

Pacific Northwest Section Water Treatment Committee and King County Subsection

Fall Workshop: Taste and Odor

Wednesday October 7, 2026

Mercer Island Community and Event Center

Workshop Schedule

Time	Presentation	Speakers
8:45-9:00	Introduction	Julia Cummings, WTC Chair, Carollo Engineers
9:00-9:30	Addressing Groundwater Taste and Odor Issues in the PNW	Pierre Kwan, HDR Inc.
9:30-10:00	Case Studies Using Utility-Staffed Taste and Odor Panels to Optimize Groundwater Supplies	Alex Mofidi, Confluence Engineering
10:00-10:15	Break	
10:15-10:45	When Pristine Isn't Perfect: Tackling Taste and Odor in Northwest Surface Water	Ali Leeds, Carollo Engineers
10:45-11:15	Optimizing Ozone Dosage for T&O Control: Case Studies from Tacoma GRFF and Medford WTP	Amy Gao, Jacobs
11:15-11:45	Advances in Monitoring of T&O Compounds: Going Beyond MIB and Geosmin	Susheera Pochiraju, Hazen and Sawyer
11:45-12:45	Lunch	
12:45-1:15	Portland's Experience Using FPA and FRA in Pilot Testing and Distribution System Monitoring to Evaluate Taste and Odor	Anna Vosa, Portland Water Bureau
1:15-1:30	Break	
1:30-3:30	Senses and Tastes - Taste and Odor Analysis in Action	Elizabeth Cruise, Seattle Public Utilities

Anticipated Learning Outcome

Participants in this course will learn about common types of taste and odor compounds, methods for treatment, methods for monitoring and assessing taste and odor, and utility-focused case studies. Introductory sessions will focus on types of compounds present in surface water and groundwater, followed by case studies for treatment of these compounds. The remainder of the workshop will focus on analysis methods and include case studies for local utilities on how to utilize flavor profile analysis, flavor rating assessment, and other methods to optimize treatment choices and improve overall water quality.

How This Training Can Be Used to Influence Water Quality, Water Supply, or Public Health Protection

This training will provide operators with knowledge on the types of treatment technologies that may be beneficial for addressing common taste and odor issues that may be present. Additionally, operators will learn common analysis methods for assessing taste and odor concerns that can be implemented to help support decision making and improve overall system water quality. Attendees will receive hands-on demonstration of how to complete Flavor Rating Assessment (FRA) that can be used to assess taste and odor in their own water supplies.

Speaker and Presentation Info

- Pierre Kwan – PE, Water Treatment Technical Director, HDR
 - Presentation Title:
 - Addressing Groundwater Taste and Odor Issues in the PNW
 - Presentation Abstract:
 - This presentation talks about common causes of taste-and-odor issues in groundwater and how to address them. While taste and odor issues are commonly thought of as a surface water issue, they can be present in groundwater sources. Understanding raw water quality, and the source of the taste and odor issues, is critical because the optimal treatment method will depend on the specific issue of concern.
 - Professional Qualification:
 - BS Civil Engineering from Ohio State University, MS in Civil Engineering from University of Washington
 - Background:
 - Pierre is HDR's Water Treatment Technical Director. He has 27 years of professional engineering experience in Oregon and Washington helping public and private water systems produce safe, clean drinking water. He has been involved with PNWS AWWA throughout his career.

