Summary of Major Changes to the Revised Draft Specification for Weather-Based Irrigation Controllers

The U.S. Environmental Protection Agency's (EPA's) WaterSense® program is pleased to announce the release of the *WaterSense Revised Draft Specification for Weather-Based Irrigation Controllers* (revised draft specification). The purpose of this document is to summarize the major revisions made to the *WaterSense Draft Specification for Weather-Based Irrigation Controllers* (initial draft specification) released in 2009, to share reasoning for these changes, and to ask for feedback. All materials referenced in this document can be found on the WaterSense website at http://www.epa.gov/watersense/partners/controltech.html.

Background

There are more than 13.5 million irrigation systems currently installed in the United States. Replacing existing standard clock timer controllers or installing new WaterSense labeled weather-based irrigation controllers could offer a significant water-saving opportunity for homeowners and organizations that use irrigation systems, once these products are labeled in the future.

In November 2009, WaterSense released its initial draft weather-based irrigation controller specification for public comment and received substantial feedback. In the months since, EPA has been addressing stakeholder comments and developing additional resources to assist manufacturers in effectively navigating the product certification and labeling process. One such additional resource, the *Draft Supplemental Guidance for WaterSense Certification and Labeling of Weather-Based Irrigation Controllers,* has been published along with the revised draft specification on the WaterSense website. EPA developed this document to provide clarification and specific direction as to how the WaterSense certification process works and will apply to the future certification and labeling of weather-based irrigation controllers.

In addition, EPA commissioned follow-up research at the University of Florida to answer questions raised after the publication of the initial draft specification. A new report, *Examination of SWAT Protocol Utilizing a Performance Analysis of Weather-Based Irrigation Controllers: Update with Extended Data,* presents follow-up research to the original research study, *Examination of SWAT Protocol Utilizing a Performance Analysis of Weather-Based Irrigation Controllers*, conducted by the University of Florida in 2008 and 2009. This follow-up research examined potential changes EPA considered making to the initial draft specification. Both reports can be viewed on the WaterSense website.

Further, WaterSense and the University of Florida held a training session for interested licensed certifying bodies in January 2009 to assist with implementation of the performance test. To ensure that calculations are consistent among certifying bodies, WaterSense asked the University of Florida to develop a spreadsheet program that performs the calculations required by the performance test protocol according to the criteria in the revised draft specification. This tool, *Performance Test Spreadsheet for Weather-Based Irrigation Controllers*, is also posted on the WaterSense website. Licensed certifying bodies will be required to use this spreadsheet program when conducting the performance test for weather-based irrigation controllers. Prior to

the issuance of a final specification for weather-based irrigation controllers, EPA will update the spreadsheet to reflect any changes made to the revised draft specification.

Although the specification requirements and performance test spreadsheet may change with the release of the final specification, it is important for manufacturers to understand how the performance test will be run and become familiar with the certification process. Therefore, EPA encourages manufacturers to begin working with licensed certifying bodies to test products to the revised draft specification using this version of the performance test spreadsheet. A list of accredited licensed certifying bodies is posted on the WaterSense website at http://www.epa.gov/WaterSense/about_us/cert_bodies.html#lcb. Once the specification is final, a list of licensed certifying bodies accredited to test weather-based irrigation controllers will be added to the website. In addition, WaterSense is looking for feedback regarding the operation and mechanics of the performance test spreadsheet, to ensure that the results of the performance test are appropriately applied and documented.

EPA is soliciting your feedback regarding the revised draft specification and requests your review of the supplemental documents and performance test spreadsheet program. EPA will accept written comments and plans to hold two public meetings via webinar to discuss the revised draft specification. The following section provides an overview of the major revisions made to the draft specification.

Overview of Major Revisions to the Draft Specification

In response to public comments and the research conducted at the University of Florida, EPA made the following revisions to the initial draft specification:

Section 1.0 Scope and Objectives

EPA received many comments requesting that the specification apply to controllers that use weather data and evapotranspiration (ET) principles, not necessarily ET data directly, as indicated in the initial draft specification. Additionally, commenters recommended adopting the scope language from the Smart Water Application Technologies™ (SWAT) test protocol for climatologically based controllers, referred to from here forward as the SWAT protocol. WaterSense agreed with commenters on both issues and revised the specification to include controllers that use various types of weather data, not just ET data. In addition, WaterSense modified the scope language to more closely align with that of the SWAT protocol.

