [enicholas@mountainwtr.com](mailto:enicholas@mountainwtr.com)

After obtaining her Master's Degree in Environmental Engineering from Colorado School of Mines, Emily Nicholas has returned to her Idaho roots. Her previous experience ranges from managing production enhancement operations in the oilfield to becoming a certified wastewater treatment operator. Her passion for water and wastewater treatment has led her to specialize in water systems for public and private concerns. She is driven to find cost effective and efficient solutions for her clientele.

**Presenter:** **Derek Probst, E.I.T.**  
Title: Project Engineer Mountain  
Organization: Waterworks  
Email: [dprobst@mountainwtr.com](mailto:dprobst@mountainwtr.com)

Bringing his past experience in water and wastewater projects from Arizona and Utah, Derek Probst has joined the Mountain Waterworks team as a project engineer to serve communities across Idaho. Derek is proud to be tackling emerging problems within the water industry as evident by his role in the first state funded Lead and Copper abatement initiatives. In all projects he seeks client-specific solutions for existing and potential problems.

# Making Sense of Microbiological Sampling: Why is it Important and What Does it Mean?

*Previously Titled: Pathogens in Wastewater-Risk Exposure and Disease*

## Abstract

Reductions in infectious disease due to advanced water and wastewater treatment remain one of the major public health advancements of the past century. The continued success of both existing infrastructure and new advancements (e.g., water reuse) requires microbiological sampling to monitor the effectiveness of treatment and the continued protection of public health. This talk will review the background/rationale for the range of microbiological methods used to analyze water and wastewater, including different types of microbial pathogens, indicators of fecal contamination, and newer descriptors of the diverse set of microorganisms present, or the microbiome. The goals of the presentation are to help the audience appreciate the importance of the sampling and to understand important guidance to ensure the accuracy of the information collected.

## Presenter: Jay Garland

<b>Presenter:</b>	<b>Jay Garland</b>
Title:	Division Director
Organization:	EPA
Email:	<a href="mailto:garland.jay@epa.gov">garland.jay@epa.gov</a>

Professional Background: Dr. Jay L. Garland joined the EPA's Office of Research and Development in 2011 after spending over 20 years working on NASA's efforts to develop closed, bioregenerative life support systems for extended human spaceflight. Since receiving a Ph.D. in Environment Science from the University of Virginia, his research has addressed a range of topics, including methods for microbial community analysis, factors affecting survival of human associated pathogens, and various biological approaches for recycling wastes. His work is committed to the development of sustainable systems using ecological principles and innovative design.

# Idaho Pollution Discharge Elimination System Permit Development Information: How Facility Operators Inform the Permit Process

## Abstract

- Overview of the Clean Water Act and NPDES Program
  - IPDES as of July 1, 2018
- Scope and Regulatory Framework of Regulatory Program
- NPDES Permit Application Process
- Technology based Effluent Limitations for POTWs
- Water Quality Based Effluent Limits (WQBELs)
- Characterizing the Effluent and Receiving Water
- Determining the Need for WQBELs
- Monitoring and Reporting
- Specific examples of how daily operations at the water renewal facilities impacts future permit limits
  - Outliers
  - Stable operating procedures
  - Importance of n size
  - Importance of consistency

## Presenter: Kathryn (Kate) Harris

**Presenter:** Kathryn (Kate) Harris  
**Title:** Water Quality Programs Manager  
**Organization:** City of Boise  
**Email:** [kharris@cityofboise.org](mailto:kharris@cityofboise.org)

Professional Background:

### Education

Post-Graduate Study: Idaho State University (42 graduate credits)  
 1997 M.S. Ecology – Central Michigan University  
 1994 B.S. Biology – Loyola University of Chicago

### Qualifications/Credentials

Accomplished ecologist with over 20 years environmental education and experience. Expertise in aquatic ecology, water resource management and environmental assessment.