- Contact Information:
 - Phone – 206-826-4735
 - Email – pierre.kwan@hdrinc.com
- Alex Mofidi – PE, Confluence Engineering Group LLC
 - Presentation Title:
 - Case Studies Using Utility-Staffed Taste and Odor Panels to Optimize Groundwater Supplies
 - Presentation Abstract:
 - Small systems typically do not have water quality staff dedicated to resolving taste and odor (T&O) issues within their systems. This presentation will summarize case studies from two small groundwater-fed water systems in Washington. These case studies describe the utilities forming ad-hoc, internal testing panels that conducted T&O evaluation tests to help optimize treatment and improve system aesthetic water quality.
 - Professional Qualification:
 - BS, MS Civil Engineering
 - Licensed PE (OR, WA, CA, ID, TX, IL)
 - Background:
 - Alex is based in Seattle and has 35 years of experience optimizing water treatment and distribution system water quality for drinking water systems (15 years as a utility engineer and then Water Quality Purification manager for Metropolitan Water District of Southern California, and 20 subsequent years in consulting).
 - Contact Information:
 - Phone – 206-866-4562
 - Email – alex@confluence-engineering.com
- Ali Leeds – PE, Carollo Engineers
 - Presentation Title:
 - When Pristine Isn't Perfect: Tackling Taste and Odor in Northwest Surface Water
 - Presentation Abstract:
 - Surface waters in the NW are generally pristine sources of drinking water. However, our pristine waters also provide growing environments for naturally occurring algae which may produce compounds that cause taste and odor issues. Two of the most common compounds are geosmin and 2-Methylisoborneol (MIB). These compounds are commonly treated with activated carbon or ozone. Additionally, some plants in the NW utilize permanganate, reporting anecdotal success in treatment of taste and odor. This presentation will focus on common source water conditions in

surface waters that result in taste and odor compounds, and the evaluation and treatment of them.

- Professional Qualification:
 - MS Engineering, University of California-Berkley
 - Licensed PE (OR, WA)
- Background:
 - Ali is based in Seattle and has 19 years of experience as design engineer with a focus on water treatment. She serves as Carollo's Pacific Northwest water treatment lead.
- Contact Information:
 - Phone – 206-538-5169
 - Email – aleeds@carollo.com
- Amy Gao – PE, Jacobs
 - Presentation Title:
 - Optimizing Ozone Dosage for T&O Control: Case Studies from Tacoma GRFF and Medford WTP
 - Presentation Abstract:
 - Taste and Odor (T&O) is a major challenge for drinking water utilities that rely on surface water sources in the Pacific Northwest. Seasonal source water quality variations, algae blooms, and increasing concentration levels of NOMs can result in severe T&O problems. While ozone is an effective tool for T&O control, determining the optimal ozone dosage to achieve treatment objectives while minimizing chemical consumption and operational impacts remains a challenge.
This presentation will be focusing on the ozone optimization solutions at the Tacoma Water Green River Filtration Facility and Medford Duff Water Treatment Plant. For both facilities, historical data, source water quality trends, and treatment performance were evaluated to understand ozone demand and optimize T&O control.
Lessons learned from the case studies can provide practical guidance for future ozone dosage application at other facilities and delivering high-quality finished water.
 - Professional Qualification:
 - M.S. in Environmental Engineering from The University of Texas at Austin, B.S. in Earth and Environmental Engineering from Columbia University
 - Background:
 - Amy Gao is a licensed professional engineer in the state of WA, NV, and NY. Amy has about 15 years of experience in drinking water from planning and piloting to design and commissioning. Her experience covers design of PFAS treatment systems, ozone, floc/sed, filtration, UV, and advanced oxidation.

