WaterSense® Draft Specification for Soil Moisture-Based Irrigation Control Technologies Public Meeting Summary

November 20, 2019, 1:00 to 4:00 p.m. Eastern

Meeting Summary

The U.S. Environmental Protection Agency's (EPA's) WaterSense program released a draft specification for soil moisture-based irrigation control technologies, also called soil moisture sensors (SMSs), on November 7, 2019. The EPA organized this meeting with stakeholders as part of the specification development process. The purpose of the webinar was to review the *WaterSense® Draft Specification for Soil Moisture-Based Irrigation Control Technologies* and to discuss stakeholder questions and comments.

The PowerPoint slides from this presentation can be reviewed on the WaterSense website at: https://www.epa.gov/watersense/soil-moisture-based-control-technologies. 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. 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 objectives. 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 detailed the criteria the program uses for product evaluation and labeling. Through 2018, the WaterSense program has helped consumers and businesses save 3.4 trillion gallons of water and $84.2 billion in water and energy bills.

2. SMS Background

Julius Duncan of the EPA, defined the product category, summarized the research WaterSense has conducted on SMSs dating back to 2007, and explained how this product can reduce irrigation water waste, as well as and how it differs from other weather-based irrigation control technologies. He described the EPA's history of collaborating with industry on test method development and performance testing. WaterSense has actively participated in the development of the recently published American Society of Agricultural and Biological Engineers (ASABE) draft standard *X633 Testing Protocol for Landscape Soil Moisture-Based Control Technologies* (*ASABE X633*). This standard provides a test method for examining the performance of SMSs to sense moisture in the soil and inhibit an irrigation event when the moisture exceeds a pre-set threshold. The EPA intends to require SMSs to be tested in accordance with this test method, once the standard is final, in order to earn the WaterSense label. Mr. Duncan reviewed in detail the various components of the test method described by the standard, including testing in various soil types and salinity levels, at varying water depletion levels, and under freezing

conditions. He explained that the University of Florida conducted performance testing using *ASABE X633*. Mr. Duncan also noted that ASABE is accepting public comment on this standard until December 2, 2019 and encouraged stakeholders to provide comments directly to ASABE.

Participant Questions

Are different types of soils used in the layers of soil for testing? Mr. Duncan responded that different soil types are only used between different test boxes. Ms. Tanner clarifier that one box will have fine soil and the second box will have coarse soil, but these types of soils are not mixed between boxes. The standard details the soil recipes required for testing.

What is the purpose of the layers? Ms. Tanner explained that the soil and SMSs are packed into the test boxes in a layered procedure, described in *ASABE X633*, ensuring that the soil is packed tightly and uniformly around the SMSs for the test.

3. SMS Draft Specification: Scope

Mr. Duncan reviewed the definitions and terminology the EPA has crafted to define the scope of this product category for the purposes of the draft specification, which were based on those included in *ASABE X633*. The draft standard scope covers two types of products, soil moisture content sensor controllers and soil water potential sensor controllers. The EPA crafted its product definition to cover both of these technologies. Mr. Duncan described these technologies and their components, including the sensor mechanism and the interface device.

The EPA has also developed three definitions for the draft specification that align with terms used in the *WaterSense® Specification for Weather-Based Irrigation Controllers* (WBICs): “stand-alone controllers,” and “add-on and plug-in devices." Mr. Duncan clarified how these terms apply to SMSs and defined the overall scope of the draft specification, clarifying which types of products are included and excluded. He discussed the inclusion of products that enable or disable an irrigation event based on readings from an SMS, while on-demand SMSs, which initiate irrigation events based on a pre-set window of soil moisture levels, are excluded.