### Work History

4/17 – present Water Quality Programs Manager, City of Boise, Idaho  
 03/05-04/17 Water Quality Sampling and Monitoring Coordinator, City of Boise, Idaho  
 1/04-2/05 Senior Staff Aquatic Ecologist: ENTRIX, Inc., Walnut Creek, California  
 5/03-11/03 Hydrologist: Bureau of Land Management, Susanville, California  
 8/96-05/03 Stream Ecology Research Assistant: Idaho State University, Pocatello, Idaho

### Previous Classes Taught

I have several years of experience developing courses and teaching classes. I taught several courses during my academic years. During my undergraduate program I taught basic science classes to grade school students in Chicago schools. My first year at Central Michigan University was partially funded through a Teaching Assistantship; I taught Biology to Biology majors. In addition, I was contracted to teach a short course (6 weeks) called Water Conservation, in which I was responsible for course content development; teaching; and writing/grading exams. My first year at Idaho State University was also partially funded by a teaching assistantship; I taught Biology to non-majors. In other years I was responsible for teaching Ecology Laboratory, Freshwater Ecology Laboratory and Stream Ecology Laboratory. I have taught two classes approved by Idaho Bureau of Occupational Licenses.

### Related Work Experience

I am the Environmental Division Water Quality Programs Manager for the City of Boise. Before my current position, I was the Water Quality Sampling and Monitoring Coordinator and have worked for the City of Boise since March 2005.

Work experience that qualifies me to teach the proposed courses as follows:

- Compiled and submitted NPDES permit reapplication materials for the water renewal facilities and geothermal system
- Implement sampling and monitoring program to meet NPDES permit requirements
  - Implement Watershed Based Fish Tissue Mercury Monitoring Program
  - Update and submit Mercury Minimization Plan reports to EPA
  - Complete EPA end-of-year reports for temperature and phosphorus
- Develop and implement programs to address surface water related programs and regulatory issues
  - Completed Water Effects Ratio evaluation
  - Biotic Ligand Model data collection and evaluation
- Serve as the local government Lower Boise River Watershed Council Board Member
  - Served on technical advisory committees for Lower Boise River Total Phosphorus TMDL development
  - Led the point source workgroup for TMDL Implementation Plan development
  - Represented local government in the update of the Lower Boise River Water Quality Trading Framework
- Represent municipal interests on the Southwest Idaho Basin Advisory Group
- Participate in water quality standards and criteria development, review, and negotiated rulemaking
- Contribute to IPDES program development documents
- Create and deliver presentations for articles or educational outreach programs and activities
  - IRU Boise River Community Lecture Series: City of Boise Sampling and Monitoring Programs
  - WaterShed: The Necessity of Clean Water
  - BREN – blog articles for Dixie Drain Phosphorus Removal Facility and 2017 *E. coli* issues
  - SWIOS – Dixie Drain presentation and Clean Hands/Dirty Hands sampling method presentation
- Continue professional development
  - Completed EPA's Water Quality Standards Academy
  - NACWA Water Quality Committee member
- PNCWA, WateReuse, and WE&RF member

# BNR and Microscopy Part 1: BNR System Overview

## Abstract

This presentation will cover an overview of Biological Nutrient Removal systems, including configuration, typical conventional systems, benefits of BNR system and limits of technologies.

## Presenter: Rick Kelly

**Presenter:** Rick Kelly  
**Title:** Senior Process Engineer  
**Organization:** Brown and Caldwell  
**Email:** [rkelly@browncald.com](mailto:rkelly@browncald.com)

**Professional Background:** Rick Kelly is a senior process engineer with experience in municipal and industrial wastewater treatment and wastewater treatment process upset. Rick has specific experience in process modeling of biological treatment systems; nitrification, denitrification, and phosphorus removal; methods for control of foaming and bulking filamentous organisms; process upset investigations through plant-, pilot-, and laboratory-scale testing; wastewater treatment plant (WWTP) design; and plant capacity assessments through the use of computer simulation tools, solids mass balances, stress testing of clarifiers and solids thickening and dewatering equipment, and hydraulic profiling. Rick also has special interest in struvite control and mitigation in digestion and dewatering systems.

