

WaterSense® Point-of-Use Reverse Osmosis (RO) Systems Notice of Intent (NOI) Public Meeting Summary

February 16, 2022 2:00 to 4:00 p.m. Eastern, Webinar

Meeting Summary

Stephanie Tanner, the U.S. Environmental Protection Agency (EPA) WaterSense program’s Lead Engineer, welcomed everyone to the meeting, clarified how to use the webinar software, and reviewed the meeting agenda and purpose. She introduced fellow presenters Emma Hughes and Robert Pickering of Eastern Research Group, Inc. (ERG), who provide technical contract support to WaterSense.

The purpose of the webinar was to introduce a new group of stakeholders to the WaterSense program and review the *WaterSense Notice of Intent (NOI) to Develop a Draft Specification for Point-of-Use Reverse Osmosis (RO) Systems*. The presentation PowerPoint can be reviewed on the WaterSense website at www.epa.gov/watersense/point-use-reverse-osmosis-systems.

After reviewing the meeting agenda, Ms. Tanner polled attendees on what types of organizations they represent. The results are shown in Figure 1. A full list of the attendees and a list of presenters are provided in Appendix A.

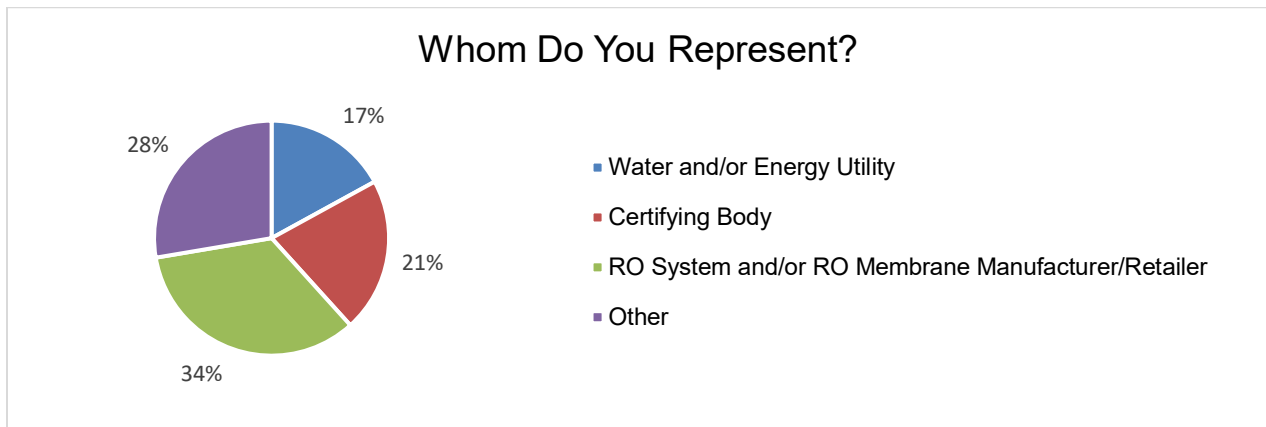


Figure 1. Poll Question

The presentation discussion and participant questions and comments are summarized below.

1. Introduction

Ms. Tanner provided an overview of WaterSense, a voluntary program that labels water-efficient, high-performing products, including the program’s history and the typical WaterSense specification development process. WaterSense interacts with industry and other stakeholders, such as standards committees and utilities, during this process. She noted the criteria the program uses for product evaluation and labeling. Through shipments of WaterSense labeled

products, the program has helped save more than 5.3 trillion gallons of water and \$108 billion in water and energy bills since it was started in 2006 through 2020.

Participant Questions

Vikas Thusoo (Envirogard Products Limited) suggested that conventional efficiency of existing RO systems should be quantified, because it is against this value that WaterSense's 20 percent water efficiency improvement can be made. Mr. Pickering responded that within the NOI, WaterSense anticipated the average efficiency of conventional models to be about 20 percent. If any participants have data relevant to this metric, WaterSense welcomes them to submit this data to EPA. Ms. Tanner replied that with respect to WaterSense's goal of distinguishing products that are 20 percent more water-efficient than typical products, WaterSense benchmarks that 20 percent based on a national standard or, if a national standard does not exist, an industry standard. For example, the national standard for toilets is 1.6 gallons per flush (gpf), and therefore WaterSense's threshold for toilets is 1.28 gpf, because that is 20 percent less than the national standard. For RO systems, because there is no national standard, WaterSense will look at what is available in the market, as well as existing industry voluntary consensus standards.