Mr. Duncan asked the audience a series of questions:

- *Based on what has been presented, is the proposed scope appropriate?*
- *Specifically, is it appropriate to exclude on-demand type products? Did the EPA define them accurately?*
- *Should the EPA not limit the technology to soil water content sensor controllers or soil water potential controllers? Are there other product types on the market?*

Participant Questions and Comments

Please comment upon the weather-based irrigation controller definitions for irrigation adequacy and irrigation excess versus the SMS definitions for water depletion levels and field capacity levels. Please explain how these may be consistent. Ms. Tanner explained that these terms are not interchangeable nor applicable among the product types, as they function very differently. The EPA intends to make these specifications consistent through the packaging, labeling, and supplemental capability requirements for certification.

How did you define "event" as in the interruption of an "irrigation event"? Ms. Tanner explained that many irrigation systems run on a scheduled irrigation program, and the SMS will communicate the soil water content at the time a scheduled irrigation event should occur and enable or disable that event as needed. Based on the moisture level that is present in the soil, the SMS will or will not allow the irrigation schedule to continue.

Can we adjust the moisture or water content in the soil, or is this preset by the manufacturer? Ms. Tanner explained that the moisture level is determined by what is actually present in the soil. Most SMSs are intended to be conditioned in the soil onsite. The pre-set moisture levels can be set by the user, but some models set this level automatically based on programming. Joanna Kind of Eastern Research Group, Inc. (ERG), clarified that, if the threshold is set automatically by the product, the user can override these threshold values.

Will there be testing developed for on-demand SMSs in the future? Ms. Tanner responded that the EPA would like on-demand testing to be developed in future, but the technology currently lacks a test method. The *ASABE X633* development committee decided in 2013 that these products would be tested separately, so the EPA limited the scope of the draft specification to match the scope of the draft *ASABE X633* standard. Tom Penning of Irrometer Company, Inc., added that ASABE's original intent was to develop a test method for on-demand SMS technologies under the ASABE standard, *X627 Weather-based Landscape Irrigation Control Systems (ASABE X627)*. Thus, there is a path for these products to become part of the standard process and be tested similarly to WBICs. Ms. Tanner briefly explained the history of standard development related to WBICs and SMSs and ultimate split between the *ASABE X627* and *X633* standards committees. She noted the EPA is supportive of this process and hopes there will be a way to accelerate development of a standard for on-demand SMSs.

Can you please define "irrigation event"? My interpretation of the specification is that there must be a pre-defined irrigation schedule where watering can be inhibited based on soil moisture content. It is not clear if an event shall be inhibited only at the start, or at any time during the event. It is also not clear if the event shall not be inhibited once started. I think the goal is to inhibit at any time during the event. Ms. Kind responded that products on the market currently fall under one or the other of these categories (they can either inhibit an irrigation event at the start or during the event), and the WaterSense draft specification is intended to apply to both technologies. She suggested perhaps the EPA can include clarifying language in the final specification.

I'm of the perspective that [on-demand technologies] should [be included in the specification]. Otherwise, you begin to negatively impact manufacturers' ability to innovate. A way to do that is to include both those products that inhibit irrigation as well as generate irrigation events based on moisture content. I don't think this seems like a significant change to the specification; if you generate irrigation events based on moisture content, that seems appropriate. Then, if you deem it necessary, you can develop constraints when applied to generated irrigation schedules. For example, implement a constraint to not water on Tuesdays, even if the soil moisture content is sufficiently low. This could be described as a constraint to go along with these generative schedules. Ms. Tanner responded that later in the presentation she would discuss performance criteria and supplemental capabilities included in the draft specification. However, one of these capability requirements is for SMSs to work within a water utility's watering restrictions. Typically, these are programmed into the base controller or stand-alone controller, including

restrictions on watering certain days of the week. Ms. Tanner explained that the current issue regarding on-demand technologies is the lack of a test method. The respondent noted he believed developing a test method would be possible. Ms. Tanner noted that the current bypass SMS test method took 13 years to develop and said she hopes that the lessons learned during the bypass SMS test method development process would accelerate the on-demand test method development process. She noted the EPA would be open to this process going forward and is always interested in more technologies being labeled and supporting innovation in industry to aid consumers.