## BNR and Microscopy Part 2: Use of Microscopy to Evaluate AS and BNR Systems

*Previously Titled: AS and BNR Systems*

### Abstract

This is the second session on BNR systems and microscopy. In this session, a brief overview of microscopic evaluations and techniques will be discussed. We will go through what different organisms are observed under the microscope and what they mean for the health of an activated sludge process and BNR processes. We will finish with a brief overview of other laboratory tests that are helpful in monitoring the health of BNR systems.

### Presenter: Rick Kelly

**Presenter:** Rick Kelly  
**Title:** Senior Process Engineer  
**Organization:** Brown and Caldwell  
**Email:** [rkelly@browncald.com](mailto:rkelly@browncald.com)

**Professional Background:** Rick Kelly is a senior process engineer with experience in municipal and industrial wastewater treatment and wastewater treatment process upset. Rick has specific experience in process modeling of biological treatment systems; nitrification, denitrification, and phosphorus removal; methods for control of foaming and bulking filamentous organisms; process upset investigations through plant-, pilot-, and laboratory-scale testing; wastewater treatment plant (WWTP) design; and plant capacity assessments through the use of computer simulation tools, solids mass balances, stress testing of clarifiers and solids thickening and dewatering equipment, and hydraulic profiling. Rick also has special interest in struvite control and mitigation in digestion and dewatering systems.

# Whole Effluent Toxicity: Introduction, Regulation, Tips for Success

## Abstract

### Course Outline:

- Introduction to WET
- How WET is regulated in the IPDES permit program
- City of Boise permit conditions and protocols
- Pitfalls to avoid during sample collection and data interpretation

### **INTRODUCTION TO WHOLE EFFLUENT TOXICITY (WET) TESTING**

- What is WET testing
  - Definition - measures effects on an effluent sample on live organisms
  - Clean Water Act standardized protocol
  - Describe endpoints measured
    - acute and chronic (survival and reproduction)
- Why do we do WET testing (objective)
  - Prevent toxicity to aquatic life
  - Description of the bioassay approach – species are surrogates for all organisms in the aquatic ecosystem
    - Species
      - Invertebrate
      - Fish
      - Algal
- WET Sample collection
  - Representative operating conditions
  - Grab v composite (depends on discharge type)
  - Rules
    - Cannot exceed 72 hours
    - Chilled
    - Others
- Test Details
  - Effluent dilution series
    - Receiving water concentration
  - Replicates
  - Randomized
  - Static renewal
- Test Example
  - Setup (photo)
- Definitions – toxicity units
- Results
  - What statistics are generated
  - How is pass fail determined
- Example of City of Boise test results

### **HOW WET IS REGULATED**

- Reasonable Potential Analyses
- Limits
- Other permit conditions:
  - Accelerated testing

- Toxicity Identification Evaluation
- Toxicity Reduction Evaluation
  - EPA document on Municipal TRE Guidance

### **CITY OF BOISE PERMIT CONDITIONS AND PROTOCOLS**

- City of Boise IPDES permit requirements and conditions
  - Details
    - Species
    - 24 h composite
    - Frequency of tests (“quarterly”)
  - Accelerated testing
- City of Boise Toxicity Identification Evaluation
  - Details
    - Notification protocols
    - Operations review
    - Laboratory review
    - Pretreatment response
- City of Boise Toxicity Reduction Evaluation
  - Information and data acquisition
  - Facility performance evaluation
  - Toxicity Identification Evaluation results
    - Toxicity Source Evaluation
    - Toxicity Control Evaluation
    - Toxicity Control Implementation