Many commenters expressed concern about the station count limitation aimed to focus on residential and light commercial products. Commenters either recommended an alternative station count limit or the elimination of the requirement altogether. EPA decided that large commercial systems would be adequately tested by the performance test protocol and, as a result, removed the station count requirement. However, because large commercial controllers can be installed on irrigation systems covering large areas, WaterSense added an additional requirement in Section 4.0 Supplemental Capability Requirements that controllers with more than 48 stations must have the capability to interface with a flow sensor.

Section 3.1 Modifications to the SWAT Protocol

Based on the conclusions from the follow-up research conducted at the University of Florida and the performance test training with interested licensed certifying bodies, EPA included the following additional modifications to the SWAT protocol under Section 3.1 of the specification:

3.1.2 Missing Data: During the performance test training, licensed certifying bodies questioned how to handle missing weather data (i.e., rainfall or ET) from the reference weather station and what level of missing data would be acceptable. This is not currently addressed in the SWAT protocol nor was it addressed in the initial draft specification. To eliminate confusion and strengthen the specification requirements, WaterSense determined that it needed to specify what action should be taken if the reference weather station did not record a day or more of data. To help WaterSense define this requirement, the University of Florida conducted research evaluating whether performance scores were significantly impacted by various days of missing data. The study concluded that two consecutive days or three days in total of missing data during a single 30-day test period should not significantly impact performance scores. The revised draft specification incorporates this concept and provides direction to licensed certifying bodies on how to handle missing data.

3.1.3 Root Zone Working Water Storage Starting Point: During the performance test training, the licensed certifying bodies and the University of Florida found that starting the performance test with the root zone working water storage (RZWWS) at full, rather than at half full as indicated in the current version of the SWAT protocol, ensured that the reference RZWWS and controller's RZWWS start at the same level. EPA made this change to the specification to reflect this finding.

3.1.4 Rainfall Requirement: From the beginning of the weather-based irrigation controller specification development process, stakeholders have questioned the transferability of performance scores from one climate region to another, specifically if controllers tested in a dry climate would perform well when installed in a wet climate. The original research conducted at the University of Florida in 2008 and 2009 aimed to examine these concerns. The report was inconclusive regarding performance score transferability from dry to wet climates, due to the lack of significant rainfall during the study period. After the publication of the initial draft specification, this question still remained for many stakeholders, so WaterSense asked the University of Florida to analyze additional data from controllers that were experiencing a rainy period. The results from testing the controllers during a rainy period indicated that performance scores are not transferable from dry to wet climates. As a result, EPA decided to add a requirement that would test a controller's ability to handle rainfall. WaterSense is proposing the 30-day test period include at least four days that receive at least 0.10 inches of rain. This does not increase the SWAT protocol rain requirement of at least 0.40 inches in total, but requires that the controller encounter at least four days with rainfall to achieve this total.

3.1.5 Order of Operations: In the early stages of specification development, some stakeholders were concerned that the order of operations in the SWAT protocol moisture balance unfairly penalized controllers for not being able to predict rainfall. The original research conducted at the University of Florida in 2008 and 2009 aimed to examine this concern, but was inconclusive due to a lack of rainfall during the study period. However, the University of Florida follow-up research examined this same concern under periods of heavy rain and concluded that the order of

operations did impact performance scores. Based on this conclusion, WaterSense is proposing that the order of operations implemented during the SWAT protocol daily water balance calculation be ET first, then irrigation, then rainfall, rather than rainfall occurring first, as designated by the SWAT protocol.

Section 3.2 Performance Requirements

The initial draft specification did not designate whether the performance scores (irrigation adequacy and irrigation excess) would be averaged across the six SWAT protocol zones or whether each zone had to pass the thresholds of 80 percent and 5 percent, respectively. Many commenters recommended that the average of the six zones meet the performance criteria threshold. As part of the follow-up research study, the University of Florida examined the difference in passing rate between averaging zones and requiring each zone to pass. In many cases, one or more zones did not meet the performance thresholds individually, but the controller would have still passed if averages were used. WaterSense revised the initial draft specification to require that each zone pass the threshold in order for the controller to be certified, assuring that labeled products are capable of performing well in a variety of landscape conditions.

Section 4.0 Supplemental Capability Requirements

WaterSense received a variety of comments on the supplemental capability requirements ranging from requests to remove the section entirely to support for the section with recommended language changes. After reviewing all comments and proposed language, WaterSense deleted a number of features and revised the language to reflect the controllers' capabilities, rather than features, in an effort to make the language less prescriptive. This change minimizes the number of capabilities required, but still meets the needs of utilities for controllers that can comply with their water efficiency program requirements. In addition, the requirements are presented in table format, indicating which capabilities are required when the controller is operating in standard mode and which are required when the controller is operating in smart mode.