Am I correct in assuming that you are excluding wireless SMSs that require a controller interface from being in this program? Ms. Tanner responded that the specification includes both wireless and wired sensor models that connect to base or stand-alone controllers. She noted she would discuss this further in the presentation.

I have a question on the definition of an event. Many would define an irrigation program as a series of events. The program criteria describe the program, schedule, or sequence itself as an event, and this would be interrupted by the SMS. Ms. Tanner responded that the specification intended a single event to be interrupted. She gave an example of a schedule planning irrigation every Wednesday at a certain time; that specific scheduled event would be interrupted by the SMS. The next Wednesday, the SMS would make the same evaluation. A new decision is made every time the system is supposed to irrigate. The commenter noted that most controllers come on at a scheduled start time and then run a series of stations or valves. Each of these stations or valves would be an "irrigation event." The commenter said that they believe the intention is to interrupt the beginning of that series of events, not to interrupt each individual event. Ms. Tanner clarified that, generally yes, this is the intention and noted this description could vary depending on the complexity of a given irrigation system and how many zones are equipped with SMSs. Ms. Kind suggested respondents could submit clarifying language and definitions on this issue in their written comments.

I'm a little confused by the definition for on-demand SMS. It says "enable" irrigation, and I think it should be "allow" irrigation. How do (on-demand SMSs) differ from the scenario we just discussed? Shouldn't these be included? Ms. Tanner explained that bypass SMSs are only programmed with one soil moisture threshold, and on-demand SMSs have two of these programmed levels. Another attendee clarified that the set of zones is referred to as a cycle of zones—one event for all zones.

Will the SMS controller interrupt an irrigation event during the irrigation, or only prior to the start of the irrigation event? Ms. Kind explained that there are different products available on the market that operate both ways; some SMSs inhibit only prior to the start of the event, and some will interrupt during the event. There is nothing in the specification to test the difference between the two, so the user would need to evaluate which they prefer.

Who can we talk to about a test method for on-demand controllers? Ms. Tanner responded that Brent Mecham of the Irrigation Association (IA) is head of the *ASABE X627* standard committee. She also noted that WaterSense will be attending the IA show in December 2019, in Las Vegas, Nevada, and would be willing to meet with Mr. Mecham and manufacturers to discuss how to restart standard development for on-demand technologies in the IA Resource Center in the exhibit hall.

Can you elaborate on how utilities can restrict irrigation? Is there a universal software that can over-ride different systems from various manufacturers? Ms. Tanner explained that some products use signal-based cloud controllers; there has been some movement on the part of utilities to have access to the data, but this is not widespread. Overall, most utilities will recommend a schedule, and it is the responsibility of the homeowner to comply. Some utilities enforce these restrictions.

4. SMS Draft Specification: Performance Criteria

Ms. Kind described the performance testing study conducted by the University of Florida under a grant from the Metropolitan Water District of Southern California under their Innovation Conservation Program (ICP). Four models of SMSs that comprise the majority of the market were tested with the draft *ASABE X633* test method. She noted the raw data will soon be made available on the ICP website, and a summary report of the WaterSense analysis for this specification is currently available on the WaterSense website at: https://www.epa.gov/watersense/soil-moisture-based-control-technologies

Three replicates of each of the four brands were tested in two soil media, at three depletion levels and two salinities. WaterSense used the resulting data to establish the performance criteria and to identify test method modifications for the purposes of this draft specification. The EPA sought to evaluate whether all the test conditions were required and whether any of the test results differed across different salinity and soil combinations. Statistical analysis helped the EPA determine that these test conditions did not lead to statistically significant differences in the test results. Thus, the EPA modified the test conditions to greatly reduce the burden on testing laboratories. Ms. Kind described the research and evaluation process the EPA used to develop these modifications and how these modifications reduce overall burden.

