Partnership Staff Introduction

AWWA’s Partnership for Safe Water Staff are pleased to present the 2017 Annual Data Summary Report. This annual data summary report has been approved for publication by the Partnership for Safe Water Steering Committee and contains a technical summary of the data submitted by participants in the Partnership for Safe Water treatment plant and distribution system optimization programs.

The data included in this report primarily consists of combined filter effluent turbidity, disinfectant residual/DBP, pressure, and main break data from Partnership utility subscribers, covering the period from June 2015 through May 2016. The purpose of this report is to provide collective program performance results that can be used by individual utilities to compare their performance with those of all Partnership participants.

Caution should be exercised when interpreting the data contained in this report. Although more than 300 surface water filtration plants and 50 distribution systems submitted the data, this is only a fraction of the total number of surface water treatment plants and water systems in North America. Among these Partnership subscribers are many of the largest, proactive, and best managed utilities. The data presented is only that which is submitted voluntarily by program subscribers. It may, therefore, be misleading to extrapolate the data to represent larger industry trends.

The report also features program highlights from 2016. The past year has been an outstanding one for the Partnership program. The program continues to grow, both in terms of subscribers, program volunteers, and technical resources. The launch of a parallel optimization program for wastewater utilities – the Partnership for Clean Water – was also featured in 2016.

More than 20 new subscribers joined the Partnership for Safe Water program during 2016, and the number of volunteers choosing to share their time and expertise with the program is more than 50. Outreach remains strong, with professional presentations at many Section and national conferences highlighting program benefits. Additionally, nearly 65 Partnership awards were presented in 2016, part of the more than 750 awards presented throughout the program’s 21-year history.

It is truly a privilege to work with Partnership for Safe Water subscribers and volunteers. Thank you for an outstanding 2016!

Barb Martin & Tom Schippert
Partnership Staff

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AWWA
6666 W. Quincy Ave.
Denver, CO 80235
(303-347-6220 - bmartin@awwa.org)
## Partnership for Safe Water Steering Committee - 2016

<table>
<thead>
<tr>
<th>Name</th>
<th>Role</th>
<th>Organization</th>
</tr>
</thead>
<tbody>
<tr>
<td>Michael Barsotti, Chair</td>
<td>Chair</td>
<td>AWWA Representative Cha[mp[lain Water District</td>
</tr>
<tr>
<td>Andrea Song</td>
<td>AMWA Representative Denver Water</td>
<td></td>
</tr>
<tr>
<td>Douglas Kinard</td>
<td>ASDWA Representative South Carolina Department of Health and Environmental Control</td>
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</tr>
<tr>
<td>Bruce Hauk</td>
<td>NAWC Representative Illinois American Water</td>
<td></td>
</tr>
<tr>
<td>Gregory Carroll</td>
<td>USEPA Representative USEPA, Office of Ground Water and Drinking Water</td>
<td></td>
</tr>
<tr>
<td>Frank Blaha</td>
<td>Water Research Foundation Representative</td>
<td></td>
</tr>
<tr>
<td>James Fay (non-voting)</td>
<td>Past Steering Committee Chair</td>
<td>Champlain Water District Term Ended 2009</td>
</tr>
<tr>
<td>Steve Hubbs (non-voting)</td>
<td>Past Steering Committee Chair</td>
<td>Formerly, Louisville Water Co. Founding Chair</td>
</tr>
<tr>
<td>Robert Cheng (non-voting)</td>
<td>Past Steering Committee Chair</td>
<td>Coachella Valley Water District Term Ended 2015</td>
</tr>
</tbody>
</table>

## Partnership for Safe Water Partner Organizations

Partner organizations include American Water Works Association (AWWA), AMWA, ASDWA, NAWC, USEPA, Water Research Foundation, and Association of Metropolitan Water Agencies (AMWA)

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**Partnership for Safe Water Quebec Licensee** (Administered by Réseau Environnement)

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**Partnership for Safe Water** Quebec Licensee (Administered by Réseau Environnement)
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Partnership Highlights

More than 99% of 95th percentile CFE turbidity values reported by treatment program subscribers, regardless of phase, were less than 0.20 NTU.

