

## WaterSense® Cation Exchange Water Softener Notification of Intent Public Meeting Summary

**January 19<sup>th</sup>, 2011 1:00pm-3:00pm (EST), Webinar**

### **Meeting Participants**

Diganta Adhikani, California State University – Fresno  
Dave Averbeck, Pentair  
Amanda Ayoub, Portland Energy Conservation, Inc.  
Garth Babcock, Pentair  
Scott Batiste, Puronics, Inc.  
Matthew Bauer, Bauer Soft Water Company  
John Beaver, Culligan  
Ron Bennett, Hobart Service  
David Bentley, NSF International  
Mark Bertler, Diversified Pacific Partners  
Margaret Bicking, EcoWater Systems  
David Black, Bishop Plumbing & Heating, Inc.  
Jayson Boyd, nuvoH2O  
Gary Bracht, North Dakota Department of Health  
Cathleen Brennan, Coastside County Water District  
Frank Brigano, KX Technologies  
Mark Brotman, Kinetico, Inc.  
RJ Burke, Water-Right  
Matthew Carey, Culligan  
Mark Copelli, General Electric (GE)  
Patrick Dalee, DuPure  
Martha Davis, Inland Empire Utilities Agency  
Anish Desai, International Association of Plumbing and Mechanical Official Research & Testing (IAPMO R&T)  
Franco DiFolco, Canadian Standards Association International (CSA International)  
Al Dietemann, Saving Water Partnership  
Ted Dyer, Dyco Water Systems  
Daniel Elko, Pentair  
Mark Felton, Pacific Water Quality Association  
Rene Fleming, City of St. George Water Services Department  
Jeffrey Franks, Technical Engineering Solutions LLC  
Arthur Friedrich, Butler Water Systems  
Donna Fries, Miami-Dade Water and Sewer Department  
David Gascoyne, GE  
Thea Graybill, National Association of Clean Water Agencies  
Sharon Green, Los Angeles County Sanitation Districts  
Thomas Griesbach, Diamond H2O  
Nathan Groh, Minnesota Pollution Control Agency  
Greg Gruett, Water-Right  
Kurt Gruett, Water-Right

Guy Gruett, Water-Right  
Susannah Harris, Eastern Research Group (ERG)  
Gary Hatch, Hatch Global Consulting Services LLC  
Brook Hatton, Canadian Standards Association International  
Jeff Hellenbrand, Hellenbrand  
Jesse Hernandez, Culligan  
Bill Hoffman, H.W. Hoffman & Associates  
Ken Hoffman, LifeSource Water Systems, Inc.  
John Hofherr, Pentair  
Chris Hughes, Hague Quality Water International  
Marty Jessen, Rayne Water  
John Koeller, Koeller and Company  
Cynthia Lane, American Water Works Association  
Mark Laucella, CUNO, Inc. a 3M Company  
Ye Liu, Aquion Water Treatment Products  
Darin Martin, Martin Water Conditioning  
Cary McElhinney, U.S. EPA Region 5  
Bill Mennen, Greenway Water Technologies  
Michael Mormino, ENPRESS LLC  
Jeff Mosher, National Water Research Institute  
Douglas Oberhamer, Culligan  
Edward Osann, National Resources Defense Council (NRDC)  
Matthew O'Toole, Abbey EcoWater Systems  
Thomas Palkon, Water Quality Association (WQA)  
Thomas Pape, Alliance for Water Efficiency  
Cathie Paré, City of Santa Barbara  
Hanifah Parker-Morrison, U.S. Environmental Protection Agency (EPA)  
Scott Parkhurst, SGS  
Andrew Paulsen, Soderholm & Associates  
Rhianna Pensa, Otay Water District  
Jim Poston, Stalwart Built Homes  
Jerry Rai, Aqua-Phyd Water Technologies  
Justin Ramsey, Pro Products  
Jim Rawson, GE  
Regu Regunathan, Regunathan & Associates, Inc.  
Richard Rizzo, Kinetco, Inc.  
Jennifer Robinson, Utah Department of Environmental Quality  
Andrew Ronchak, Minnesota Pollution Control Agency  
Morton Satin, Salt Institute  
Joseph Scarpa, Green Paradigm Realty LLC  
Ann Sever, Wallace Group  
Roy Sieber, ERG  
Gerard Silvani, City of Phoenix  
Kent Sovocool, Southern Nevada Water Authority  
Crystal Swain, NSF International  
Rebecca Tallon, Pentair  
Stephanie Tanner, U.S. Environmental Protection Agency  
Stephanie Thornton, U.S. EPA

