Summary of WaterSense® Specification Review Webinar for Utilities and Promotional Partners

June 5, 2019, 1:00 to 3:00 p.m. Eastern

Meeting Summary

The U.S. Environmental Protection Agency's (EPA's) WaterSense program is considering revising its specifications for lavatory faucets and faucet accessories, showerheads, tank-type toilets, urinals, and weather-based irrigation controllers (WBICs). The EPA organized this meeting with utility and promotional partners as part of the revision determination process.

The main objectives for this meeting were as follows:

- Present information the EPA has collected as part of its specification review.
- Summarize issues and considerations the EPA must address if it decides to revise a specification.
- Review public comments received to date on the *Notice of Specification Review* as they relate to all specifications current under review for possible revision.
- Solicit additional feedback and information from utilities and promotional partners.

The EPA did not intend to decide whether to move forward with a specification revision during this meeting.

A PDF of this presentation can be reviewed on the WaterSense website at www.epa.gov/watersense/product-specification-review. A full list of the attendees and a list of presenters are provided in Appendix A. The presentation discussion and participant questions and comments are summarized below.

1.0 Introduction

Stephanie Tanner, the 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. The purpose of this meeting was not to determine whether to revise the specification, but rather to present data and solicit feedback about whether the EPA has collected sufficient information to make a determination.

The EPA intends to conduct the specification review analysis during summer 2019 and develop a recommendation regarding whether to move forward with a specification revision by December 31, 2019.

2.0 Lavatory Faucet Specification Considerations

Kimberly Wagoner of Eastern Research Group, Inc. (ERG), a WaterSense contractor, summarized background on the WaterSense *High-Efficiency Lavatory Faucet Specification,* including certification trends and the number of products certified to date. Ms. Wagoner provided an overview of the current lavatory faucet specification requirements. The WaterSense specification allows a maximum flow rate of 1.5 gallons per minute (gpm) at 60 pounds per

square inch (psi). All faucets and faucet accessories must: conform to applicable requirements within The American Society of Mechanical Engineers (ASME) A112.18.1/CSA Group (Canadian Standards Association) B125.1 *Plumbing Supply Fittings*; have a minimum flow rate of 0.8 gpm at 20 psi; and be marked with the maximum flow rate.

Water Efficiency and Performance Considerations

Ms. Wagoner explained that, due to changes in the market and new regulations adopted by various states and municipalities, the EPA is considering reducing the maximum flow rate criteria below 1.5 gpm. The EPA would also consider revising the minimum flow rate requirement, which could be more difficult to meet if the maximum flow rate requirement is reduced. Lowering the minimum flow rate will likely drive incorporation of pressure compensation rather than fixed orifice flow control. Ms. Wagoner then also reviewed preliminary water savings potential estimates for the different thresholds under consideration.

Ms. Wagoner reviewed outstanding questions the EPA would still like feedback on related to lavatory faucets and invited participants to ask questions. No questions or comments were submitted at that point.

Poll Questions

Ms. Wagoner polled attendees on whether they believe WaterSense has enough information to determine whether to revise its specification for lavatory faucets. The results are shown in Figure 1.

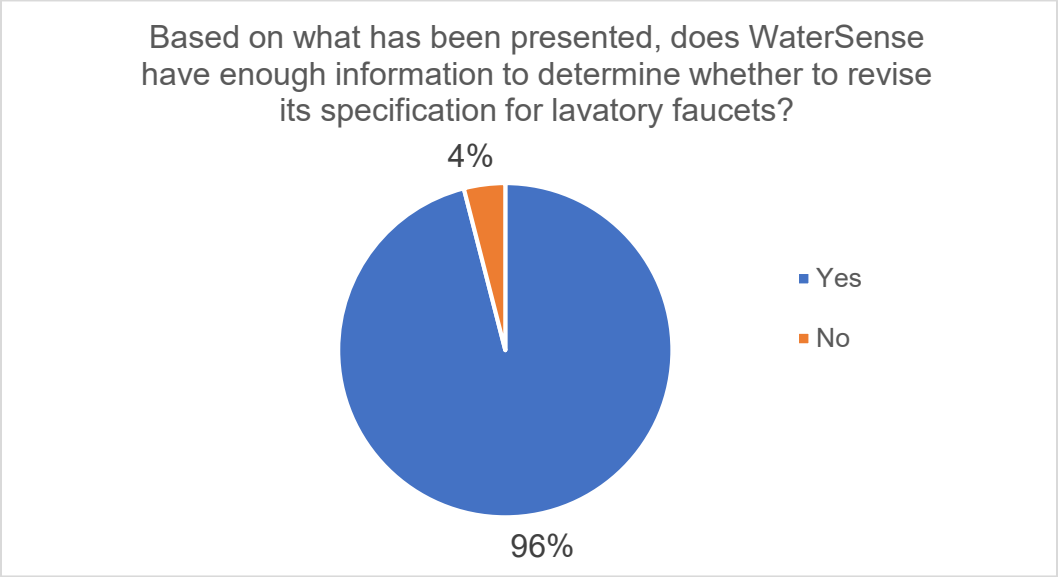

Figure 1. Poll Question #1 Results

Ms. Tanner polled attendees on whether they think the EPA should revise the efficiency criteria of the WaterSense specification for lavatory faucets. Ms. Tanner asked attendees to provide

feedback about what information they think the EPA needs to consider before moving forward with a determination. Results of the poll are shown in Figure 2.

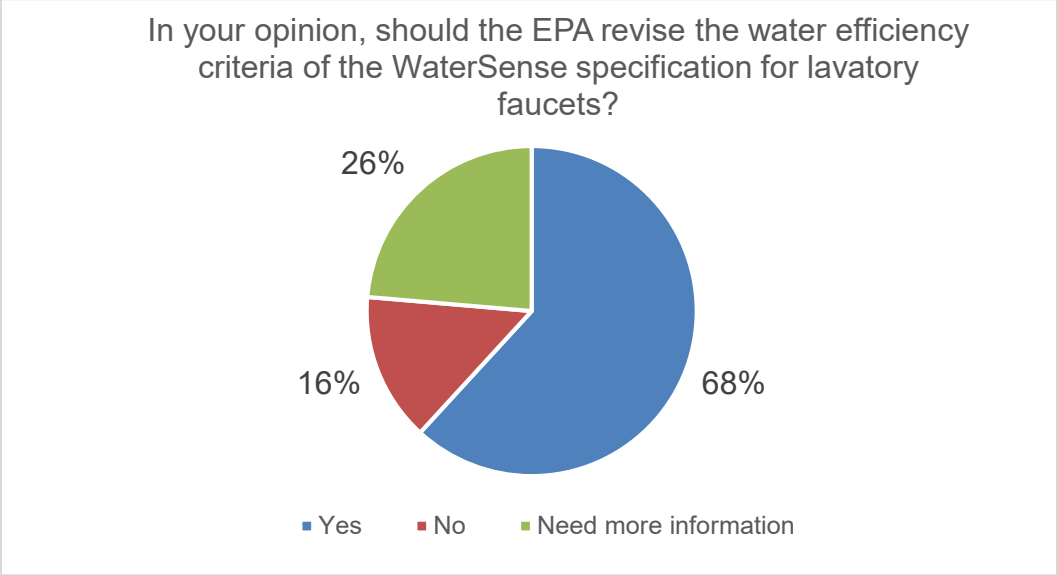

Figure 2. Poll Question #2 Results

Participant Questions and Comments

One participant commented that the EPA should consider instant hot water heaters, as some of them may not be triggered by flow rates as low as 1 gpm. Ms. Tanner thanked the commenter for this information.

Q: Is there any estimate of what fraction of 1.5 or 1.2 gpm faucets exceed those standards as installed (i.e., they have had a flow restriction device removed by the installer)?

A: Ms. Tanner explained that the EPA does not collect information on what happens to products after installation, and it is the responsibility of the homeowner to accurately install any products they purchase. She added that WaterSense does specify that products may not be packaged with any accessories or other devices that would circumvent the specification's thresholds for water efficiency.