- Contact Information:
 - Phone – 917-216-9135
 - Email – Amy.Gao@jacobs.com
- Susheera Pochiraju – PhD, PE, Hazen and Sawyer
 - Presentation Title:
 - Advances in Monitoring of T&O Compounds: Going Beyond MIB and Geosmin
 - Presentation Abstract:
 - Occurrences of taste and odor (T&O) compounds in surface water sources such as rivers, lakes and reservoirs have serious impacts on public perception of water quality. The literature from past few decades was largely focused on methylisoborneol (MIB) and geosmin, but there have been several T&O events caused by non-MIB/geosmin compounds in the recent past. Monitoring methods for T&O compounds typically include sensory methods such as flavor profile analysis (FPA) or threshold odor number (TON) or analytical methods such as gas chromatography-mass spectrometry (GC-MS). Standard method 6040D measures MIB and geosmin, however, due to increasing occurrence of non-MIB/geosmin compounds, 6040D has been revised by AWWA Standard Methods committee to detect up to 20 T&O compounds from various odor categories on the odor wheel including earthy/musty, swampy, fruity, medicinal/sweet and fishy/rancid categories. This presentation will discuss various detection techniques and provide an update on standard method 6040D revised method. In addition, sensory techniques and algal characterization tools such as flow imaging microscopy will also be presented.
 - Professional Qualification:
 - PhD, Civil and Environmental Engineering, Saint Louis University
 - MS, Environmental Engineering, University of Colorado Boulder
 - Licensed PE (CO)
 - Background:
 - Susheera works primarily on drinking water and reuse initiatives at Hazen and serves as the Intermountain Reuse Practice Lead. Her experience includes working on direct potable reuse rulemaking with state regulators in Colorado and Arizona as well as with the WateReuse Association. Her expertise also ranges from advancing applied research for emerging technologies to exploring innovative design and optimization methods for advanced treatment systems. Susheera specializes in bench-scale studies, advanced treatment pilots, and full-scale design of ozone, UV, and advanced oxidation systems. She is a licensed professional engineer in the

state of Colorado and serves on the Journal Advisory Board for Journal AWWA.

- Contact Information:
 - Phone – 720-323-8138
 - Email – pochiraju@hazenandsawyer.com
- Anna Vosa – PE, City of Portland
 - Presentation Title:
 - Portland’s experience using FPA and FRA in pilot testing and distribution system monitoring to evaluate taste and odor
 - Presentation Abstract:
 - Taste and odor of drinking water is an important part of a customer’s experience and willingness to accept public water, but is often overlooked as a water quality parameter during treatment studies and distribution system monitoring. This is a missed opportunity when making major treatment and operational decisions, as standard methods are available to assess taste and odor that are cheap and easy to implement. The Portland Water Bureau incorporated the standard methods Flavor Rating Assessment (FRA) and Flavor Profile Analysis (FPA) throughout its Bull Run Treatment project to evaluate treatment alternatives, such as pre-oxidation using ozone or chlorine. Following the Camp Creek Fire in 2023, Portland used FRA and FPA to semi-quantitatively monitor taste and odor impacts from the fire. In recent years, Portland has collected samples for FRA and FPA during quarterly disinfection byproduct monitoring to assess the impact of distribution system water age and quality on taste and odor. This presentation will review the FRA and FPA methods, discuss considerations for tasting water produced during pilot and bench testing, and review findings from Portland’s taste and odor evaluations.
 - Professional Qualification:
 - BS Civil & Environmental Engineering (Clarkson University), MS Environmental Engineering (Virginia Tech)
 - Licensed PE (OR), CWRE (Oregon)
 - Background:
 - Anna has 20 years water industry experience, including experience in consulting (HDR and Confluence Engineering Group, LLC), state government (WA Department of Health), and utility operations (Portland Water Bureau). Anna’s experience includes drinking water treatment bench and pilot testing, corrosion control treatment studies, water system planning, treatment design, water system surveys (inspections) and investigations, operator training, regulatory compliance, and distribution system water quality monitoring and optimization.
 - Contact Information:

- Phone – 971-322-9864
 - Email – anna.vosa@portlandoregon.gov
- Elizabeth Curise – Seattle Public Utilities
 - Presentation Title:
 - Senses and Tastes - Taste and Odor Analysis in Action
 - Presentation Abstract:
 - This session will present operators and attendees with training and hands-on experience with water tasting analysis. The session will discuss Flavor Rating Assessment (FRA), Flavor Profile Analysis (FPA), and other analysis methods used by Seattle Public Utilities and their Flavor Profile Panel, including how the data is used. Attendees will receive hands-on demonstration and training on how to perform FRA.
 - Professional Qualification:
 - BS Biology, Seattle University
 - Background:
 - Liz Cruise is a Senior Water Quality Analyst with 30 years of experience with Seattle Public Utilities. She is a subject matter expert in taste and odor and phytoplankton and serves as the program manager for SPU's Taste and Odor Program.
 - Contact Information:
 - Phone – 206-218-9476
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