Mike Trammell, WATTS  
Loretta Trapp, Clack Corp.  
Pauli Undesser, WQA  
John Van Newenhizen, Van Newenhizen & Associates, Inc.  
Kim Wagoner, ERG  
Chris West, C-Tech Water Solutions LLC  
Richard Westergaard, Gloucester County Planning Division  
Phil Weynand, San Antonio Water System  
Lauren Wingo, ERG  
Kevin Wong, Canadian Water Quality Association  
Doug Workman, Liberty Pure  
Kenneth Wright, Universal Technical Resource Services, Inc.  
Heather Yates, City of Guelph, Waterworks Division

## Meeting Summary

### 1. Meeting Introduction

A public meeting webinar was held on cation exchange water softeners to explain the specification development process, clarify the Notification of Intent (NOI), discuss stakeholder feedback, and gather input on a path forward for labeling this product under US EPA's WaterSense Program.

### 2. Introduction to WaterSense and Specification Development Process

Stephanie Tanner (US EPA's WaterSense program) provided an introduction to the WaterSense program and the specification development process. Ms. Tanner reviewed the evaluation factors WaterSense considers when selecting products or product categories for labeling and provided a specific clarification regarding non-water using products.

"It is not the intent of the WaterSense program to place these products at any disadvantage in the marketplace or in their eligibility for water conservation incentives, purchasing guidelines, or specifications. EPA recognizes that many of these products may meet applicable national standards and can be appropriate water efficiency options. Decision-makers should consider them as equally eligible for the same rebates, tax incentives, procurement guidelines, and other conservation incentives as WaterSense-labeled products. Where a specification exists for a specific category of products, the WaterSense label should be used."

This clarification regarding non-water using products will be posted on the WaterSense website in the near future and manufacturers can use this language if they feel their product has been unfairly excluded from incentive programs.

Ms. Tanner then went on to explain that the WaterSense specification development process begins with technical analysis and market research to identify data needs and any outstanding issues, followed by the release of an NOI to develop a specification. After the outstanding issues have been fully addressed and adequate data has been gathered, a draft specification is released. The draft specification is open to public comments, which will be considered as the

specification is revised and a final specification is released. The certification structure for the product is released with the final specification.

Sharon Green (Los Angeles County Sanitation Districts) asked what third-party infrastructure is typically used for certifying products.

Ms. Tanner explained that the WaterSense certification scheme is in accordance with ISO Guide 65 for certifying products. There are a number of accredited certifying bodies that certify and label WaterSense products per the WaterSense certification scheme. The certification scheme and accompanying Q&A on how the scheme works can be found on the WaterSense website ([www.epa.gov/watersense](http://www.epa.gov/watersense)). Manufacturers can submit their products to one of eight certifying bodies and if they meet all the requirements of the specification and are a WaterSense partner, they may receive the WaterSense label.

### 3. Cation Exchange Water Softener NOI

Ms. Tanner then discussed why WaterSense is interested in labeling cation exchange water softeners and reviewed the technical aspects of cation exchange water softeners that were introduced in the NOI. Covered under the scope presented in the NOI are residential and possibly commercial demand-initiated regeneration cation exchange water softeners. WaterSense has identified potential water efficiency and performance criteria for cation exchange water softeners. These are:

- *Water efficiency:* WaterSense is considering improving upon the current NSF 44 voluntary water efficiency requirement of 5 gallons per 1,000 grains of hardness removed by at least 20 percent.
- *Softening performance:* Currently, the NSF 44 standard requires water softeners to deliver water that contains less than 1 grain per gallon of hardness. WaterSense is interested in whether a performance requirement allowing for more hardness to pass through the system could be developed.
- *Salt efficiency:* WaterSense is considering improving upon the current NSF 44 voluntary salt efficiency requirement of 3,350 grains of hardness removed per pound of salt—possibly raising the level to match the California requirement of 4,000 grains of hardness removed per pound of salt.
- *Regeneration efficiency:* WaterSense would like to address the frequency at which water softeners regenerate by developing a requirement to assess the percent of the hardness removal capacity exhausted prior to regeneration initiation.
- *Multiple salt dosage settings:* WaterSense would like to develop performance requirements at multiple salt dosage settings to ensure that units perform efficiently on all settings.

Following this discussion, Ms. Tanner provided some estimates for how much water a WaterSense specification might achieve and then opened up the call for questions.