Vikas Thusoo also asked EPA to confirm whether only the NSF International (NSF) can perform the RO system tests or if other American National Standards Institute (ANSI) accredited certifying labs (e.g., CSA Group, International Association of Plumbing and Mechanical Officials [IAPMO], Water Quality Association [WQA]) can perform them as well. Ms. Tanner confirmed that other accredited certifying bodies (CBs) can perform these tests. While WaterSense is looking at the NSF/ANSI standards, there are a number of accredited CBs that are able to certify products to those standards.

2. RO Systems Background

Emma Hughes (ERG) described how RO systems work and summarized the background research WaterSense has conducted on RO systems. She described the types of RO systems on the market, as well as the many aspects of RO systems that may influence consumer purchasing decisions.

Ms. Hughes reviewed the existing standards, codes, and test methodologies for point-of-use RO systems that WaterSense identified. EPA's initial RO system research also investigated existing studies and market data on RO systems. However, EPA was not able to identify any information on point-of-use (POU) RO system market size or trends, or any studies that focus specifically on POU RO systems and their potential for water savings. Ms. Hughes noted that attendees are encouraged to submit any comments, studies, or data related to these data gaps.

Participant Questions

Eugene Leung (California State Water Resources Control Board) asked how the ASSE International (ASSE) is involved with POU RO systems, since NSF/ANSI 58 is the existing standard for POU RO systems. Mr. Pickering explained that NSF/ANSI 58 *Reverse Osmosis Drinking Water Treatment Systems* is the primary standard for POU RO systems; however,

ASSE 1086 *Reverse Osmosis Water Efficiency – Drinking Water* also includes POU RO systems with a focus on distinguishing more water-efficient systems.

Vikas Thusoo stated that the 1:4 ratio presented is not accurate, as that ratio is determined without a storage tank. Most POU RO systems use a pressure tank and, as it fills up, the RO system has to produce water against the back pressure that this tank creates. Therefore, the ratio progressively worsens as the tank fills up.

Kyle Thompson (Plumbing Manufacturers International [PMI]) asked what the typical ratio of concentrate to permeate for point-of-entry (POE) systems is. Ms. Hughes responded that POE systems perform better than the 1:4 treated-to-waste ratio of POU systems, they have electric pumps that improve efficiency. However, they ultimately would waste more water than POU systems due to the high volume of water they treat for applications such as clothes washing, toilet flushing, and bathing that don't require highly treated water.

An anonymous attendee asked whether CSA B483.1 *Drinking Water Treatment Systems* would be applicable for Canadian markets. Mr. Pickering responded that EPA did not look into this standard when conducting research for the NOI. EPA will consider this standard moving forward and determine whether it is commensurate to the NSF/ANSI 58 standard used in the United States. However, Mr. Pickering indicated that because WaterSense is a U.S.-based program, it often references or prioritizes ANSI or other standards used in the United States.

3. RO Systems NOI: Scope

Ms. Hughes reviewed the definitions EPA crafted for "RO system," "POU RO system," and "POE RO system" for the purposes of a draft specification. She noted that EPA is currently considering excluding POE RO systems and accessory devices (e.g., permeate pumps, recirculation kits) from the scope of the specification, but may label high-efficiency membranes, pending further information on the subject. She reviewed the outstanding questions and data gaps included in the NOI related to the scope of a draft specification, then addressed audience questions on those topics.

Participant Questions

Vikas Thusoo said that high-efficiency membranes for POU units will not necessarily improve a system's water efficiency. Water efficiency is largely dependent on the drain flow control and feed water pressure. Even if the high-efficiency membrane were to make a marginal improvement, that level of improvement should be quantified. Otherwise, it can be confusing for the end user.