### **PITFALLS TO AVOID (WHAT CAN YOU DO)**

- Choose your laboratory wisely
  - EPA document available to help develop RFPs
  - Understand the WET testing protocols enough to ensure that your laboratory is performing the necessary steps required
- Sample during representative operations
  - Do not modify conditions during WET sampling weeks just to pass the test
- Use clean sampling equipment and avoid sample contamination
  - Includes sampling lines
- Ice samples well
  - Ensure that storage refrigerators meet temperature requirements
- Check for ammonia levels – test design can be modified to reduce ammonia toxicity exaggeration
- When toxicity is detected:
  - Ensure all test conditions met
  - Ensure sample was representative
  - TIE
    - Review facility operations check for unusual operations or occurrences
    - Investigate toxicity
      - Contact non-domestic users (new water treatment additive)

**Presenter: Kathryn (Kate) Harris**

**Presenter:** Kathryn (Kate) Harris  
**Title:** Water Quality Programs Manager  
**Organization:** City of Boise  
**Email:** [kharris@cityofboise.org](mailto:kharris@cityofboise.org)

## Professional Background

### Education

Post-Graduate Study: Idaho State University (42 graduate credits)

1997 M.S. Ecology – Central Michigan University

1994 B.S. Biology – Loyola University of Chicago

### Qualifications/Credentials

Accomplished ecologist with over 20 years environmental education and experience. Expertise in aquatic ecology, water resource management and environmental assessment.

### Work History

4/17 – present Water Quality Programs Manager, City of Boise, Idaho

03/05-04/17 Water Quality Sampling and Monitoring Coordinator, City of Boise, Idaho

1/04-2/05 Senior Staff Aquatic Ecologist: ENTRIX, Inc., Walnut Creek, California

5/03-11/03 Hydrologist: Bureau of Land Management, Susanville, California

8/96-05/03 Stream Ecology Research Assistant: Idaho State University, Pocatello, Idaho

### Previous Classes Taught

I have several years of experience developing courses and teaching classes. I taught several courses during my academic years. During my undergraduate program I taught basic science classes to grade school students in Chicago schools. My first year at Central Michigan University was partially funded through a Teaching Assistantship; I taught Biology to Biology majors. In addition, I was contracted to teach a short course (6 weeks) called Water Conservation, in which I was responsible for course content development; teaching; and writing/grading exams. My first year at Idaho State University was also partially funded by a teaching assistantship; I taught Biology to non-majors. In other years I was responsible for teaching Ecology Laboratory, Freshwater Ecology Laboratory and Stream Ecology Laboratory. I have taught two classes approved by Idaho Bureau of Occupational Licenses.

### Related Work Experience

I am the Environmental Division Water Quality Programs Manager for the City of Boise. Before my current position, I was the Water Quality Sampling and Monitoring Coordinator and have worked for the City of Boise since March 2005.

Work experience that qualifies me to teach the proposed courses as follows:

- Compiled and submitted NPDES permit reapplication materials for the water renewal facilities and geothermal system
- Implement sampling and monitoring program to meet NPDES permit requirements
  - Implement Watershed Based Fish Tissue Mercury Monitoring Program
  - Update and submit Mercury Minimization Plan reports to EPA
  - Complete EPA end-of-year reports for temperature and phosphorus
- Develop and implement programs to address surface water related programs and regulatory issues
  - Completed Water Effects Ratio evaluation
  - Biotic Ligand Model data collection and evaluation
- Serve as the local government Lower Boise River Watershed Council Board Member
  - Served on technical advisory committees for Lower Boise River Total Phosphorus TMDL development
  - Led the point source workgroup for TMDL Implementation Plan development
  - Represented local government in the update of the Lower Boise River Water Quality Trading Framework

- Represent municipal interests on the Southwest Idaho Basin Advisory Group
- Participate in water quality standards and criteria development, review, and negotiated rulemaking
- Contribute to IPDES program development documents
- Create and deliver presentations for articles or educational outreach programs and activities
  - IRU Boise River Community Lecture Series: City of Boise Sampling and Monitoring Programs
  - WaterShed: The Necessity of Clean Water
  - BREN – blog articles for Dixie Drain Phosphorus Removal Facility and 2017 *E. coli* issues
  - SWIOS – Dixie Drain presentation and Clean Hands/Dirty Hands sampling method presentation
- Continue professional development
  - Completed EPA’s Water Quality Standards Academy
  - NACWA Water Quality Committee member
- PNCWA, WateReuse, and WE&RF member