Q: You've presented the distribution of faucets by flow rate in terms of models. Don't you also have sales data by flow rate from WaterSense partners?

A: Ms. Tanner responded no, the EPA does not collect this data.

Scope Considerations

Ms. Wagoner summarized the scope of the current WaterSense faucet specification, which applies to bar sink and lavatory faucets and accessories in private use and excludes metering faucets, lavatory faucets in public use, and kitchen faucets.

i. Kitchen Faucets

Ms. Wagoner explained that, due to changes in the market and inquiries from WaterSense manufacturer and promotional partners, the EPA is considering expanding the scope of the faucet specification to include kitchen faucets. Ms. Wagoner then provided details about the current market and existing water savings data that the EPA has collected regarding kitchen faucets. In addition to establishing a flow rate threshold, the EPA would also identify performance considerations (e.g. temporary override feature, minimum flow rate, multiple modes of operation) to ensure adequate functionality and customer satisfaction.

Ms. Wagoner invited participants to ask questions; one attendee provided links to additional data sources, but no additional questions or comments were submitted.

ii. Metering Faucets

Ms. Wagoner explained that the EPA is also considering expanding the scope of the faucet specification to include metering faucets. This consideration is driven by the fact that metering faucets do not have a regulated maximum flow rate or cycle length, contrary to other public lavatory faucets. Also, the EPA has received reports that WaterSense labeled aerators are being used on metering faucets to claim that they are WaterSense labeled. Ms. Wagoner provided details about the current market, applicable existing standards and requirements, and existing water savings data that the EPA has collected regarding metering faucets. In addition to establishing a flow rate threshold, the EPA would also identify performance considerations (e.g., life cycle testing, minimum flow rate) to ensure adequate functionality and customer satisfaction.

Ms. Wagoner summarized comments received to date on the *Notice of Specification Review* related to lavatory faucets, kitchen faucets and metering faucets. She also reviewed outstanding questions the EPA would still like feedback on related to kitchen and metering faucets.

Participant Questions and Comments

One commenter noted that good handwashing practice requires 20 to 30 seconds, and setting a high cycle time could promote longer handwashing periods and better health. Moreover, the committee added, a minimum flow rate is essential, as low flow rates make handwashing more difficult and potentially discourage handwashing. However, another commenter explained, the 30-second guideline for handwashing should not occur under running water.

Ms. Wagoner polled attendees on what product categories WaterSense should expand the scope of its faucet specification to include. Results of the poll are shown in Figure 3.

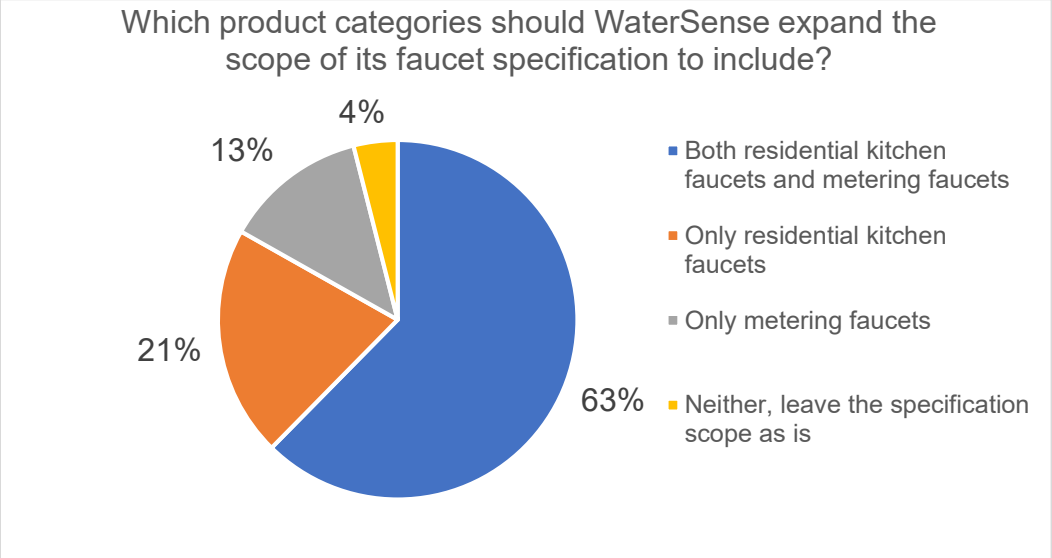

Figure 3. Poll Question #3 Results

Ms. Wagoner polled attendees on whether they would consider rebating or incentivizing high-efficiency kitchen faucets. Results of the poll are shown in Figure 4.

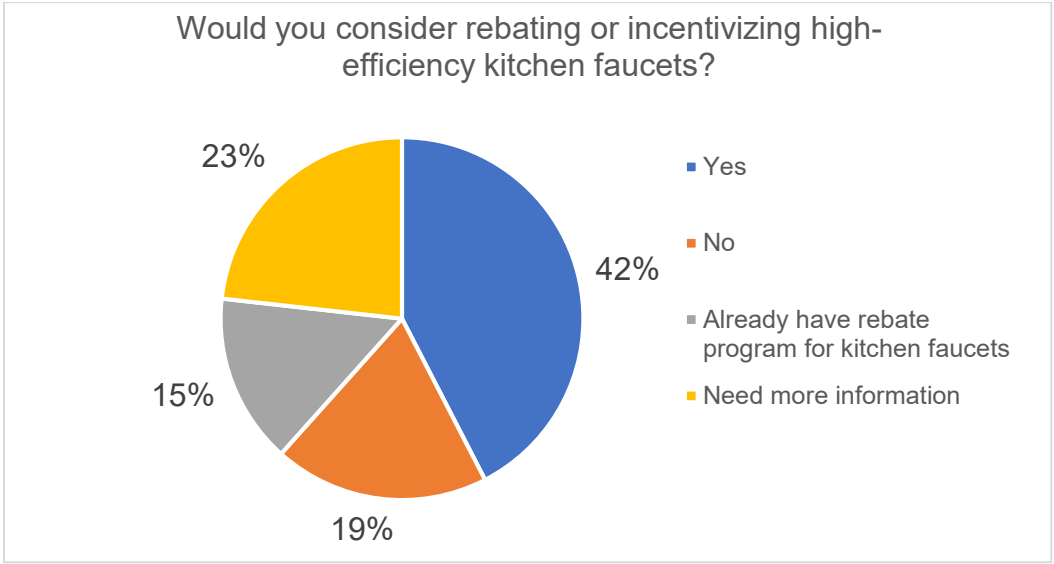

Figure 4. Poll Question #4 Results

Ms. Wagoner polled attendees on whether they would consider rebating or incentivizing high-efficiency metering faucets. Results of the poll are shown in Figure 5.

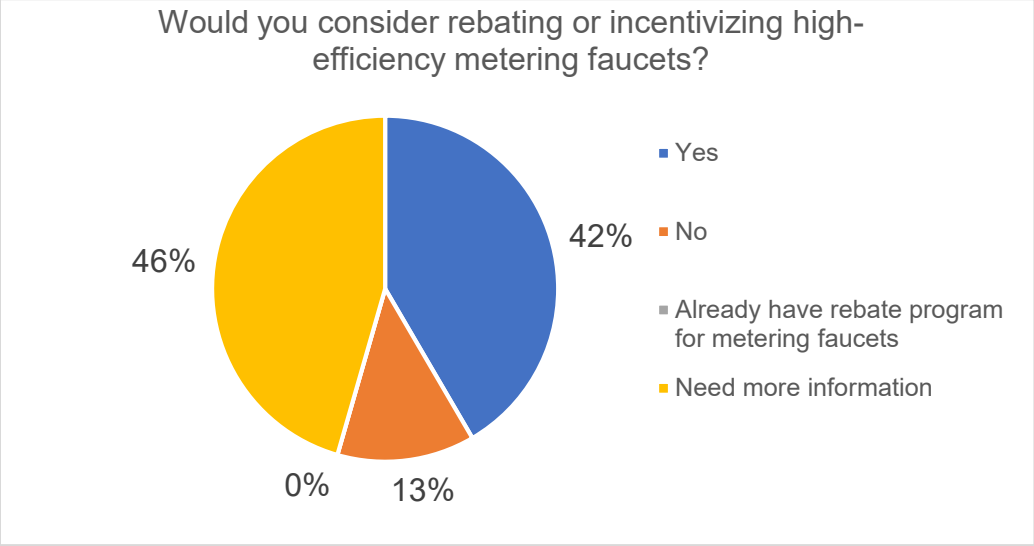

Figure 5. Poll Question #5 Results

Ms. Tanner explained that the EPA will make a decision regarding specification revisions at the end of 2019 and, if a revision is warranted, that process will begin in early 2020 and will include all the typical stages involved in specification development (e.g., public comment, draft and final specifications). The decision made at the end of 2019 will accelerate, not replace, this specification development process.