Water Quality: Treatment Program

Treatment plants that have completed a Phase III self-assessment continue to exhibit an average 60% reduction in CFE turbidity, compared to their originally reported baseline values.

Excellence in Water Treatment Award-winning plants have an average 95th percentile CFE turbidity of 0.037 NTU - and 25% of these plants serve less than 100,000 people.
Approximately 95% of distribution system disinfectant residual samples meet the Partnership’s optimization goals.

Performance: Distribution Program

Nineteen distribution systems have received the Directors Award. Two distribution systems have received the Presidents Award for Distribution System Operation.

Aggregate pressure and main break subscriber performance data are reported for the first time in 2017.
After a successful pilot by Marshalltown Water Works (pictured left) and Long Beach Water Department, the Treatment Plant Optimization Program opened to groundwater treatment facilities.

Leadership and Governance

Andrea Song (Denver Water, CO - left, 2nd from right) replaces Brian Haws (Austin Water, TX - above, middle) as AMWA representative to the Steering Committee.

The number of engaged volunteers who choose to share their time and expertise with the Partnership is more than 50 - Thank You!
Collaboration with AWWA Sections, utilities, and partner organizations provides resources developed "for utilities, by utilities". (L-Mike Sullivan, Oak Creek Water and Sewer Utility, presents at a Section event)

Marketing and Outreach

The Partnership for Clean Water, a parallel optimization program for wastewater utilities, was launched in 2016.

Numerous conference presentations, Opflow and Journal articles, and media hits result in more than 20 new subscribers in 2016.
The Partnership for Safe Water was founded in 1995 when six organizations dedicated to safe drinking water came together to develop a voluntary program to reduce the risk of Cryptosporidium exposure from plants treating surface water. A new program for distribution system optimization was introduced in 2011 to further ensure the quality and safety of water delivered to consumers. The Partnership for Safe Water program celebrated its 20th Anniversary in 2015.

The goal of the Partnership is to work with utilities to optimize water utility operation and help ensure public health protection. The Partnership provides self-assessment and optimization programs so that operators, managers, and administrators have the tools they need to improve performance above and beyond even proposed regulatory levels.

The Partnership program helps utilities optimize water utility performance and improve water quality by using flexible technical tools that allow utilities to customize performance improvements at their own pace with limited capital spending. Hundreds of utilities realize the benefits of participation in the Partnership’s treatment plant and distribution system optimization programs.

The Partnership was formally chartered as an Enterprise Department of the American Water Works Association (AWWA) in January 2013. The Partnership has two dedicated full-time AWWA staff members who manage program operation and is directed by a Steering Committee comprised of one volunteer representative appointed by each Partner organization. The Program Effectiveness Assessment Committee (PEAC) is comprised of volunteer water utility optimization experts. The PEAC
provides technical program leadership, through recommendations to the Steering Committee, and is responsible for reviewing Phase III (Self-Assessment) and Phase IV (Optimization) utility completion report submissions.

An overview of each program is provided below. Program participants must maintain compliance with all applicable health-based regulations to remain in good standing.

**Treatment Plant Optimization Program**
The treatment plant optimization program was the original *Partnership for Safe Water* program at the time of its inception in 1995. The tools that were developed by the *Partnership* are based on methods described in the handbook *Optimizing Water Treatment Plant Performance Using the Composite Correction Program* - EPA/625/6-91/027. The goal of the treatment program is to reduce the risk to water consumers from microbial contaminants, such as *Cryptosporidium*, by reducing filter effluent turbidity.

The program is designed to help water treatment plants reduce filter effluent turbidity by optimizing plant processes to increase particulate removal, allowing them to surpass current regulatory requirements. Subscribers are not required to meet the *Partnership's* turbidity goals at the time they initially join the program. Plants participating in the program complete a comprehensive self-assessment of treatment plant operations, which includes areas such as performance, plant unit processes, operations, and administration. The self-assessment is used to identify performance limiting factors, for which an action plan for improvement can be developed and implemented to address. Progress is tracked through the submission of annual data and optimization reports.

