

## ONLINE TRAINING/WEBINAR SPEAKER INFO, BIO & TOPIC ABSTRACT

*Please provide the following information and email to [support@nwmoa.com](mailto:support@nwmoa.com).*

*If you are presenting on multiple topics during this event, please fill out one form for each topic.*

Name: Chad Bennett  
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☒ Checking this Box confirms that I agree to be videoed and recorded for the duration of the Online Training/Webinar.

**1. Speaker Biography** (please provide one paragraph – 150 words or less)

Chad Bennett has over 13 years of experience on membrane process and system design for potable use and waste water reuse. Additionally, he has over 4 years of experience with agricultural infrastructure for water pollution prevention. Chad works with regulators, engineers, and operators on US water regulations, membrane filtration, and other water related subjects.

**2. Topic Title** (please provide the topic title for your presentation)

Piloting Confirms Phosphorus Reduction in Waste Water Discharge to Improve the Health of the Spokane River

**3. Topic Abstract** (please provide a minimum of 250 words for your presentation and describe how it relates to membrane technology)

In September 2016, the Riverside Park Water Reclamation Facility in Spokane, Washington completed a head-to-head pilot between pressurized and submerged membrane technologies to identify a solution for the plant's large-scale water reuse and reclamation challenges. The water reuse project and plant upgrade is a major component of Spokane's Integrated Clean Water Plan, a \$310 million multi-year initiative to improve the health of the Spokane River.

The purpose of this demonstration pilot was to evaluate the performance of both systems filtering pretreated secondary effluent from the Riverside Park Water Reclamation Facility. Specific objectives of the pilot test included 1) validation of phosphorous reduction to listed concentration by means of combined coagulation, flocculation, and microfiltration treatment process, 2) demonstration of particulate and microbial removal capability via on-line turbidity instruments, 3) confirmation of on-line integrity test procedures and 4) evaluation of membrane flux and recovery.

Throughout the pilot, Pall Water's pressurized system delivered reliable performance treating the secondary effluent source at 25.7 GFD with a 96.3% recovery for the wastewater treatment plant. True to the ultimate goal, the plant easily achieved the stringent discharge limits for phosphorus at 18 ppb, consistently producing effluent between 9- 13 ppb. Additionally, the plant designed a custom engineered system to successfully treat seasonal algae and other unique characteristics of wastewater in order to produce the safest water for discharge back into the Spokane River. Overall, the pressurized membrane system produced excellent finished water quality, averaging 11.8 NTU.

Ultimately, the plant selected Pall's pressurized membrane system based on significantly higher water recovery, simple integrity testing and lower overall maintenance and cost of operations. The facility, designed to treat a maximum monthly average wastewater flow of 50 MGD and a 12-hour peak flow of 75 MGD, is currently being installed.



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**4. Polling Questions** (please provide up to 5 questions you might ask the audience, relative to your topic, which you would like to engage with them on. Questions are multiple choice. A right or wrong answer is not required. If you do provide a question with only 1 correct answer, please indicate which answer is correct.. Provide 3 answers to choose from.)

1. Q. What is eutrophication?(A3)  
A 1 Participation awards for all activities  
A 2 Stratification of warm, well mixed water near the surface and relatively still cool water in lakes  
A 3 Rapid increase in algae, phytoplankton, and aquatic plant growth in surface waters
2. Q. Why is eutrophication a problem? (all)  
A 1 Impact on ecosystem balance  
A 2 Impact on recreational activities  
A 3 Impact on drinking water sources
3. Q. What nutrient is typically the limiting factor for eutrophication in fresh surface water systems?  
(A2)  
A 1 Nitrogen  
A 2 Phosphorus  
A 3 Carbon
4. Q.  
A 1  
A 2  
A 3
5. Q.  
A 1  
A 2  
A 3