# Collection System Troubleshooting

## Abstract

The presentation will review collection systems and solutions. The various tools available to address common problems in collection systems and the use of those tools will be discussed. Collections troubleshooting case studies will be provided with practical information to be used in the execution of duties in daily work in a collection system. Collections troubleshooting can include issues on: pumps and motors, pipeline maintenance, operating hydraulic cleaning equipment, lift station maintenance and repair, operating CCTV equipment to evaluate existing infrastructure, as well as collection system repair and rehabilitation, dye testing, and smoke testing.

## Presenter: Keith Slack

**Presenter:** Keith Slack  
**Title:** Collections Operator  
**Organization:** City of Boise

**Professional Background:** Keith Slack holds an Idaho Class IV Collections License and has over 10 years of experience with wastewater collections. Keith has experience with pipeline maintenance, operating hydraulic cleaning equipment, lift station maintenance and repair, operating CCTV equipment to evaluate existing infrastructure, as well as collection system repair and rehabilitation, including working on several trenchless rehabilitation projects.

He is a collections operator in various local cities and has been since 2007. Keith is currently employed with the City of Boise. He holds Collections class 4 license. In 2018, Keith was awarded the “Collections Operator of the Year” award by the Southwest Idaho Operators Section (SWIOS) of the PNCWA.

# Hydraulics Primer

## Abstract

This session covers the basics of open channel flow and pressurized flow for sewers and lift stations.

### Presenter: Rich Wiebe

**Presenter:** Rich Wiebe, P.E.  
**Title:** City Engineer/Asst Public Works  
**Organization:** City of Boise  
**Email:** [rwiebe@cityofboise.org](mailto:rwiebe@cityofboise.org)

**Professional Background:** Rich Wiebe is an Assistant City Engineer for the City of Boise. Prior to working at the City, he worked as a consultant; providing sewer studies and sewer designs for many of the cities in the Treasure Valley. He also spent three years in Juneau, AK as the surface engineer for silver mine.

## Industrial Pretreatment

### Abstract

This presentation will cover the general definitions and requirements for industrial pretreatment including what it means to be a categorical and/or substantial industrial user. The presentation will review drivers surrounding pretreatment, common pollution types, identification of waste streams, strategies for prevention, and options for discharge. Local case studies will be presented demonstrating varying degrees of sophistication, treatment level, and operations. The presentation is geared for industrial users, wastewater pretreatment coordinators, and city officials.

### Presenter: Tyson Knudsen

**Presenter:** Tyson Knudsen, P.E.  
**Title:** Managing Engineer  
**Organization:** Cascade Earth Sciences  
**Email:** [tyson.knudsen@cascade-earth.com](mailto:tyson.knudsen@cascade-earth.com)

**Professional Background:** Mr. Knudsen is a Professional Civil Engineer with 11 years of experience in engineering and construction management. Mr. Knudsen's experience includes project management, facility planning, design, permitting, and construction oversight of water and wastewater systems. He has both a Master's and Bachelor's degree in Civil Engineering from Utah State University. Key technical responsibilities within CES are water and wastewater engineering for municipal and industrial clients. He has experience managing construction projects in excess of \$30M dollars. Mr. Knudsen is also experienced in representing and assisting municipalities with general city engineering services, regulatory compliance, and funding assistance.

## Lean a Little Bit Closer: Twin Falls Grandview Sewer

### Abstract

Murraysmith was contracted by the City of Twin Falls to evaluate and solve odor and corrosion issues associated with the large diameter Grandview Sewer Trunkline. All collections systems naturally create and contain odorous compounds. But, the Grandview Trunk is particularly odorous and has severe concrete structure (manhole) and pipe degradation.