An anonymous attendee asked how many manufacturers EPA had found with RO systems certified to ASSE 1086. Ms. Hughes responded that WaterSense was not able to identify any systems that have been certified to ASSE 1086. Mr. Pickering mentioned that this may be because it is a relatively new standard, having been released in 2020.

Eugene Leung asked whether the scope of the specification should separate POU RO systems into two subgroups, one for pump-assisted systems and one for those that operate from water pressure alone. He said that the chemical removal performance may differ between the

subgroups, so it makes sense to separate them. Ms. Hughes responded that WaterSense has identified some outstanding questions and data gaps regarding pump-assisted devices that will be discussed later in the presentation. WaterSense encourages attendees to submit information and comments on this topic for consideration when developing the scope of the specification.

An anonymous attendee asked the following clarifying questions about the certification process if WaterSense were to label high-efficiency membranes: If manufacturer A wants to sell a compatible membrane for manufacturer B's system, would manufacturer A be required to perform testing to earn the WaterSense label to prove that their compatible membrane provides all the same contaminant removal capabilities as manufacturer B's system and membrane? Further, would the testing be performed using manufacturer B's system? If so, would EPA require manufacturer B to allow manufacturer A to test their system for the benefit of manufacturer A? Ms. Tanner responded that although WaterSense typically labels whole devices, there are some products where the industry has a significant amount of mixing and matching between products. For example, with flushometer-valve toilets, the valve is often sold separately from the bowl. Therefore, EPA labels both components to allow for mixing and matching. In those cases, each product must adhere to a relevant set of WaterSense criteria to bear the WaterSense label, but they don't have to get permission from other manufacturers to do so. If WaterSense allows the individual labeling of membranes, manufacturers who produce a membrane that works in other systems will have to show some proof to the CBs that the membrane will meet the criteria when it is used in other systems. They usually do this by using those other systems during testing, or having the CB make an engineering determination that there is no difference between your membrane and the membrane of the system's manufacturer. Manufacturers would then have to list the products that their individual membrane is compatible with so consumers can look that information up. Ms. Tanner referred attendees to the WaterSense Product Search Tool for examples of how WaterSense has addressed this concept with other products (e.g., irrigation controller add-on/plug-in devices).

An anonymous attendee said that CBs have current policies pertaining to replacement components (e.g., membranes, filters) that should be followed. Generally, replacement parts, components, and pumps are strictly part of the certified system and are not advertised to be used with other, non-certified systems.

4. RO Systems NOI: Water Efficiency

Ms. Hughes described the parameters used to define RO system water efficiency (recovery rating, efficiency rating, and pure-to-waste ratio). She presented the water efficiency criteria for existing industry standards and compared this with the typical water efficiency of POU RO systems on the market. She noted that WaterSense is considering adopting the NSF/ANSI 58 testing procedures for recovery rating and efficiency rating. She also noted that WaterSense is considering adopting the ASSE 1086 criteria to require RO systems to achieve a recovery rating of at least 40 percent and an efficiency rating (as applicable) of at least 40 percent. Ms. Hughes provided a brief overview of the potential water savings that could be achieved with these criteria. She explained that WaterSense intends to require all labeled RO systems to have an automatic shutoff device and identified a data gap concerning post-purchase modifications.

Participant Questions

An anonymous attendee asked how listeners can provide input on the questions following this presentation. Ms. Hughes responded that comments can be submitted to watersense-products@erg.com. During the presentation, attendees are welcome to submit questions or responses in the Q&A window or raise their hand to be unmuted and voice their comments.

An anonymous attendee asked if EPA has facilitated any research with the main CBs to determine what efficiency and recovery ratings exist for the products currently certified to NSF 58. They suggested that this research could be used to establish WaterSense criteria that include currently certified product to NSF 58. Ms. Hughes responded that WaterSense has had discussions with CBs and received some efficiency and recovery data from them. WaterSense plans to continue to work with CBs to refine this data during the development of a draft specification.