Ms. Kind explained the performance criteria included in the draft specification and justification for inclusion. They include requirements related to functionality, precision (relative average deviation [RAD]), ability to sense a change in soil moisture, and function after a freeze.

Participant Questions and Comments

Will there be one RAD value per SMS? Or will there be three RAD values, one each for 20 percent, 40 percent, and 60 percent? Ms. Kind explained there will be one RAD value for each product, which is the average of those three RAD values at different depletion levels.

What is "field season"? Ms. Kind explained that term is intended to refer to the irrigation season. It is the EPA's understanding that some SMSs need to be reconditioned after each freeze or winter season.

Will WaterSense provide a spreadsheet to handle the details of the calculations? Ms. Kind noted that a spreadsheet for calculations has been developed and distributed to the licensed certifying bodies (LCBs) for all currently labeled irrigation products, and the EPA plans to do the same for SMSs.

Is the product tested while frozen to determine if it prohibits irrigation? Ms. Kind explained that the product is not tested while frozen. The product is frozen, but then must return to the pre-test temperature before being tested.

5. SMS Draft Specification: Supplemental Capability Requirements

Ms. Kind explained that the EPA intended to align this list of supplemental capability requirements with those included in the WaterSense WBIC final specification. The original list in the WBIC specification was developed through a working group with manufacturers and utilities. She also noted that very few comments were submitted related to this list when the EPA solicited feedback as part of its specification review process for the WBIC specification this past year. This led the EPA to believe that this list of requirements is working successfully for stakeholders. She also explained that the EPA hopes to promote WBICs and SMSs together as "smart" irrigation control technologies and therefore aims to make the specifications as consistent as possible

Ms. Kind explained that these requirements must be able to be met through programming and functionalities included on either the stand-alone controller, or the add-on or plug-in device paired with the compatible base controller. She walked through each of the requirements on the list and the reasoning behind the EPA's inclusion of each.

Participant Questions and Comments

With regards to the note about loss of connection from the sensor mechanism, is the connection in question between the controller and the add-on device, or loss of connection between the sensor and the add-on? Ms. Kind explained that the supplemental requirements apply to either a singular product (stand-alone controller) or to two pieces joined together (the base controller and the add-on or plug-in device). If it is a stand-alone controller, then the connection in question is between the sensor mechanism and the controller itself. If it is an add-on or plug-in device, the connection lost would be between the sensor mechanism and the interface device. Ms. Kind noted that some interface devices include red signal lights to indicate when the signal has been lost.

For RAD equation, are there nine observations (three sensors by three boxes)? Is there one mean value (x bar) per each soil depletion? For clarity, consider defining "n" in the specification, since it would always be the same and controlled by the test method. Ms. Tanner responded that it is nine observations. Ms. Kind noted there is a mean value for each soil depletion and suggested submitting a written clarification.

This concept of pairing the base controller with the add-on or plug-in device is new. It was not discussed in the committee. It certainly makes sense for testing; however, the original intent was for these devices to be easily used with homeowners' existing systems. This seems to now be requiring them to replace their entire control system. There are some of these requirements with which I'm not sure if any controllers on the market comply. These add-on devices are simple switches, so if they lose communication to the controller, then the switch is just constantly open. A wireless connection may be able to indicate it has lost communication, but a simple switch won't be able to recognize this loss of signal. Ms. Tanner responded that an add-on or plug-in device is designed to update, or make "smart," a base controller, such as a clock

timer with some supplemental requirements. Generally, she said, WaterSense does not find these add-on or plug-in devices have all of these capabilities, which is why the specification requires them to be paired with a controller that does have them. This is to provide utilities some level of assurance that systems in place have some minimal level of water-efficient functionality, even if the communication connection is lost. The EPA realizes there is a cost and burden to this, but WBIC manufacturers have been doing this for 9 years, have navigated it successfully, and it has resulted in utilities rebating to their products that are not stand-alone products (meaning add-on and plug-in devices).