The first step of the project was developing a liquid and air phase sampling program to understand both the odor compound generation areas and primary release mechanisms. This included vapor phase monitoring, liquid phase sampling, collecting odor complaint data, and interviewing City staff. The results were then summarized in a memorandum. The City plans to continue the project through the summer with system evaluation, treatment system piloting, life cycle cost assessment calculations, selected system design and construction.

Murraysmith also designed a replacement sewer along the Trunkline approximately 1,300 LF long with new 48-inch diameter gravity sewer pipe and three corrosion resistant manholes: Lined concrete manhole, bacterial inhibited manhole, and polymer concrete manhole. The corrosion resistant manholes were utilized as a pilot project to aid the City in determining which system is preferred for manhole replacement in areas of the City with existing corrosion or high corrosion potential. In the future the City will make decisions for replacement manholes that will best serve the City. The condition of the pilot manholes will be tracked and documented through the year and included in the presentation.”

### Presenter: Mark Cummings

**Presenter:** Mark Cummings, P.E.  
**Title:** Professional Engineer  
**Organization:** Murray Smith  
**Email:** [Mark.Cummings@murraysmith.us](mailto:Mark.Cummings@murraysmith.us)

**Professional Background:** Mark Cummings, P.E., has a Bachelor of Science in Biological and Agricultural Engineering and Master of Science in Environmental Engineering, both from the University of Idaho. Mark has worked for Murraysmith since 2009 and has served in a variety of planning, design, and construction roles on water and wastewater projects for municipal clients.

# Temporary Sewer Bypass Pumping

## Abstract

Typically bypass pumping will occur because of new construction, lift station rehabilitation, lift station malfunctioning, broken gravity line, force main rupture, tie-ins or a combination of these factors. Bypass pumping is an important part of the pipe rehabilitation process. Temporary bypass pumping systems can transfer sewage and water flow, which helps to maintain uninterrupted services. The presentation will review different case study scenarios to bypass pumping, emergency vs planned. Information needed to design bypass pumping systems and the type of equipment to spec for bypass pumping.

## Presenters: John Laible, Keith Slack, and Cary Jensen

**Presenter:**                    **John Laible**  
**Title:**                            Industrial Sales Representative  
**Organization:**                Rain for Rent  
**Email:**                           [JLAIBLE@rainforrent.com](mailto:JLAIBLE@rainforrent.com)

**Professional Background:** John was born and raised in Nampa, Idaho graduated from Carroll College in 1998. He started working for Rain for Rent in 2007. John started his 12th year with Rain for Rent and for the last 8 years he has been the Industrial Sales Representative. During this time he designed and provided equipment for temporary bypass pumping and has worked with multiple municipalities, engineering firms and construction companies from Northern Idaho to Eastern Oregon and Southwest Idaho. He has designed temporary bypass systems from 50 GPM to 21,000 GPM.

**Presenter:**                    **Keith Slack**  
**Title:**                            Collections Operator  
**Organization:**                City of Boise  
**Email:**                           [Slackkeith@gmail.com](mailto:Slackkeith@gmail.com)

**Professional Background:** Keith Slack holds an Idaho Class IV Collections License and has over 10 years of experience with wastewater collections. Keith has experience with pipeline maintenance, operating hydraulic cleaning equipment, lift station maintenance and repair, operating CCTV equipment to evaluate existing infrastructure, as well as collection system repair and rehabilitation, including working on several trenchless rehabilitation projects.

He is a collections operator in various local cities and has been since 2007. Keith is currently employed with the City of Boise. He holds Collections class 4 license. In 2018, Keith was awarded the “Collections Operator of the Year” award by the Southwest Idaho Operators Section (SWIOS) of the PNCWA.

**Presenter:**                    **Cary Jensen**  
**Title:**                            Branch Manager  
**Organization:**                Rain for Rent  
**Email:**                           [CJENSEN@Rainforrent.com](mailto:CJENSEN@Rainforrent.com)

**Professional Background:** Cary has 14 years of experience specializing in permanent and temporary liquid handling needs across a wide range of market segments including; agriculture, mining, oil & gas, construction, food processing, paper and pulp, environmental, and municipal.