Participant Questions and Comments

Q: Are there any specifications on dipper wells?

A: Ms. Tanner explained that WaterSense does not currently have a specification for dipper wells, but one of the advantages to possibly expanding the lavatory faucet specification to include metering faucets is that these might be used in place of dipper wells in some applications.

3.0 Showerhead Specification Considerations

Ms. Wagoner provided an overview of the current *WaterSense Specification for Showerheads* and certification trends and summarized information that WaterSense has collected regarding high-efficiency showerheads in the current market. The current specification allows for a maximum flow rate of 2.0 gpm and must also conform to performance requirements included in the ASME A112.18.1/CSA B125.1 *Plumbing Supply Fittings* standard, including requirements related to minimum flow rate, spray force and spray coverage.

Water Efficiency and Performance Considerations

Ms. Wagoner explained that, due to changes in the market and new regulations adopted by various states and municipalities, the EPA is considering reducing the maximum flow rate below 2.0 gpm. The EPA is also considering revising the showerhead performance criteria. However, the agency has no data to suggest that users are dissatisfied with the current performance of labeled showerheads. Ms. Wagoner then reviewed potential health and safety concerns that have been associated with lower flow showerheads (e.g., thermal shock, scalding). The EPA has not identified any areas for potential scope expansion; however, there could be potential for water efficiency and performance revisions.

Ms. Wagoner summarized comments received to date on the *Notice of Specification Review* related to showerheads. She reviewed outstanding questions the EPA would still like feedback on related to showerheads and invited participants to ask questions. No questions or comments were submitted, but some attendees provided links to relevant research.

Ms. Wagoner polled attendees on whether they believe WaterSense has enough information to determine whether to revise its specification for showerheads. Ms. Wagoner asked attendees to provide feedback about what information they think the EPA needs to consider before moving forward with a determination. Results of the poll are shown in Figure 6.

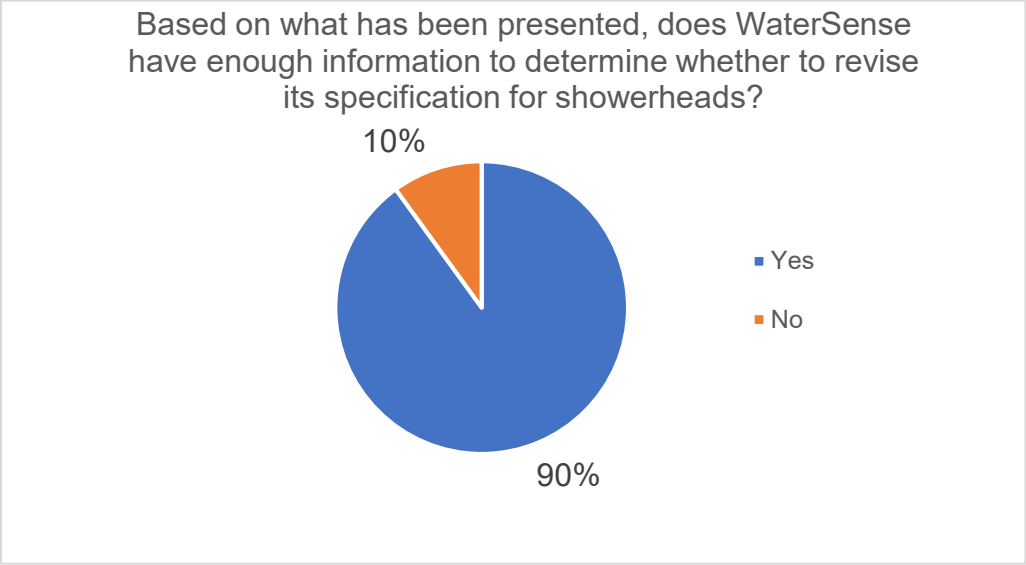

Figure 6. Poll Question #6 Results

Ms. Wagoner polled attendees on whether they think the EPA should revise the efficiency criteria of the *WaterSense Specification for Showerheads*. Results of the poll are shown in Figure 7.

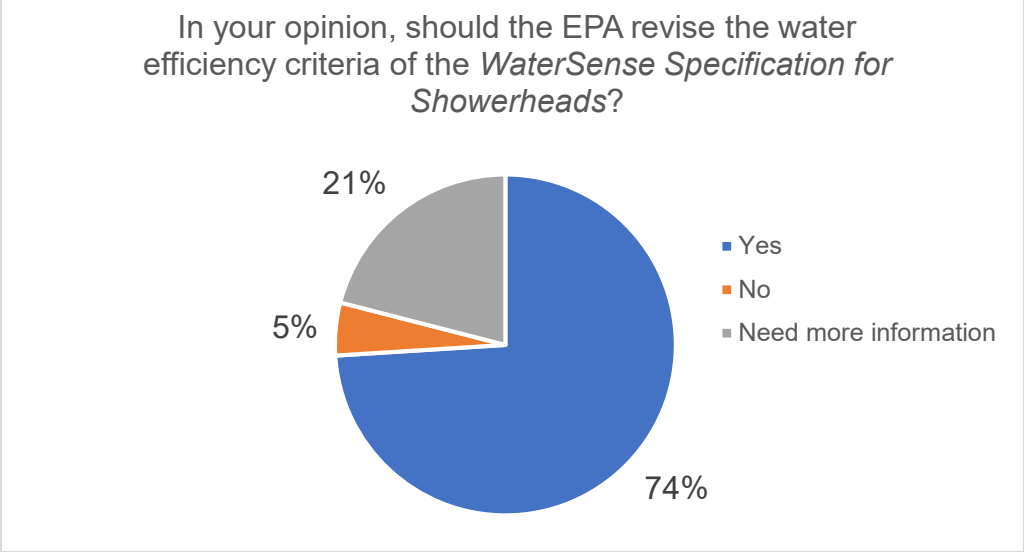

Figure 7. Poll Question #7 Results

Ms. Wagoner polled attendees on whether they have received complaints regarding the performance of WaterSense labeled showerheads. Results of the poll are shown in Figure 8.

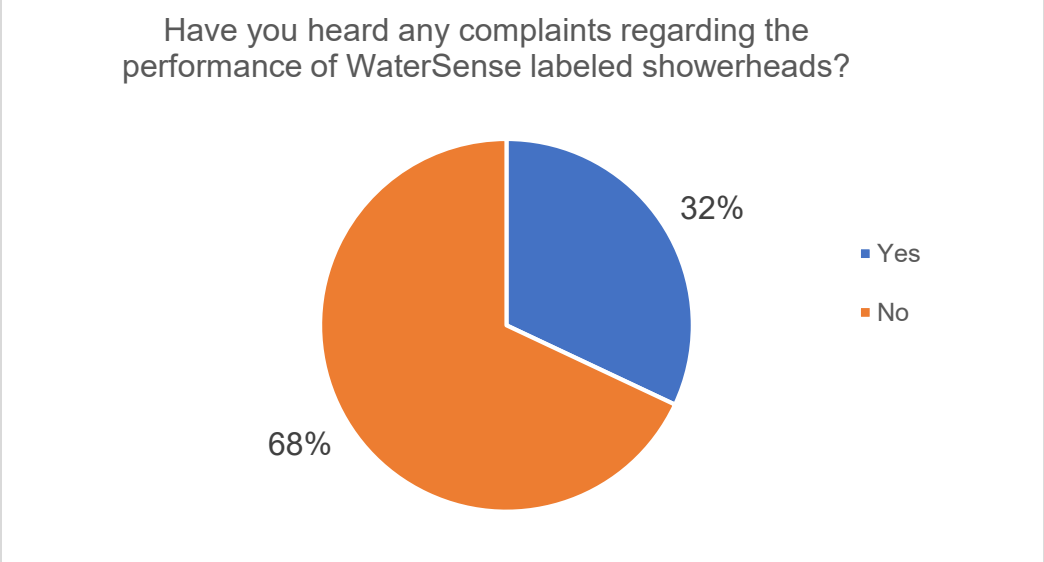

Figure 8. Poll Question #8 Results

Participant Questions and Comments

Q: Has WaterSense collected any data on the number of showerhead models with variable orifice technology to maintain acceptable flow at locations with low water pressure?