It seems inappropriate to require a "rainfall" device as a supplementary requirement, since the SMS itself is a "rainfall" device. Ms. Tanner clarified that the supplemental capability requirements do not require a rainfall device to be attached, simply that it has the ability to attach to one. However, it is the EPA's understanding that SMSs often connect to WBICs in the same spot that a rainfall device would attach, so this requirement will necessitate some discussion with industry to refine. The EPA agrees an SMS is similar to a rainfall device. Ms. Kind added that the EPA is seeking direct feedback on the list of supplemental capability requirements to identify these issues. Comments could be submitted that recommend adding, modifying, or removing requirements from this list for the final specification.

Controllers switched to manual mode will not irrigate automatically, so there is no point in automatically returning to some other mode. Ms. Tanner explained that the intent of the requirement is to not have them switch back to manual mode, but rather for them to default to the "smart" technology.

Are the test labs only to verify the supplemental requirements by review of the feature, or by actual physical testing? Ms. Tanner said labs will review the that the features are present; but they are not physically tested.

For add-on devices, especially if they connect to rainfall detectors, there is only the presence or absence of rainfall. So how can one determine loss of communication? Ms. Tanner said that the concern is whether the controller is receiving information from the SMS. On a plug-in device, this indicator can be on the interface device, or on a stand-alone controller, it would be integrated into the system. If that is not how these products function or that functionality is not available, then this should be submitted in written comments and discussed with industry in future. The EPA intends this requirement to apply to the SMS, not a secondary rainfall device that may be present in the system. Ms. Kind added that the reasoning behind this requirement comes from typical manufacturer instructions to program systems to irrigate every day. If that signal is lost, the user should be informed, so if the system reverts to its original everyday watering schedule, the user would be able to recognize and correct it. The EPA is open to other methods by which this problem can be resolved.

The requirement to be "capable of allowing manual operation and automatically return to soil moisture mode" could be interpreted a couple ways. Many affordable products on the market are not going to meet this requirement because they have a physical hardware switch to bypass interrupt devices to allow for things like testing and winterization. If this is allowed to stand, it would force the consumer into a higher price category of controllers. I think we really should re-

think this requirement; I couldn't support this. Ms. Kind requested these comments be submitted in writing and the EPA will consider them.

6. SMS Draft Specification: Packaging and Product Documentation Requirements

Ms. Tanner described the current definitions developed for WBICs (e.g., stand-alone, plug-in, and add-on devices) and how the EPA has incorporated them into the draft SMS specification. The EPA's intention with packaging and documentation requirements is to ensure that when customers purchase WaterSense labeled products, they get the products they are expecting, and efficient models are easy to identify. In the past, utilities expressed concern over products operating in non-water-efficient modes. The packaging and product documentation requirements reflect these needs of consumers and utility partners.

All products must come with instructions that tell the buyer how to use the product in the water-efficient mode. All of the instructions required for product set-up and programming must be included in the package or online, as this is how LCBs will obtain instructions for setting up the product for testing. Labs are not permitted to request clarification or additional direction from the manufacturer for testing.

Plug-in and add-on devices do not need to be sold with the base controller; these products are intended to upgrade older or basic technology a user may already own. Documentation needs to describe which base controllers this device is compatible with, and packaging must state this device is only WaterSense labeled when paired with a base controller from this list. It must be clear that this label is conditional on it being paired with an approved base controller.

7. SMS Draft Specification: Testing Configuration and Compatible Base Controller Determination

Ms. Tanner described the criteria used in initial testing of devices paired with base controllers. She summarized recent improvements made to the WaterSense Product Search Tool, located on the website here: https://lookforwatersense.epa.gov/. Ms. Tanner performed a live demonstration of how to use the Product Search Tool to find WaterSense labeled WBICs and their compatible paired products.