Ed Osann (NRDC) asked what assumptions were used to develop the water savings that were presented. Mr. Osann also asked what the savings referred to and for a clarification on what was meant by “even existing DIR unit water use can be improved upon by increasing the water efficiency and reducing the frequency of regeneration.”

Ms. Tanner clarified that the water savings numbers were based only on the number of new units sold each year and does not account for replacement of existing units. Ms. Tanner also clarified that the statement about existing DIR units referred only to improving upon existing models, not existing units. Ms. Tanner explained that WaterSense has no mechanism for improving upon existing units installed in the field and can only impact the design of new models.

Darin Martin (Martin Water Conditioning) asked if any consideration would be taken for efficient use of heating water.

Ms. Tanner explained that energy savings would be auxiliary to water savings.

Gary Hatch (Hatch Global Consulting Services LLC) introduced himself, noting that he does work for NSF and is associated on a volunteer basis with WQA. Mr. Hatch asked who would own this specification and whether or not it the specification would be available for incorporation into other standards.

Ms. Tanner explained that WaterSense owns all of its specifications but references standards where appropriate. WaterSense likes to work with consensus-based organizations because they are able to incorporate WaterSense requirements into their voluntary standards. As an example, WaterSense worked with the American Society of Mechanical Engineers (ASME) A112 committee to develop a showerheads specification. The WaterSense specification has been released but in the future, the hope is that the ASME showerhead standard will adopt criteria equivalent to the WaterSense criteria. NSF 44 would have the option of incorporating WaterSense requirements for cation exchange water softeners over time.

Sharon Green (Sanitation Districts of Los Angeles County) asked if there were any assumptions used for product life to come up with the water savings and also asked how WaterSense plans to evaluate the environmental impacts of water softeners.

Ms. Tanner first noted that she will be addressing environmental concerns in following slides. Ms. Tanner explained that WaterSense would like to hear from partners in the water and wastewater treatment industry to understand the environmental impacts of water softeners. EPA has already begun to meet with several utilities. Ms. Tanner offered that she will clarify more later on, but that WaterSense intends to gather a list of issues and develop a plan to address them.

Ms. Tanner then addressed Ms. Green's other question regarding the assumptions used to develop water savings. Because the water saving estimate refers only to new products sold in a year and not replacement savings, product life was not used in the calculation. The approximated water savings are more technical and are not savings consumers can necessarily expect. Ms. Tanner noted that market transformation programs, like WaterSense, aim to affect 10% of the new sales each year.

Two representatives from Water-Right asked that when referencing performance, is WaterSense only referring to water use, salt use, and regeneration. The commenters wanted to know if WaterSense is only addressing hardness or will iron or similar contaminants be included.

Ms. Tanner explained that WaterSense is only looking at hardness removal. Ms. Tanner clarified that WaterSense intends to use the NSF 44 standard as a basis for a WaterSense specification. NSF 44 contains performance requirements aside from those proposed in the WaterSense NOI. Similarly, the scope of the NOI standard covers products that are intended to remove hardness and does not have requirements for iron or other contaminant removal.

The representatives from Water-Right followed up with their previous question and asked if products are already NSF certified, would the process of obtaining WaterSense certification be faster.

Ms. Tanner noted that this may not necessarily be the case. Products would still have to be tested to meet the WaterSense criteria and would not be automatically grandfathered into the program with an existing NSF 44 certification. Manufacturers that have their products certified to NSF 44 may, however, have somewhat of an advantage if they have an existing relationship with a certification body.

Kevin Wong (Canadian WQA) asked what the timeline would be for specification development. Mr. Wong was curious because there is an existing Canadian standard, CSA B483, which could integrate the WaterSense specification fairly quickly.

Ms. Tanner stated that the timeline for specification development will depend on the complete list of issues and how long it takes for WaterSense to address these issues. Typically, there are at least six months before a draft specification is issued after the release of the NOI and then another six months in between when the draft and final specifications are released.

Mr. Wong shared that there is ongoing research in Canada regarding salt usage and the wastewater from water softeners.

#### **4. Issues to Consider**

Kim Wagoner (ERG, contractor to US EPA's WaterSense program) presented the list of issues concerning water softeners that WaterSense has developed through discussions with stakeholders over the past few months:

- Effects of increased sodium and chloride on on-site septic system performance
- Impacts of sodium and chloride discharged to municipal systems that recycle wastewater for irrigation or other use
- Chloride and TDS restrictions/limitation for wastewater treatment plants and impaired waters

After presenting this list, Ms. Wagoner created a virtual white board to add additional issues that stakeholders have identified. The resulting list is included in Appendix A to this meeting summary.