A: Ms. Wagoner explained that the current specification has flow rate requirements at three different water pressures (e.g., 20, 45 and 80 psi), with the intent to ensure pressure compensation and proper performance across that range. Moreover, 45 psi is the water pressure at which thermostatic mixing valves are rated, and WaterSense wanted to ensure labeled showerheads would be compatible with these devices. Ms. Tanner explained that the EPA does not collect any data on the type of technology employed within showerheads.

Q: I need more information regarding showerheads. I guess I understood the questions at the end of the section to indicate that there could still be concerns about scalding or thermal problems. Perhaps I misunderstood?

A: Ms. Tanner explained that, during the original development of the specification, there were some concerns about the potential for scalding. However, the EPA addressed these concerns by requiring testing at the same pressure with which mixing valves are tested. The EPA also has never received or identified any data to support these concerns but would look into this issue further if a revision to this specification was warranted.

Comment: Customer complaints are about low pressure, which may not be accurately describing their experience, but how they communicate the issue.

A: Ms. Tanner responded that the EPA has found that when customers discuss “low pressure,” they really mean “low force.” The EPA has knowledge of potential issues with the spray force testing, and that WaterSense might need to change the method for measuring the force so as to prevent the weight of the water from influencing the test results.

Comment: The complaints I have heard were in regard to old low-flow showerheads. The past poor performance made people hesitate to install these showerheads. We explain that the WaterSense products must perform as well as traditional products to earn the label and that they used an older style. They have improved greatly; the point being that maintaining performance is essential if the flow rate lowers.

Comment: We've received complaints for some of the 1.5 gpm showerheads not providing enough flow rate. We tried going below 1.5 gpm, and it was a tough give-away.

A: Ms. Tanner thanked the commenter for this input.

4.0 Tank-Type Toilet Considerations

Robbie Pickering of ERG summarized background on the *WaterSense Specification for Tank-Type Toilets,* including certification trends and the number of products certified to date. Mr. Pickering provided an overview of the current toilet specification requirements. The WaterSense specification allows a maximum flush volume of 1.28 gallons per flush (gpf). All toilets must: pass the flush performance criteria based on the waste extraction test protocol in ASME

A112.19.2/CSA B45.1 *Ceramic Plumbing Fixtures*; conform to applicable requirements within ASME A112.19.1/CSA B45.2 and ASME A112.19.14 *Six-Liter Water Closets Equipped with a Dual Flushing Device* (for dual flush); and be marked with the flush volume.

Water Efficiency Considerations

Mr. Pickering explained that, due to new regulations adopted by various states and municipalities, the EPA is considering reducing the maximum flush volume criteria below 1.28 gpf. The EPA is also considering revising the dual-flush requirements, as many utilities have expressed concern that the current requirements may not be achieving water savings commensurate with the WaterSense goal of 20 percent. Furthermore, WaterSense labeled dual-flush toilets do not save any water when compared to the requirements of ASME A112.19.14, which is the national standard for these products. For each water efficiency consideration, Mr. Pickering provided an overview of related studies that the EPA has identified and will consider when making a specification revision determination. Mr. Pickering invited participants to ask questions, but no questions or comments were submitted at that point.

Performance Considerations

Mr. Pickering provided an overview of potential performance considerations that the EPA may develop or improve if the agency decides to revise the tank-type toilet specification. These include a greater waste quantity threshold for the waste extraction test and new performance criteria to ensure adequate bowl cleansability.

Mr. Pickering reviewed public comments received to date regarding potential revisions to the tank-type toilet specification. He provided a list of outstanding questions the EPA would still like feedback on related to toilets and invited participants to ask questions.

Participant Questions and Comments

Q: Do you have literature on the effectiveness of older plumbing with WaterSense labeled toilets? We have an issue with plumbers who are telling their customers WaterSense labeled fixtures aren't effective.

A: Mr. Pickering responded that the one of the studies previously mentioned from the Plumbing Efficiency Research Coalition regarding drain line carry only examined commercial toilets, which are known to have more issues with drain line carry due to longer drain lines. However, the study stated that similar drain line concerns were not prevalent in residential settings. Moreover, residential buildings have additional sources of wastewater (e.g., showers, clothes washing machines, dishwashers) that facilitate drain line carry.

Ms. Tanner also noted that, prior to the release of the specification, the EPA sponsored research, conducted by Bill Gauley of Veritec Consulting and Lawrence Galowin of the National Institute of Standards and Technology (NIST), that investigated drain line carry testing on toilets that were potentially eligible for the pending WaterSense label.

Q: Will the discussion include toilets with sensor flushes?

A: Ms. Tanner responded that WaterSense does not include criteria for the actuating mechanism used in toilets.

Mr. Pickering polled attendees on whether they believe WaterSense has enough information to determine whether to revise its specification for tank-type toilets. The results are shown in Figure 9.

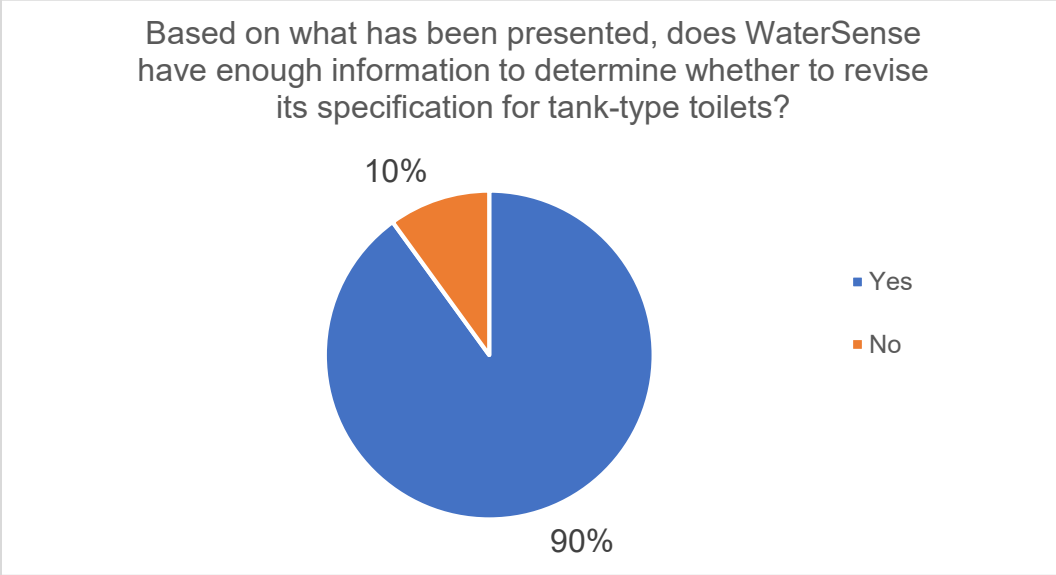

Figure 9. Poll Question #9 Results

Mr. Pickering polled attendees on whether they think the EPA should revise the water efficiency criteria of the tank-type toilet specification. Results of the poll are shown in Figure 10.