An anonymous attendee commented that RO system efficiency is affected by several aspects, including the shutoff valve, membrane, tank style, line pressure, and back pressure. Therefore, changing one of these components may have an unintended consequence on the product, so it may not be possible to list components separately.

5. RO Systems NOI: Performance and Product Testing

Ms. Hughes discussed the NSF/ANSI 58 criteria for total dissolved solids (TDS) and contaminant reduction and told attendees that WaterSense is considering requiring that all labeled products conform to the applicable requirements of NSF/ANSI 58. She then explained the importance of filter and membrane lifespan and described the ASSE 1086 membrane life test procedures and requirements. Ms. Hughes told attendees that WaterSense is considering adopting the ASSE 1086 membrane life test procedures and criteria into a potential specification.

6. RO Systems NOI: Product Marking, Documentation, and Marketing

Ms. Hughes described WaterSense's concerns with consumer understanding and perception of the current water efficiency metrics (recovery rating, efficiency rating, pure-to-waste ratio) and explained that WaterSense is considering using the term "treated-to-waste ratio" to describe RO system water efficiency. For hybrid systems, she explained that product marking should specify that the WaterSense label applies solely to the RO portion of the treatment process. Ms. Hughes noted that WaterSense will provide careful messaging to consumers so as not to promote use of RO systems over other water treatment technologies that may be equally or more appropriate.

7. RO Systems NOI: Systems Impacts and Other Considerations

Ms. Hughes summarized some final considerations and data gaps, including questions about the cost to consumer due to increased water efficiency, energy consumption of electric RO systems, impacts to wastewater and septic systems, and use of POU and POE RO systems to meet drinking water regulations.

8. Next Steps

Ms. Hughes directed the audience to the *WaterSense NOI to Develop a Draft Specification for Point-of-Use RO Systems* on the WaterSense web page for RO systems (www.epa.gov/watersense/point-use-reverse-osmosis-systems) and noted that background materials for all WaterSense labeled products, including NOIs, comment response documents, and draft specification materials, are available on the WaterSense website for reference or for stakeholders to gain a better understanding of the specification development process. She requested that those attending the webinar submit their comments or any additional, pertinent information to watersense-products@erg.com. EPA will review comments and data submissions to determine next steps for developing a draft specification.

Participant Questions

Eric Yeggy (WQA) asked the presenters to confirm that RO systems in fact dilute the overall concentration of drinking water contaminants in the septic systems. He explained that the same mass of contaminants will enter the septic system whether or not an RO system is present. However, with the RO system, a higher volume of water would be added due to the reject stream. Mr. Pickering confirmed that this is WaterSense's understanding. WaterSense does not anticipate there to be any significant impacts to septic systems, but they would like to hear about any data or studies on this topic.

A few attendees asked about the timeline for submitting written comments and whether there is a comment deadline. Ms. Tanner clarified that EPA does not have a timeline for submitting comments, because the process depends on the existing data gaps and the need for further research or engagement to determine the criteria in the draft specification. Even so, EPA encourages stakeholders to submit comments within six weeks, as submitting comments later may hold up the development of a draft specification. Ms. Tanner emphasized that positive comments are equally as important as constructive feedback and encouraged commenters to provide data to support comments. If submitting negative comments, she requested, commenters should include an explanation of what EPA should do differently and why.

Betty Lee (Brondell) asked where attendees can access a recording of this presentation. Mr. Pickering responded that the presentation and a written summary will be posted to the WaterSense RO Systems web page (www.epa.gov/watersense/point-use-reverse-osmosis-systems).

Eugene Leung asked if there is a phone number available to call the project team for follow-up questions. Ms. Hughes responded that questions regarding the WaterSense program can be directed via email to the WaterSense Helpline (watersense@epa.gov) or by calling (866) WTR-SENS (987-7367). For questions or comments pertaining specifically to the RO Systems NOI, participants can email watersense-products@erg.com. Ms. Tanner encouraged attendees to indicate in their comments whether they would like someone from the WaterSense team to reach out via phone for further discussion. Additionally, the WaterSense website (www.epa.gov/watersense) is a helpful resource with program and contact information.