Ed Osann (NRDC) noted that the NOI referenced the ENERGY STAR specification for external power adapters. Mr. Osann explained that ENERGY STAR withdrew this specification at end of 2010 and will instead begin requiring level V external power supplies for ENERGY STAR labeled products that previously specified the external power adapter specification. Mr. Osann

recommended that WaterSense also specify level V for the energy component of the specification.

Kevin Wong (Canadian WQA) explained that WQA and National Onsite Wastewater Recycling Association (NOWRA) are currently conducting research regarding the effect of water softeners on onsite septic systems. Mr. Wong noted that two years ago Ontario changed their septic code to cater to some of the issues caused by water softener discharge on certain soil clay types. This seemed to resolve all the issues in the building code and there haven't been any issues since. Mr. Wong offered to provide a copy of the building code changes to WaterSense. Mr. Wong also shared that Gary Hatch is leading this effort at WQA.

Gary Hatch (Hatch Global Consulting Services LLC) explained that he chairs the Water Science Committee for WQA, which is looking to develop a request for proposal for septic issues to study. The research would look at the ratio of monovalent cations to divalent cations and how that balance may affect the settling of sludge in on-site septic systems. The proposal will hopefully be finalized in the next month or so to receive approval from WQA.

Regu Regunathan (Regunathan & Associates, Inc.) asked how WaterSense plans to consider these issues in relation to the program's main objective of addressing water-efficiency. Mr. Regunathan found that these issues would seem to go beyond the scope of this objective.

Ms. Tanner clarified that WaterSense wants to get better information on the impacts of sodium and chloride to determine what criteria could be set and the effects these new criteria would have on the existing issues. WaterSense does not intend to negatively impact the current situation. Ms. Tanner explained that utilities are trying to manage chloride and TDS and that WaterSense needs to better understand these issues for their benefit. Additionally, as an EPA program, WaterSense does not want to have a negative impact on partner utilities. WaterSense expects to balance water efficiency with the overall contribution of sodium and chloride to reduce their concentrations in the discharge, thereby better managing negative impacts from water softeners. If the chloride issue is determined to be too severe, WaterSense would not continue with the water softener specification development process.

Mr. Regunathan suggested that the potential salt savings could also be calculated, explaining that salt saving numbers could be useful for both water and wastewater utilities.

Andrew Ronchak (Minnesota Pollution Control Agency) suggested looking at the effects of water softeners from the perspective of impaired waters. Non-salt options continue to come up as a possible alternative to water softeners. From a pollution prevention standpoint, it would be useful to know whether or not non-salt water softeners work. Mr. Ronchak understands that WaterSense does not look at non-water using products, but was of the opinion that this situation is different because waters are being polluted.

Dan Elko (Pentair) shared that as a manufacturer, he finds the motives of the WaterSense program to be in the right direction. Mr. Elko stated that his concern lies with how a WaterSense label may compete with the NSF 44 certification. Mr. Elko asked how a manufacturer would manage both certifications and the doubling of certification costs. Mr. Elko asked for WaterSense's experience with this issues in regards to past product specifications.

Ms. Tanner explained that it is important to consider that the WaterSense certification system was developed to fit into existing certification processes relevant to the product category. The WaterSense certification is essentially an add-on to product standards. Certification bodies have been good about working with manufacturers to get all of certifications done at the same time, particularly for new models. In the case of water softeners, NSF 44 has other requirements that would be referenced in a WaterSense specification. Products would already have to meet the mandatory components of the NSF 44 standard to receive WaterSense label.

Ms. Tanner stated that for other product categories, manufacturers have felt it was worth the extra cost of obtaining WaterSense certification for the marketing advantage. There are over 3,000 products certified to WaterSense requirements. Over the past year, sales of WaterSense products have increased while non-efficient line sales have decreased. The marketing side of the WaterSense program works to drive consumer awareness and helps manufacturers to promote products. There is also a New Homes specification that would adopt a potential water softener specification. WaterSense is also written into the water efficiency sections of several codes and standards. Manufacturers of plumbing products thus far have been overall pleased with the certification process and have not had issues with the certification costs.

Phil Weynand (SAWS) found, from his experience, that non-salt devices do not work. Mr. Weynand had offered in the past to promote non-salt technologies but since there is no third party testing conducted, he doesn't feel confident standing behind product performance. Mr. Weynand is, however, concerned with high TDS where the effluent goes into power plant lakes and large recycled water system influent. SAWS has a local limit of 700 mg/L for TDS.