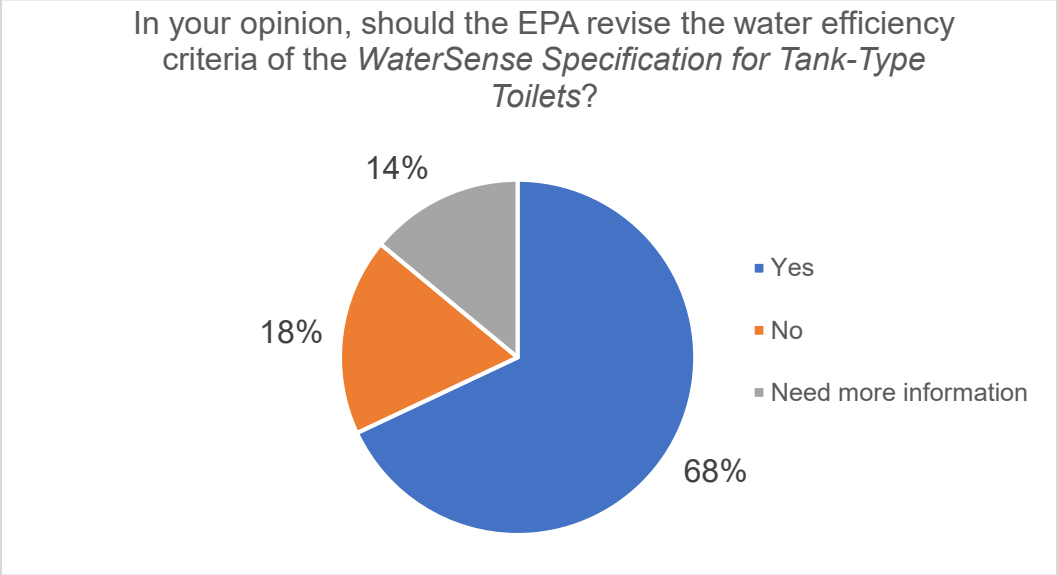

Figure 10. Poll Question #10 Results

Mr. Pickering polled attendees on whether WaterSense should eliminate the effective flush calculation for dual-flush tank-type toilets. Results of the poll are shown in Figure 11.

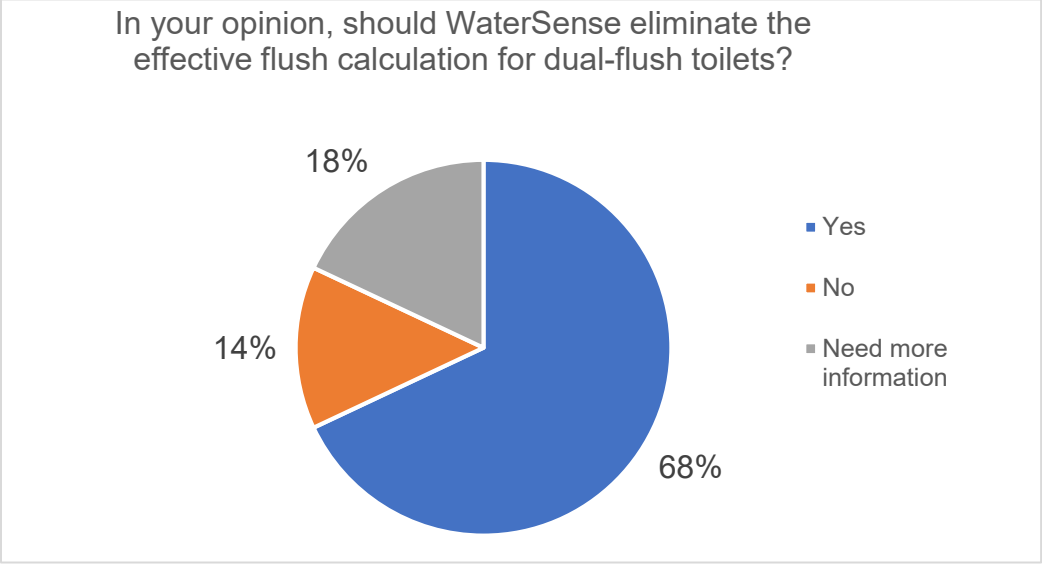

Figure 11. Poll Question #11 Results

Mr. Pickering polled attendees on whether the EPA should revise the performance criteria of the toilet specification. Results of the poll are shown in Figure 12.

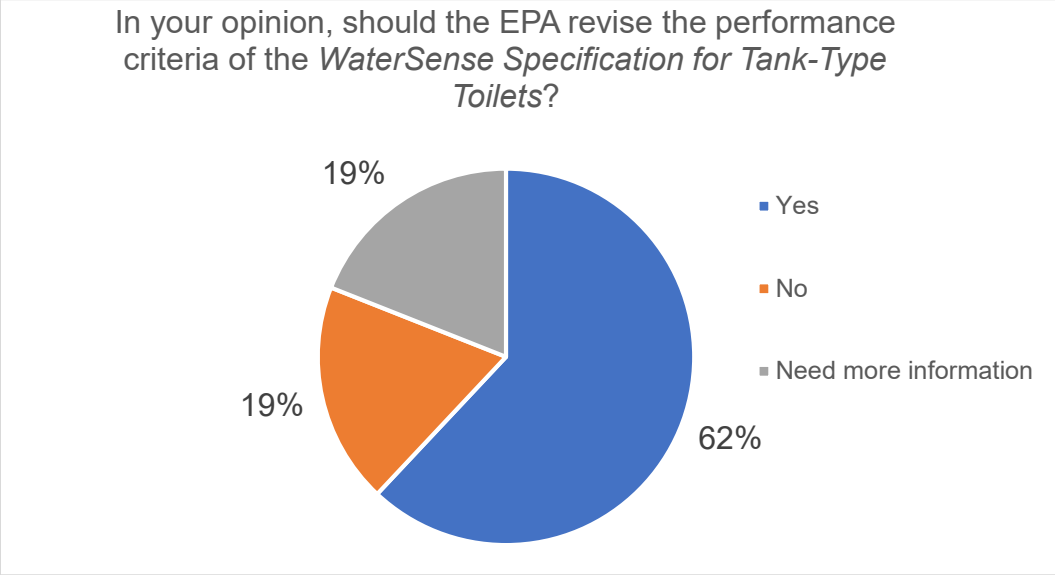

Figure 12. Poll Question #12 Results

5.0 Flushing Urinal Specification Considerations

Mr. Pickering provided an overview of the current *WaterSense Specification for Flushing Urinals* and summarized information that WaterSense has collected regarding WaterSense labeled urinals in the current market. The specification allows for a maximum flush volume of 0.5 gpf. All WaterSense labeled urinals must conform to the applicable American National Standards Institute (ANSI) standards and be properly marked. Flushing devices must not contain a flush volume adjustment that allows the flush volume to vary more than 0.1 gpf, and pressurized flushing devices must conform to the American Society of Sanitary Engineering (ASSE) Standard 1037.

Scope Considerations

Mr. Pickering explained that the scope of the current specification includes flushing urinals, but it does not include non-water urinals or hybrid urinals (non-water urinals with drain-cleansing action). The EPA is considering revising the specification to include these types of urinals.

Water Efficiency and Performance Considerations

Mr. Pickering explained that, due to new regulations adopted by various states and municipalities, the EPA is considering reducing the maximum flush volume below 0.5 gpf. Mr. Pickering summarized the savings calculations that the EPA performed to estimate potential water savings associated with a 0.25 gpf and 0.125 gpf maximum flush volume. The EPA does not have any indication of performance issues associated with the current specification. Mr. Pickering summarized relevant performance studies that the EPA has identified.

Mr. Pickering provided an overview of the public comments received to date on the *Notice of Specification Review* regarding urinals. He reviewed outstanding questions the EPA would still like feedback on related to urinals. He invited participants to ask questions, but none were submitted at that time.

Mr. Pickering polled participants on whether they believe WaterSense has enough information to determine whether to revise its specification for urinals. Results of the poll are shown in Figure 13.