Ms. Tanner explained the intention behind these requirements is to ensure consistency with the WBIC specification. This testing configuration serves as the basis for determining what the controller compatibility is and how to ensure all these supplemental capability requirements are met. Initial testing requires the base controller to be tested with the add-on or plug-in device, and this combined unit is what is evaluated related to the supplemental capability requirements. Beyond initial testing, manufacturers are encouraged to work with LCBs to identify what other base controllers may be able to be added to their certification file.

Participant Comments

[Responding to a previous comment on reverting to manual mode] This is not a requirement that the ET controller has to meet. Ms. Tanner responded that it is. Supplemental capabilities included in the draft SMS specification are taken directly from the list of WBIC supplemental capabilities.

It would seem to me a feature set of required controller capabilities would be easier than this thing with potentially thousands of compatible controllers. Ms. Tanner explained that it is WaterSense policy not to label retrofit devices. She acknowledged that this system can be tedious, but there are ample numbers of base controllers listed under the WBIC listing, so this should not be an unreasonable burden for SMS manufacturers. It also increases the level of confidence that utilities and other stakeholders have in WaterSense labeled products. Ms. Kind added that by listing the base controllers, it relieves the responsibility from the user to determine if the product they purchased has all the stipulated features.

8. SMS Draft Specification: Certification and Labeling

Ms. Tanner gave an overview of the WaterSense certification system and encouraged manufacturers that are not already program partners to file their partnership agreements now. Taking care of this paperwork ahead of time helps prevent a backlog during the rollout of the final specification. She recommended interested stakeholders review the Product Certification System, located online at: https://www.epa.gov/sites/production/files/2017-02/documents/ws-certification-product-system-v2.1.pdf. She briefly summarized the product sampling and conformity assessment LCBs will perform for testing.

Ms. Tanner then explained the labeling process and how it differs for stand-alone controllers compared to add-on or plug-in devices. She also explained the two different program marks and where they are allowed to be displayed on websites and product documentation and packaging. She then also described the function of Product Notification Templates (PNTs) and how LCBs use them to communicate product information to the program, which is then displayed on the WaterSense website.

9. Next Steps

Ms. Tanner directed the audience to submit their comments, both positive and negative, or any additional information pertinent to the *WaterSense® Draft Specification for Soil Moisture-Based Irrigation Control Technologies*, to watersense-products@erg.com by January 10, 2020. The EPA has since extended this deadline to February 1, 2020.

Other 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). Ms. Tanner announced that WaterSense intends to make the comments received on the draft specification public by publishing a comment compilation document. The EPA will review all comments provided and will consider them while developing a final specification, anticipated for summer 2020.

Ms. Tanner also encouraged attendees to review and provide comments on *ASABE X633* to ASABE by December 2, 2020. She noted that stakeholders interested in reviewing the standard will need to obtain a copy from ASABE.

She completed the meeting by announcing that the EPA will be giving the same presentation: at an information session at the IA Show in Las Vegas, Nevada, December 5 from 10 a.m. to 11:00 a.m. Pacific Time (the location can be found in the conference program). Any notes and

comments received at the IA session will be appended to the summary document produced from this webinar. The EPA will also be available for discussion at its table in the IA Resource Center during the IA Show.

Ms. Tanner also directed the audience to review the draft specification, available on the WaterSense website at: https://www.epa.gov/watersense/soil-moisture-based-control-technologies.

Participant Questions

Are there any accredited certification centers in Europe? Ms. Tanner responded no, however, some LCBs do to some extent have an international presence. LCBs can test products in other countries if they have an international presence. She recommended discussing this directly with the LCB and looking up the LCBs currently performing irrigation testing for WaterSense with an international presence and then infer which ones would also and have an international presence and do the testing for SMSs.

What is the cost target for certification? Ms. Tanner responded that this is a market-based decision between LCBs and manufacturers. But the EPA has spent a lot of time trying to reduce the cost of testing that is required for the WaterSense program. Certification includes more than just the product testing, and the cost of this process is between the LCB and manufacturer.