Ms. Tanner stated that there are a lot of concerns from utility districts that have banned water softeners. Ms. Tanner wanted to make it clear that the existence of a label provides no relief to regulations at local, state, or federal level. WaterSense is a voluntary program. Utilities can use the WaterSense product list as they see fit for their service territories.

Regu Regunathan (Regunathan & Associates, Inc.) clarified that IAPMO is in the final stages of developing a standard to test non-salt devices or water softeners for efficacy in scale reduction in water heaters and other appliances. On January 21, 2011, the protocol will be reviewed at the committee level. If the protocol passes review, there will be a standard and protocol available in the coming months. Potentially some products may pass this test.

Loretta Trapp (Clack Corp.) introduced herself as the co-chair of the NSF 44 task group. Ms. Trapp asked how WaterSense intends to ensure that water softeners with higher salt efficiencies and lower water efficiencies will work long term over a variety of water conditions.

Ms. Tanner responded that WaterSense will be working with manufacturers to deal with these and other technical related issues. WaterSense wants to make sure that product performance and water savings are maintained long term. WaterSense would like to bring these issues to the NSF 44 task group.

## **5. Data Needs**

Lauren Wingo (ERG, contractor to US EPA's WaterSense program) presented the data needs that WaterSense has identified, including:



- *Market data:*
  - Capacity and water use during regeneration for multiple salt dosages of a single unit
  - Amount of hardness removed by water softeners during the exchange cycle compared to the rated capacity
  - Comprehensive data of salt and water efficiencies of products currently on the market
- *Specification impact data:*
  - Effect of salt and water efficiency improvements on the amount and concentration of sodium and chloride in the water softener discharge
  - Additional costs associated with treating water with high levels of chloride or TDS
  - Effectiveness of California legislation that improved water softener salt efficiency
  - Input from utilities on other performance characteristics to consider to reduce the impact of water softeners in their service territory

Anish Desai (IAPMO R&T) asked when certification bodies will be able to get involved with the specification development process for water softeners.

Stephanie Tanner (U.S. EPA) explained that certification bodies are able to join the consensus-based committee (the NSF 44 task group) to work towards the development of a specification and to provide guidance on testing and certification of the products. Certification bodies can sign up to test the products after the release of the draft specification.

Marty Jessen (Rayne Water) introduced himself as the chair of government affairs at WQA. Mr. Jessen noted that a study is being conducted by the WaterReuse Foundation (WRF) at Arizona State University, headed by Peter Fox, which is looking at alternative technologies. Mr. Jessen also suggested looking into data from the Central Arizona Salinity Study.

Regu Regunathan (Regunathan & Associates, Inc.) recommended that in addition to the possible negative impacts of water softeners, that the beneficial aspects should also be considered, including a reduction in energy use. Collectively, WQA and Water Quality Research Foundation have evaluated the benefits of water softener use. The Battelle study has looked at energy use reduction from water softener use. Another study report will be released in coming months that looks at the reduction in detergent use from water softeners.

Sharon Green (Los Angeles County Sanitation Districts) offered to submit data and information developed in the past related to water softeners and chloride discharge. In regards to the California salt efficiency requirement that went into effect in 2000, no state agency has been in charge of overseeing its implementation. The requirement is essentially a paper standard that is self-implementing and has no government oversight. Ms. Green shared that instances of salinity compliance issues have only increased over that time period. For some of these instances, water softeners have been a cause. There has been more recent legislation that gives local agencies alternative pathways to develop legislation to regulate residential softeners. The passage of this legislation demonstrates that there is still a need out there to address softeners as a source of concern. Within the Los Angeles County Sanitation Districts territory, one district has a local ban. There is no concern that the WaterSense label would not enable a utility to adopt a ban, but it would make it difficult from a public outreach perspective if the public sees EPA's stamp of approval, which in turn would encourage water softener use, in the opinion of

Los Angeles County Sanitation Districts. Utilities already have difficulty reaching the public. Ms. Green believed that increased use of water softeners through increased market penetration could increase loading of sodium and chloride, whether or not the units are more efficient.

Dave Bentley (NSF International) offered test data on certified water softeners from NSF under the promise of confidentiality. Mr. Bentley asked how many years worth of data WaterSense would be interested in.