Section 5.0 Product Packaging and Documentation Requirements

WaterSense has learned from previous specifications that it is important to emphasize how products are packaged and labeled, so that consumers know what they are purchasing when they buy a product with the WaterSense label. When promoting WaterSense labeled weather-based irrigation controllers in the future, it is critical that a labeled controller be packaged with all the components it was tested with so the consumer is provided with a product that performs as tested. Therefore, EPA included additional information regarding product packaging and documentation in the revised specification. WaterSense held a webinar with interested manufacturers to gain an understanding of how products are currently packaged and marketed. In addition, WaterSense consulted with a variety of utility partners to understand how they conduct rebate programs and how WaterSense can address product packaging.

Based on the information gathered, the revised draft specification requires the product to be packaged with the same components or attributes that it was tested with to meet the specification. For controllers with weather stations or sensors, all components tested with the

controller must be packaged with the controller. For signal-based controllers, instructions on acquiring the proper weather signal must be packaged with the controller. This requirement ensures the product is capable of performing as tested, providing the consumer with the opportunity to achieve the highest potential savings.

With respect to add-on and plug-in devices, products do not have to be packaged with the base controller with which they were tested. However, the product documentation for the device must list each base controller model that the device was tested with to meet the requirements of the specification and with which the manufacturer intends it to be connected. This requirement ensures the product is capable of performing as tested, providing the consumer with the opportunity to achieve the highest potential savings.

In addition, EPA added the requirement that product packaging include an instruction manual that lists the settings and specific parts used during the performance test as described in Section 3.0. The licensed certifying body will program the controllers for the performance test according to the settings and instructions included in this manual. WaterSense added this requirement to ensure that the licensed certifying body programs the controller with the same information than the consumer receives when purchasing the product.

EPA added an additional requirement that the product not be packaged or marked to encourage operation of the controller in standard mode. Any instruction related to the maintenance of the product must direct the user on how to return the controller to smart mode. The intent of this requirement is to encourage the use of the controller in smart mode and is consistent with requirements for other WaterSense product specifications.

Appendix A: Testing Configuration and Programming

EPA added this new appendix to the specification to clearly establish the testing configuration and programming requirements for this product category. Appendix A explains that the controller must be tested with all weather stations, sensors, or service(s) required to meet this specification. As stated in Section 5.1, the product must then be packaged with the same components with which it was tested. In addition, the controller must be programmed according to the list of settings provided by the manufacturer in the product's instruction manual, as described in Section 5.1. This ensures that the consumers receive the product and components as tested.

With respect to add-on and plug-in devices, these products must be tested with each base controller model with which the manufacturer intends it to be connected. As a unit, the device and the base controller must meet all of the requirements contained in this specification. As described in Section 5.1, the device does not have to be packaged with the base controller(s), but product documentation must list each base controller the device was certified with in order for it to be considered a WaterSense labeled product.

Appendix B: Informative Annex for WaterSense Labeling (Previously Appendix A)

EPA clarified the parties eligible to partner with WaterSense under this product category. The manufacturer of the controller must become a partner in order to label their products.

Manufacturers of components such as weather stations or additional sensors, weather services, or base controllers are not eligible for partnership on that basis alone.

Partnership

Manufacturers, retailers, and distributors that produce or sell weather-based irrigation controllers will be able to join the program as WaterSense partners once EPA has processed and reviewed public comments on the revised draft specification. WaterSense will notify all interested parties when the program is open for partnership before the release of the final specification, in order to allow manufacturers, retailers, and distributors to plan for the release and promotion of WaterSense labeled weather-based irrigation controllers.

Providing Input on the Revised Draft Specification

EPA welcomes your input on the *WaterSense Revised Draft Specification for Weather-Based Irrigation Controllers*. All interested parties are encouraged to review the revised draft specification, and the accompanying supplemental documents, which may be downloaded at http://www.epa.gov/watersense/partners/controltech.html and provide written comments by March 21, 2011. Written comments should be directed to watersense-products@erg.com. Please use the comment submission template located on the WaterSense website. All comments become a part of the public record.

EPA will host two webinars with stakeholders to discuss the revised draft specification on February 23, 2011, from 9 a.m. to noon and from 1 to 4 p.m. (EST). Details regarding registration for both public meetings can be found on the WaterSense website.

If you have any questions, please contact the WaterSense Helpline at (866) 987-7367 or watersense@epa.gov. We look forward to receiving your feedback on the specification, as well as your organization's participation in WaterSense.