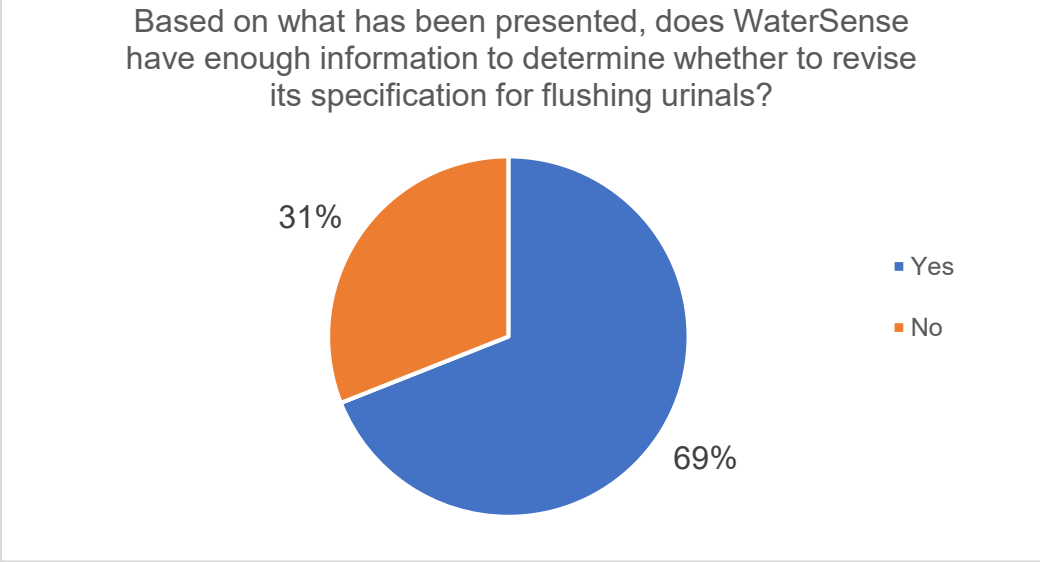

Figure 13. Poll Question #13 Results

Mr. Pickering then polled attendees on whether the EPA should revise the water efficiency criteria of the specification for urinals. Results of the poll are shown in Figure 14.

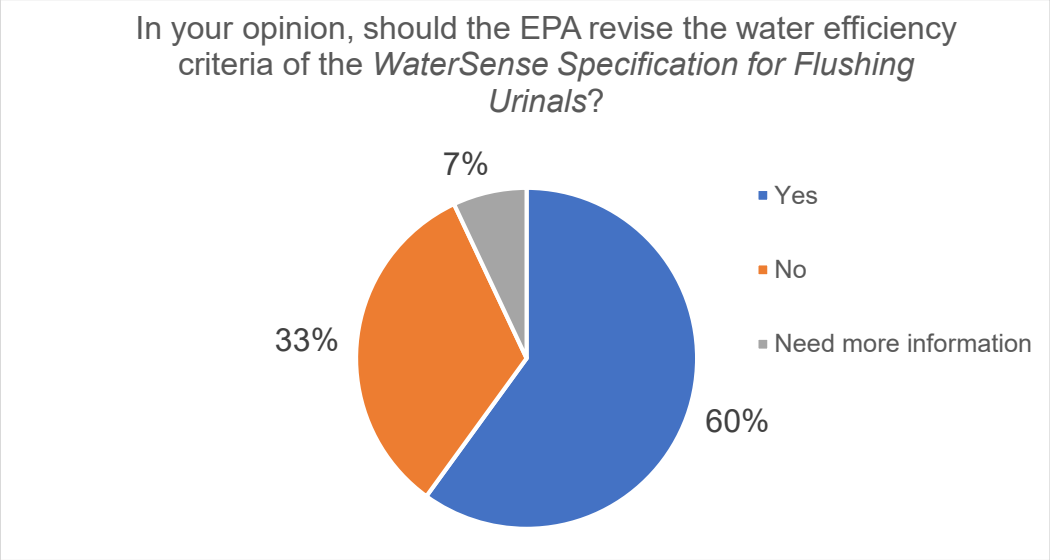

Figure 14. Poll Question #14 Results

Mr. Pickering then polled attendees on whether they operate a rebate or direct installation program for urinals, and if so, what product types are included. Results are shown in Figure 15.

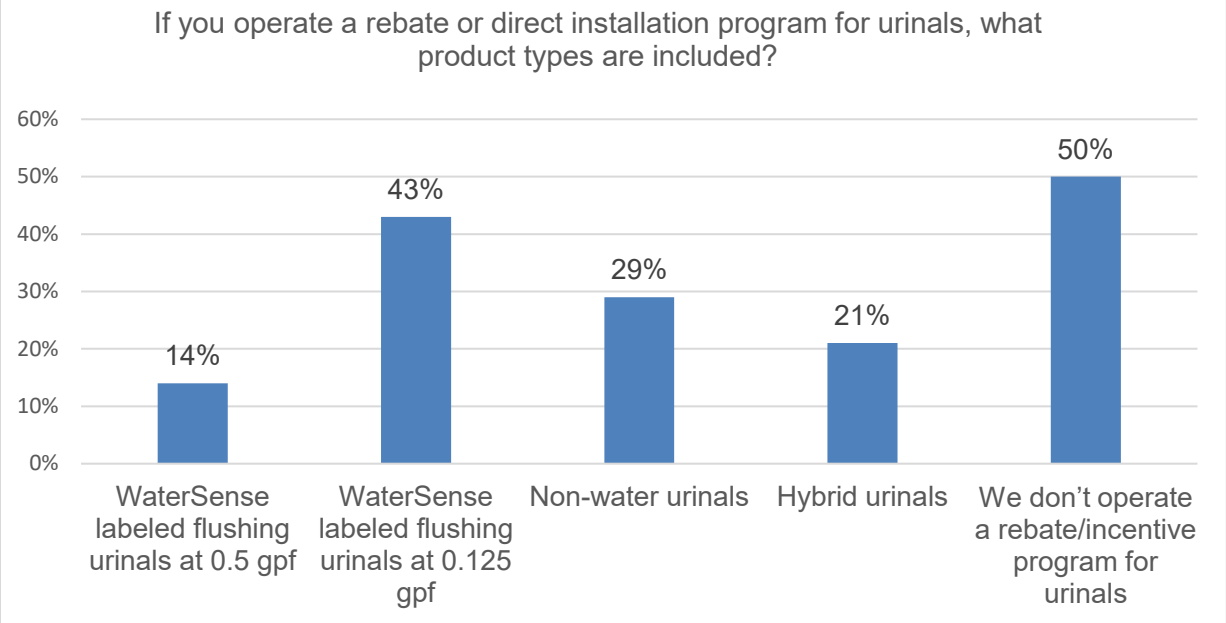

Figure 15. Poll Question #15 Results

Mr. Pickering then polled attendees on what product categories WaterSense should expand the scope of the urinal specification to include. Results are shown in Figure 16.