Ms. Tanner adjourned the meeting by thanking the audience for participating in the webinar and encouraging attendees to submit written comments or stop by and see WaterSense staff at the IA Show.

Appendix A: Meeting Participants

Attendee	Organization
Diganta Adhikari	Irrometer Company Inc.
Daniele Amistadi	Rain SPA
Maryellen Bell	HortScience Bartlett Consulting
Celine Benoit	Atlanta Regional Commission (Georgia)
Justin Burks	Santa Clara Valley Water District (California)
Dawn Calciano	City of Davis (California)
Maribel Campos	ICC-Evaluation Services (ES), LCC
Darik Chandler	Hunter Industries
Shirley Dewi	IAPMO R&T
Holly Dickman	City of Hays (Kansas)
Michael Dukes	University of Florida
Johann Feller	Southern Nevada Water Authority
Mary Hattendorf	Northern Water (Colorado)
Erica Hinton	ANSI National Accreditation Board (ANAB)
Morgan Hopkins-Crawley	Aurora Water (Colorado)
Mark James	Sprinkl
Brian Koblenz	Irricloud
Marc Kovach	Kovach Design Solutions, LLC
Elena Layugan	Upper San Gabriel Valley Municipal Water District (California)
Rodney Lynn	Forsyth County Water and Sewer Department (Georgia)
Cary McElhinney	U.S. Environmental Protection Agency (EPA) Region 5
Brent Mecham	Irrigation Association (IA)
Jayant Mehta	myRainDancers
Jon Oen	David Evans and Associates
Eric Olson	City of Fort Collins (Colorado)
Kathleen Onorevole	Eastern Research Group, Inc. (ERG)
Tom Penning	Irrometer Company Inc.
Jackie Robbins	IRRIGATION-MART
Krista Reger	Metropolitan Water District (California)
Clover Rogers	Jurupa Community Services District (California)
Sayetsi Sanchez	City of Woodland (California)
Larry Sarver	Tucor
David Shoup	Hunter Industries
Jasmine Showers	City of Santa Barbara (California)
Sean Steffensen	California Energy Commission (CEC)
Jeff Tejral	Denver Water (Colorado)
Michael Temple	IA
Molly Thistle	City of Pompano Beach Utilities Department (Florida)
Enrico Tresoldi	Rain SPA Home Irrigation
Daniela Urigwe	Energy Solutions
Robert Wanvestraut	South Florida Water Management District
Ron Wolfarth	Rain Bird Corporation
Veronica Blette	EPA

Presenter	Organization
Julius Duncan	EPA
Stephanie Tanner	EPA
Crystal Jones	ERG
Joanna Kind	ERG

Appendix B: Summary of Questions Discussed During WaterSense Session at the Irrigation Association Show

WaterSense held an informational session at the Irrigation Association Show in Las Vegas Nevada, December 5, 2019. The material presented during the session was identical to the presentation delivered via webinar on November 20, 2019, as summarize above. The EPA is presenting in this appendix the questions asked during the session to allow stakeholders who were not able to attend to be informed of the topics discussed.

Q. Why not use local soils as a more realistic test? Why would cost (of materials, shipping, etc.) be an issue to the EPA?

A. The *ASABE X633* committee used real soil as opposed to engineered soil (i.e., media), for several rounds of testing during the development of the test method. Finding soils that were consistent with respect to soil composition (i.e., percentage of sand, silt, clay) was challenging and was determined to be unsustainable over time. Additionally, shipping soil from one location to another was extremely expensive.

Also, EPA does not do the actual certification testing. Testing for the label is done at third-party certification bodies and paid for by the manufacturer. Reducing the cost for testing helps EPA keep certification cost at a level that maximizes manufacturer partners participation in the program.

Q. If the sensors aren't tested in real soil, aren't users being expected to do the real-world testing?

A. No, users will not be required to conduct real-world testing. Because real soils were used for several rounds of *ASABE X633* test method development, and results generated using real soils were similar to those using engineered soils, the committee is confident that results in the media are transferrable to the field. Additionally, as part of the development of the draft specification, EPA looked at water savings results from field studies using the SMSs that underwent performance testing demonstrate that products that perform well on the laboratory test using engineered soils will achieve water savings in the field.