Carla Long (Watts Water) asked whether NSF/ANSI 58 is a prerequisite for ASSE 1086. Ms. Hughes responded that yes, all systems certified to ASSE 1086 must meet the requirements of NSF/ANSI 58.

With no additional questions submitted, Ms. Tanner thanked the attendees for their time and adjourned the meeting.

Appendix A: Meeting Participants

Attendee	Organization
Ilan J Aberman	E.A.M Benelux B.V
Thomas Achtziger	Fortune Brands Global Plumbing Group
Jacob Adili	UL LLC
Douglas Anderson	Culligan International
Veronica Blette	EPA
Mark Brotman	Kinetico, Inc.
Stefan Buck	NSF International
Maribel Campos	ICC Evaluation Service
Anthony Capone	Kinetico, Inc.
Olivia Caracostea	Fortune Brands Global Plumbing Group
Andrew Carlson	ICC Evaluation Service
Adam Carpenter	American Water Works Association
Eric Chang	AmGreen Solutions, Inc.
Harold Chase	NSF International
Shirley Dewi	IAPMO R&T
Tina Donda	IAPMO
Debby Figoni	City of Beverly Hills (California)
Fred Fraisse	Neoperl
Mark Gibeault	Kohler Co.
Thomas Ginn	Cobb County-Marietta Water Authority (Georgia)
Stephen Glenn	Ventura Water (California)
Josh Greene	A. O. Smith
Julie Hagstrom	HGA Architects and Engineers
Brook Hatton	CSA Group
Nikki Jackson	ANSI National Accreditation Board (ANAB)
Jordan Kari	Water Quality Association (WQA)
Rajiv Khera	EPA
LAUREN Kleppin	City of Big Bear Lake Department of Water (California)
Christine Ko	AmGreen Solutions, Inc.
David Ko	AmGreen Solutions, Inc.
Betty Lee	Brondell
Sanford Lee	San Francisco Public Utilities Commission
France Lemieux	Health Canada
Eugene Leung	California State Water Resources Control Board Division of Drinking Water
Zhuodan Liao	DuPont
Inge Lindengard	IKEA
Christopher Lindsay	IAPMO
Beth Livingston	EPA
Mario Llerenas	ANAB
Carla Long	Watts Regulator Company
Water Use Manager	Miami-Dade Water & Sewer Department (Florida)
Ramiro Mata	American Society of Plumbing Engineers (ASPE)



Attendee	Organization
Chris McDonald	Fortune Brands Global Plumbing Group
Cary McElhinney	EPA Region 5
Cambria McLeod	Kohler Co.
Bryan Miller	Elkay Manufacturing
Akshay Mishra	American National Standards Institute (ANSI)
Joseph Montemurno	Orlando Utilities Commission
Kathryn Muench	A. O. Smith
Haley Munson	Elsinore Valley Municipal Water District (California)
Shannon Murphy	Aquamor
Bob Neff	Delta Faucet Company
Yvonne Nixon	Dateland Public Service Company
Tara O'Hare	EPA
Tom Palkon	IAPMO
Nichole Pennisi	Graver Technologies
JP Perez	EPA
Shelley Peters	Canadian Water Quality Association
Bryanna Poczatek	WQA
Ada Poon	Delta Faucet Company
Kyle Postmus	NSF International
Chris Putka	Kinetico, Inc.
Julie Ridgeway	City of San Luis Obispo (California)
Jonah Schein	EPA
Mike Schmidt	DuPont Water Solutions
John Smith	Kinetico, Inc.
Kelsey Smith	Hillsborough County (Florida)
Leanne Spence	Instant Save Conservation
Adam Strube	Fulton Homes
Vikas Thusoo	Envirogard Products Limited
Kyle Thompson	Plumbing Manufacturers International (PMI)
Gary Tilkian	Metropolitan Water District of Southern California
Joe Wolff	Elkay Manufacturing Company
Jessica Woods	City of Round Rock (Texas)
Eric Yeggy	WQA
Joe Yersky	Valley County Water District (California)

Presenter	Organization
Stephanie Tanner	EPA
Emma Hughes	ERG
Robert Pickering	ERG