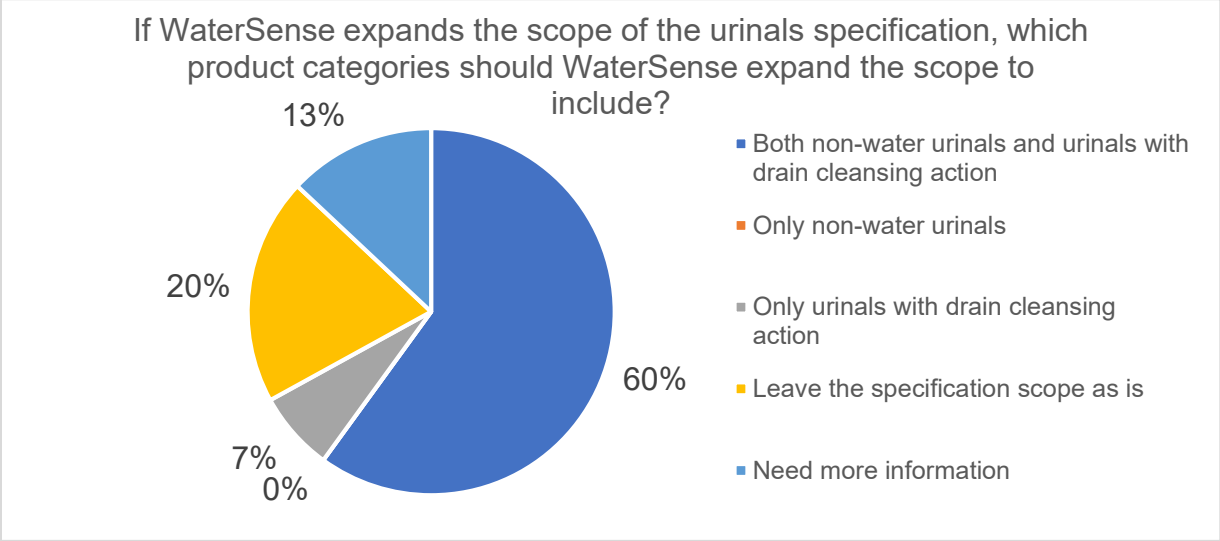

Figure 16. Poll Question #16 Results

6.0 WBIC Specification Considerations

Joanna Kind of ERG briefly summarized background on the *WaterSense Specification for Weather-Based Irrigation Controllers*, including certification trends and the number of product models certified to date. She provided an overview of the current specification scope, test method and requirements. Ms. Kind noted that, at the time of the webinar, no feedback had been received regarding suggested revisions to the specification scope, the test method nor the performance criteria.

Test Method and Criteria Considerations

The WaterSense specification references the eighth draft of the *Smart Water Application Technologies* (SWAT) test protocol but includes several modifications. Ms. Kind described the two most pertinent modifications: run times must exceed three minutes and changing the order of operations to prevent rainfall from impacting a product's test performance. The performance criteria are:

- Irrigation adequacy must be at least 80 percent for each zone;
- Irrigation excess must be less than or equal to 10 percent for each zone; and
- Average of the irrigation excess scores calculated across the six zones must be less than or equal to 5 percent.

Ms. Kind explained that the EPA, as part of programmatic oversight efforts, conducted an audit of licensed certifying bodies (LCBs) that certify WBICs in 2016. No major issues were identified, but the EPA found two potential weaknesses in the current test method:

- Not all controllers irrigated in each zone during the test period; and
- Some controllers programmed with several small irrigation events result in schedules that are unrealistic in the field.

Ms. Kind reviewed a few possible resolutions. The test method could be revised to require irrigation adequacy fall below 80 percent for a number of zones and/or place additional requirements on irrigation events, such as a longer minimum runtime, maximum cycle soak events/day and maximum soak time. Alternatively, the EPA could place a minimum irrigation amount (i.e., 0.1 inch) on irrigation events or implement a watering restriction during testing.

Ms. Kind discussed the American Society of Agricultural and Biological Engineers (ASABE) *X627 Weather-based Landscape Irrigation Control Systems* test method, which is currently under development. She summarized the history of the standards committee and WaterSense's involvement. The EPA is currently assessing the test method and the potential impacts on test scores and will consider adopting the test method when a final standard is published.

Ms. Kind then discussed the EPA's efforts to engage WBIC manufacturers and utilities in the specification review process. Regarding feedback on the test method, the EPA found manufacturers are generally not in support of revising the test method; they noted the specification is compatible with their products, and they are satisfied with its ability to test performance. There is also no evidence that consumers are dissatisfied with product performance. Utilities are also generally not in support of a test method revision, largely because they do not think the market is saturated enough yet with WBICs currently on the market to warrant an increase in performance levels. Ms. Kind noted that the EPA wants to ensure that it has sufficient feedback from all interested stakeholders and asked if there were any additional subjects or issues for the EPA to consider.

Supplemental Features

Ms. Kind reviewed the current listing of supplemental capability requirements included in the specification. She explained that in the specification review process, the EPA seeks to confirm whether these features are still relevant and should remain. She noted, however, that during initial outreach, the EPA did not receive any feedback about specific features. The EPA heard one request from a manufacturer cautioning against this list of supplemental capabilities becoming a means for utilities to request features that only pertain to their specific regions. This could increase the cost of products and result in products that include features that are unlikely to be used by most customers. Ms. Kind invited attendees to ask questions, but none were submitted at that time.

Packaging and Product Documentation Requirement Considerations

Ms. Kind explained that the specification has requirements for packaging and labeling, because these products are more complicated than most plumbing fixtures and fittings that earn the WaterSense label. This product category allows for standalone controllers, plug-in devices and add-on devices. She reviewed these requirements and explained that the goal is to ensure customers receive a labeled product when they think they are purchasing one.

Over the past several years, WaterSense has received several inquiries from consumers and utility partners expressing confusion about controller packaging and labeling, mostly specific to add-on and plug-in devices and base controllers. In July 2018, WaterSense issued technical clarifications related to this issue, published a compatibility list and held a webinar last fall for manufacturers to help resolve the confusion. The EPA maintains the compatibility list for these products on the WaterSense website. She explained that the EPA has not received additional complaints, nor received additional input from manufacturers or utilities on how these packaging requirements and clarifications are working for them. She urged participants to let the EPA know if they have any additional feedback or approaches the EPA could consider. Ms. Kind also noted that the number of questions the EPA has received related to WaterSense labeled WBICs has decreased since the clarifications and compatibility list issues were addressed, indicating these actions helped reduce confusion.

Definitions

Ms. Kind reviewed the definitions used in the current specification; this includes the terms “add-on device,” “plug-in device” and “stand-alone controller.” Ms. Kind noted that there has been confusion in the past over the which product types can bear the label. However, the EPA has not received any stakeholder feedback on these definitions to date.

Water Savings

Ms. Kind reviewed the current water savings estimates described in the *WaterSense Specification for Weather-Based Irrigation Controllers Supporting Statement*. She noted that, while these numbers do not impact the EPA’s decision to revise the specification, the EPA is currently in the process of researching more recent data. The current 15 percent water savings estimate is based on research pre-dating the publication of the specification in 2011. She urged attendees to submit more recent publications and data if they have them to share.

Manufacturer Feedback

On individual calls, most manufacturers provided positive feedback and generally were not in favor of any major specification revisions, especially not any that would increase the price of the product. Several manufacturers noted that a lower price point is likely a major contributor to the current rapid uptake in the market, and an increase in price for features that might not be used by the average consumer could reduce adoption rates. Multiple manufacturers expressed a desire to keep products simple and straightforward to use, noting that the more steps there are in the set-up process, the less likely an end user is to execute programming properly upon installation. One manufacturer encouraged WaterSense to continue testing for the “end result” using performance testing, rather than a prescriptive list of features or specific method of scheduling. Ms. Kind urged attendees to submit any information or data they have on this topic.

Ms. Kind noted that the EPA does have information on utilities’ feedback, and this information is included in the presentation posted on the WaterSense Specification Review webpage. Similarly, the EPA’s requests for additional information can be found in that presentation. Ms. Kind did not review these elements during the webinar due to time constraints.

Ms. Kind polled attendees on whether they believe WaterSense has enough information to determine whether to revise its specification for WBICs. The results are shown in Figure 17. Ms. Kind asked attendees to provide feedback about what information they think the EPA needs to consider before moving forward with a determination.