Roy Sieber (ERG), the moderator, suggested that WaterSense contact Mr. Bentley directly at a later date to determine what data set can be obtained. WaterSense will ensure that all data is handled confidentiality.

Loretta Trapp (Clack Corp.) asked if one of the data needs would be to ensure that products are installed in a manner such that they perform efficiently in the long term.

Mr. Sieber, the moderator, appreciated Ms. Trapp's comment and stated that one of the next steps of the specification development process will be to address these more complex issues.

Jeff Franks (Technical Engineering Solutions LLC) noted that water and salt efficiency will be highly dependent on usage pattern. Mr. Franks found that the industry has ignored this fact for a while.

Ms. Tanner responded that WaterSense will work with NSF 44 task group to consider these issues and develop water and salt efficiency criteria. Mr. Franks is also welcome to submit data or information on how to address this issue.

## **6. Next Steps**

WaterSense is scheduling meetings with utilities and other stakeholder groups, including the National Association of Clean Water Agencies and the American Water Works Association, in coming weeks to discuss the NOI and plans moving forward. WaterSense will also be working with the NSF 44 task group. It is important for WaterSense to have an industry-based organization to work with that is consensus-based and not entirely made up with manufacturers.

WaterSense has also joined the IAPMO committee investigating development of a test method for anti-scaling devices and continues to collect information on these devices.

Interested stakeholders were encouraged to take part in the NSF 44 task group and were asked to e-mail [watersense-products@erg.com](mailto:watersense-products@erg.com) to express their interest. Loretta Trapp (Clack Corp.), the co-chair of the NSF 44 task group, explained that the task group meetings are held via teleconference if interested parties are unable to travel.

Ms. Tanner closed the meeting by explaining that WaterSense is a public program, which means that the program strives to share all information and will keep everyone up-to-date through the website and e-mails.

Meeting participants are encouraged to submit relevant data to [watersense-products@erg.com](mailto:watersense-products@erg.com).



Meeting participants with questions relating to the WaterSense program in general may contact the WaterSense Helpline via e-mail ([watersense@epa.gov](mailto:watersense@epa.gov)) or phone (866-987-7367). Materials and information will be made available through the WaterSense website ([www.epa.gov/watersense](http://www.epa.gov/watersense)).

## Appendix A: Issues to Consider

## WaterSense® Cation Exchange Water Softener Notification of Intent Issues to Consider

*The following list of issues was developed during the January 19, 2011 WaterSense Cation Exchange Water Softener NOI Public Meeting.*

### **.Issues to Consider**

- Effects of increased sodium and chloride on on-site septic system performance
  - Study sponsored by the WQA Water Sciences Committee may address issues
    - Researching the ratio of monovalent to divalent cations on sludge settling
  - Ontario changed their septic code two years ago, which seemed to resolve some of these issues
- Impacts of sodium and chloride discharged to municipal systems that recycle wastewater for irrigation or other use
- Chloride and TDS restrictions/limitations for wastewater treatment plants and impaired waters
  - San Antonio Water System has set a local limit of 700 mg/L TDS
- Consider specifying Energy Star power adaptors – level V
- Non-salt treatment options – can they be promoted as alternative options to water softeners?
  - Efficacy of non-salt devices technologies is currently uncertain
  - IAPMO is developing a standard for non-salt devices/water softeners for scale reduction – in final stages of development
  - WaterReuse Foundation study headed by Peter Fox is looking into the performance of alternative technologies
  - Central Arizona Salinity Study has looked at the concentration of total dissolved solids in the Central Arizona region and assessed possible measures to reduce the concentration, including options for reducing the effect of water softeners
- How do manufacturers deal with WaterSense as a competitive specification to the NSF standard, and how do they deal with paying for and managing two certifications?
- How to ensure that water softeners with improved salt and water efficiencies are going to work long term and over a variety of water conditions?
- Consider benefits of water softeners
  - Battelle study on energy use reduction from water softeners
  - WQA study on the benefits of softened water in regards to detergent use
- There has been no government oversight of the implementation of California's legislation requiring water softeners to have a salt efficiency of at least 4,000 grains of hardness removed per pound of salt
  - Since its implementation, compliance issues have increased

- Concern over EPA giving “a stamp of approval” for water softeners when utilities are expressing concern about the use of these products in their community
  - An increase in market penetration of water softeners could cause water quality compliance issues

**Data Needs**

- Impact of salinity from water softeners at the local level
- How to ensure that water softeners are installed to operate in an efficient manner?
- How to consider usage patterns in different homes?