The primary data reporting parameter for the treatment program is turbidity, for raw, settled (if applicable), and filtered water. As plants progress through the *Partnership's* phases, turbidity requirements become more stringent to ensure that optimized plants are producing the highest levels of water quality. Disinfection capacity is a secondary assessment parameter for plants during the self-assessment phase of the program to ensure that adequate disinfection is provided. All surface and groundwater filtration plants are eligible to participate in the treatment plant optimization program. The treatment plant optimization program expanded to include groundwater filtration plants during 2016. Groundwater plants select plant-specific optimization parameters, in addition to turbidity, based on their specific treatment objectives.

**Distribution System Optimization Program**
The *Partnership for Safe Water's* distribution system optimization program (DSOP) is the culmination of more than a decade of research and planning focused on cultivating the knowledge and resources necessary to develop a performance assessment and optimization program for distribution system operations. The program’s objective is to help water service providers deliver high quality water to all users, providing an additional level of public health protection.

The program is primarily based on WRF Project #4109 – Criteria for Optimized Distribution Systems. Although the performance standards are rigorous, the guidance provided to DSOP utility subscribers provides them with the tools they need to continuously improve and achieve operational excellence in the distribution system. Similar to the early development of the *Partnership’s* treatment plant
optimization program, the distribution program is expected to evolve during the coming years, as knowledge and experience is gained by utility subscribers.

There are three key distribution system performance indicators that are monitored as part of the distribution system optimization program to ensure system integrity. These factors, along with the indicator by which they are quantitatively represented, include:

- Water quality integrity (disinfectant residual)
- Hydraulic integrity (pressure)
- Physical integrity (main break frequency)

Some of the 16 additional performance improvement variables included in the self-assessment process include cross-connection control, nitrification, energy management, flushing, operation and maintenance of storage facilities, security and online monitoring, and water loss control. These variables were selected based on their potential to influence, or be influenced by, the performance of each of the three primary optimization areas. Utility subscribers are not limited to these parameters and may choose to quantitatively monitor performance in additional areas. Utilities are not required to meet the Partnership’s distribution system performance goals prior to joining the program.

Utilities participating in the program complete a comprehensive self-assessment of distribution system operations, which includes areas such as performance, design, operations, and administration. The self-assessment is used to identify performance limiting factors, for which an action plan for improvement is developed and implemented. The program is designed to encourage continuous improvement and annual progress is tracked by comparing current data to the utility’s initial baseline data submission.

Partnership for Clean Water
In 2016, AWWA launched a parallel optimization and recognition program for wastewater utilities, called the Partnership for Clean Water. The Partnership for Clean Water was originally launched as a wastewater treatment plant optimization program, and the program is anticipated to expand to include areas such as collection systems, reuse facilities, and stormwater in the future. The objective of the Partnership for Clean Water is to provide technical tools and resources that support wastewater treatment facilities in their efforts to improve treated wastewater effluent quality, as well as process and facility energy efficiency. Optimizing performance and operation encourages wastewater utilities to maintain environmental and financial stewardship and a positive relationship with utility stakeholders. The Partnership for Clean Water follows a four-phased program structure to the Partnership for Safe Water and shares a similar approach to wastewater facility self-assessment and optimization.
Utilities are invited to learn more about Partnership programs by visiting [www.awwa.org/partnership](http://www.awwa.org/partnership) or [www.awwa.org/partnershipforcleanwater](http://www.awwa.org/partnershipforcleanwater). Surface and groundwater filtration plants are eligible to participate in the treatment plant optimization program, while any utility that applies a residual disinfectant to the distribution system is eligible to participate in the distribution system optimization program. Wastewater treatment plants of all sizes and process configurations are eligible for Partnership for Clean Water participation. Both US and international utilities are welcome to participate in the Partnership.

This report quantifies the widespread impact of the Partnership for Safe Water program for the 2016 calendar year. Water utility personnel are encouraged to consider sharing portions of this information with management and customers to demonstrate the cost-effective use of resources applied to gain quantifiable water quality improvements.

Partnership award winners are recognized throughout the water community. Awards are recognized at the AWWA Annual Conference and celebrated locally at utilities across North America.
**Partnership Benefits**

“The tools and self-assessment guidance provided by the Partnership have brought the focus on optimization to its current high level that is readily accepted and embraced throughout the utility.”