Q. Is a wired connected to the interface device required?

A. The draft specification allows for the sensor mechanism to communicate with the device either wirelessly or via a wire connected to the interface device.

Q. Why are the EPA modifications to the *ASABE X633* test method not incorporated into the standard?

A. The EPA modifications are not incorporated into the draft *ASABE X633* test method for several reasons. First, the timing of the draft specification and modifications made based on performance testing came after the draft test method was developed and the draft standard was in the process of being published. Second, some of the modifications could be specific to WaterSense labeling and might not be desired for all entities interested in testing SMSs. For

example, with respect to the attachment of the SMS to a base controller for the power source, a transformer could also be used if testing is conducted for purposes that don't require a base controller. With respect to the reduction in the number of test media and salinity combinations, despite performance test results generated by UF, utilities may want to conduct the test in soils more similar to those in their region.

Q. Is there a requirement for the number of sensor mechanisms a product must be able to communicate with?

A. The specification does not have a requirement regarding number of sensor mechanisms the interface device must communicate with, but this information (i.e., maximum number of sensor mechanisms the interface device can communicate with) will be displayed in the product search tool on the WaterSense website.

Q. If an interface device communicates wirelessly with a base controller, how will the device be powered during the test?

A. The EPA will discuss this question with the *ASABE X633* committee and work with stakeholders to determine the best path forward for these products.

Q. How will the test handle sensors that need to be calibrated before being installed in the soil?

A. The test method included in the draft *ASABE X633* standard allows for calibration of SMSs according to the manufacturer's instructions.

Q. One manufacturer expressed concern over the inclusion of the supplemental capability requirements in the draft specification. Specifically, they are concerned these requirements prevent SMSs from being used to retrofit the majority of base controllers installed in existing irrigation systems. As a result, they said they will have to develop more expensive SMSs with more features, or consumers will need to update their existing base controller at a greater expense, eliminating the possibility of a retrofit.

A. The EPA understands this concern and is balancing it with the goal of promoting SMSs and WBICs equally to utility partners. The list of supplemental capability requirements included in the draft specification was developed by utilities and manufacturers during the WBIC specification development process to ensure that, in addition to passing the performance test, the controllers included additional features important to water efficiency (e.g. ability to comply with watering restrictions, nonvolatile memory). This list of capabilities was recently reviewed by WaterSense partners (both utilities and manufacturers) as part of WaterSense WBIC specification review process, and none requested changes to this list, indicating to the EPA that stakeholders are satisfied with labeled products that have now been on the market for 9 years. Additionally, the EPA brought up the list of base controllers that have been identified to be compatible with WBIC add-on and plug-in devices. These products are currently listed on the WaterSense Product Search Tool and many will also be compatible with add-on or plug-in SMSs.

Q. Are SMSs used in agricultural applications included in the scope?

A. SMSs that are manufactured exclusively for agricultural use are excluded from the scope of the draft specification. However, SMSs that can be used for both landscape irrigation and in the agricultural applications are included in the scope of the draft specification.

Q. How will the LCBs test products that have both weather and SMS based control? Can these earn the label?

A. These products can earn the WaterSense label. The specifications and associated certifications for WBICs and SMSs will remain separate in the WaterSense program at this time. LCBs will certify products that have the capability to operate in either weather-based mode or soil moisture-based mode under each separate specification, meaning they will be tested and certified to each specification should the manufacturer choose to do so. The EPA is aware that there are controllers that use both weather and soil moisture simultaneously to schedule irrigation. At this time, a test method is not available to sufficiently test this capability, so these products will likely need to be tested and certified to meet one or both specifications, as decided by the manufacturer. Product packaging and product literature shall clearly convey which specification the product meets.