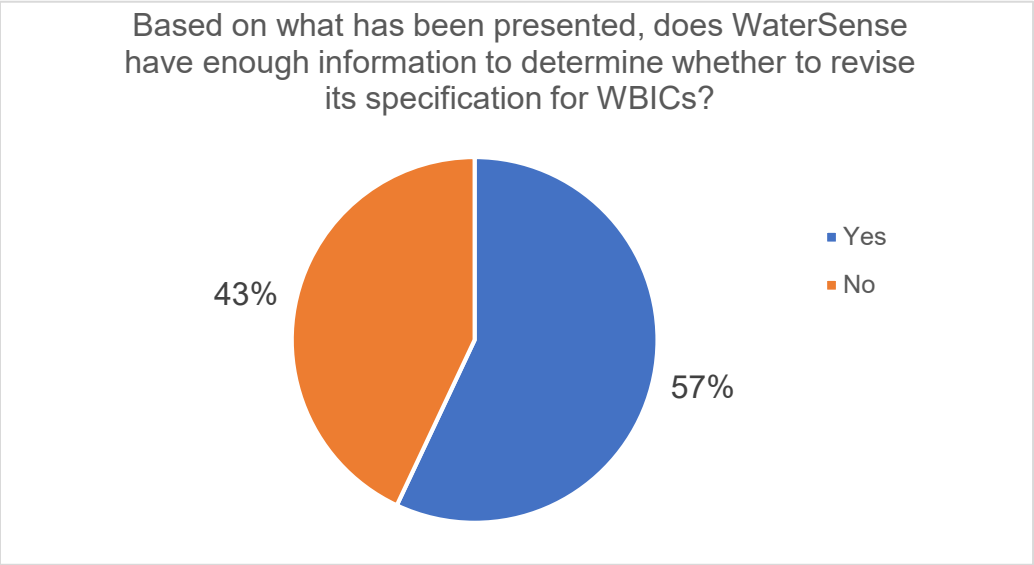

Figure 17 Poll Question #17 Results

Ms. Kind asked attendees to provide feedback on what pieces of the *WaterSense Specification for Weather-Based Irrigation Controllers* the EPA should revise. Results of the poll are shown in Figure 18.

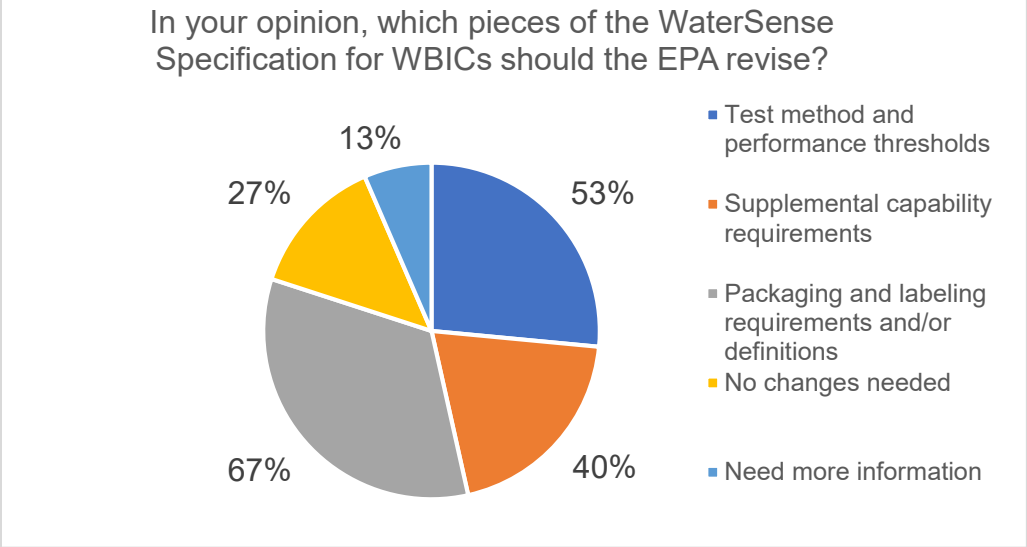

Figure 18. Poll Question #18 Results

7.0 Next Steps

Ms. Tanner did not discuss but noted that information would be available in the presentation on general considerations related to the specification review process and other research in which WaterSense has recently been engaged.

Ms. Tanner reminded attendees to submit comments, data and questions on this product specification review process to watersense-products@erg.com. WaterSense intends to summarize information collected as part of this process by the end of 2019. At that point, the EPA will issue a decision on whether to move forward with a specification revision for each relevant product category. Ms. Tanner also stressed that, if a specification revision is deemed necessary, the new specification will not be completed by the end of this year. If needed, a specification revision process would encompass all of the procedural steps partners have come to expect from the WaterSense program, including draft and final specification revisions and public comment opportunities. She reviewed final participant questions.

Participant Questions and Comments

One commenter supported keeping a certification for dual-flush toilets, as they are a popular choice, especially in California. If consistent and reliable studies show that a 2:1 ratio is not accurate, the commenter said, the standard should be reconsidered and either change the ratio or set the maximum flush at 1.28 gpf rather than 1.6 gpf. The commenter also said that septic/sewer agencies should also be included in outreach efforts, as the commenter heard concerns about reduced water flow affecting their ability to process wastewater.

Another commenter said that, if energy use is made part of the criteria for WBICs, more utilities might be interested in supporting labeled products.

Ms. Tanner adjourned the meeting by encouraging those with outstanding questions to contact the WaterSense Helpline at watersense@epa.gov or (866) WTR-SENS (987-7367). She also encouraged stakeholders to become engaged in the ASABE committee and communicate their input regarding the current SWAT test method. She noted that a recording and summary of this webinar will be posted online shortly following the conclusion of the webinar. She thanked everyone for their participation.

Appendix A: Meeting Participants

Attendee	Organization
Sam Baker	Broward County (Florida)
Victoria Bravo	Big Bear Lake Department of Water and Power (California)
Debra Burden	Citrus County Utilities (Florida)
Christine Card	City of Calgary (Canada)
Adam Carpenter	American Water Works Association (AWWA)
Simon Christensen	City of Hillsboro (Oregon)
Stephanie Cote	City of Guelph (Canada)
Allison Crowther	Kansas State University, Pollution Prevention Institute
Kimberlee Czuprynko	Village of Lake Delton (Wisconsin)
Audrey Dack	County of Maui Department of Water Supply (Hawaii)
Holly Dickman	City of Hays (Kansas)
Leena Divakar	Kansas State University, Pollution Prevention Institute
Matt Domski	Minnesota Technical Assistance Program (MnTAP)
Julius Duncan	U.S. EPA
K Durham	Santa Barbara County Water Agency (California)
Jason Grant	Miami Dade Water and Sewer (Florida)
Brent Houle	City of Winnipeg, Water and Waste Department (Canada)
Tiffany Johnson	Kansas City Board of Public Utilities
Frank Kinder	The Northern Colorado Water Conservancy District
Shari Kondrup	Brick Township Municipal Utilities Authority (New Jersey)
Lynelle Ladd	Kansas State University
James Lim	City of Durham Department of Water Management (North Carolina)
Laurel Loftin	Athens-Clarke County Water Conservation Office (Georgia)
Megan Marsee	Bernalillo County Water Conservation Program (New Mexico)
Cary McElhinney	U.S. EPA, Region 5
Mariel Miller	Fort Collins Utilities (Colorado)
Akshay Mishra	ANSI
Andrew Morris	Metropolitan North Georgia Water Planning District
Holly Mulvenon	Puget Sound Energy
Eric Olson	Fort Collins Utilities (Colorado)
Sierra Orr	Big Bear Lake Department of Water and Power (California)
Allie Orrego	Metropolitan North Georgia Water Planning District
Edward Osann	Natural Resources Defense Council
Natalie Pavlovski	Cal Water
JP Perez	U.S. EPA

Attendee	Organization
Theresa Pollick	Northwestern Water and Sewer District (Ohio)
Christine Rausch	Columbia Gas of Ohio
Sanjay Ray	Truesdail Laboratories, Inc.
Jaimie Robertson	Placer County Water Agency (California)
Jackie Sherry	Athens-Clarke County Public Utilities (Georgia)
Jacob Shiba	Elsinore Valley Municipal Water District (California)
Dominic Silva	San Antonio Water System (Texas)
Chris Snow	Utilities Inc. of Florida
Amy Talbot	Regional Water Authority (California)
Brenan Tarrier	New York State Department of Environmental Conservation
Jon Vann	The International Association of Plumbing and Mechanical Officials (IAPMO)
Kelsey Vaughn	New Hampshire Department of Environmental Services
Robert Wanvestraut	South Florida Water Management District
Rebecca Winters	Regional Municipality of Peel (Canada)
Chelsea Wulff	SUEZ

Presenter	Organization
Stephanie Tanner	U.S. EPA
Kim Wagoner	ERG
Robbie Pickering	ERG
Amanda Forsey	ERG
Joanna Kind	ERG