2016 Annual Report Excerpt

The benefits of being a Partnership subscriber are numerous and significant:

<table>
<thead>
<tr>
<th>PARTNERSHIP BENEFITS</th>
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<tbody>
<tr>
<td>Improved quality of water delivered to customers</td>
</tr>
<tr>
<td>Reduced risk from microbiological contaminants</td>
</tr>
<tr>
<td><em>Cryptosporidium</em> removal credit under the regulatory requirements of the Long-Term 2 Enhanced Surface Water Treatment Rule</td>
</tr>
<tr>
<td>Greater preparedness for water quality and treatment challenges beyond turbidity - such as cyanobacteria and their metabolites, extreme weather events, and corrosion control</td>
</tr>
<tr>
<td>Customized performance enhancement plans using the program’s technical tools and guidance</td>
</tr>
<tr>
<td>Training and technical support for Partnership programs</td>
</tr>
<tr>
<td>Annual report provides aggregate comparison data from program subscribers</td>
</tr>
<tr>
<td>Accountability through annual data reporting and progress towards optimization</td>
</tr>
<tr>
<td>Development of employee tenacity for producing high quality water</td>
</tr>
<tr>
<td>Improved teamwork among plant personnel at all levels</td>
</tr>
<tr>
<td>Enhanced customer confidence through awards and recognition program</td>
</tr>
<tr>
<td>Recognition from local regulators for documented achievements</td>
</tr>
<tr>
<td>Interactions with top water professionals to better understand operations</td>
</tr>
<tr>
<td>Ability to identify cost-effective optimization solutions that can be shared and applied</td>
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<tr>
<td>Professional growth, networking, and leadership experience through Partnership volunteer opportunities</td>
</tr>
</tbody>
</table>

These benefits are provided with the support of utility subscriber fees, which cost utility customers, on average, less than one penny per year.
Partnership Subscribers

**Partnership Treatment Plant and Distribution System Optimization Program subscribers provide water to nearly 100 million people!**

As of December 2016, The *Partnership for Safe Water* treatment plant optimization program’s subscriber base as of consisted of 259 utilities with 482 water treatment plants, while approximately 146 utility subscribers with 160 unique distribution systems participated in the distribution system optimization program. Nearly 40 additional treatment plants located in Quebec participate in the Programme d’Excellence en eau Potable (PEXEP), a parallel program, managed through Reseau Environnement. As of 2016, PEXEP, once primarily a treatment plant optimization program, also includes a program for distribution system optimization.

Subscriber Facts:

- *Partnership* programs serve utilities of all sizes - more than 50% of subscribers in both programs serve communities of fewer than 100,000 people, as indicated in Figure 2.
- *Partnership* subscribers are geographically diverse - subscribers are represented in more than 40 states, the District of Columbia, four Canadian provinces, and Australia.
- *Partnership* subscribers are committed to optimization – more than 85 subscribers participate in both treatment plant and distribution system optimization programs.
- Treatment program subscribers serve approximately 40% of the US population served by surface water; distribution program subscribers currently serve less than one percent of community water systems in the US.
Treatment Program Summary

The size categories displayed in Figure 2 are those used by AWWA to determine utility membership and are based on numbers of service connections. These size ranges have been converted to population served for the purposes of this comparison, as Partnership subscriber fees are based on the population served by a utility. Although a substantial number of the Partnership utilities are among the very largest in the country, more than 50% of utility subscribers serve fewer than 100,000 customers. The number of utilities in the smaller size categories is increasing. Collectively, the utilities participating in the treatment plant optimization program serve a combined population of more than 89 million, or more than 40% of the U.S. population served by surface water, which was estimated by EPA at over 216 million for fiscal year 2014. The 2016 population distribution of Partnership subscribers remained consistent with that of the 2015 reporting period.

Figure 2 – Partnership for Safe Water – Percent Distribution of Treatment Program Subscribers by Population Served (6/1/2015 – 5/31/2016)
Another means of comparison is to examine the number of utilities that participate in the *Partnership for Safe Water* treatment plant optimization program as a percentage of the total number of drinking water utilities in the United States. Although the treatment program expanded to include groundwater in 2016, the majority of subscribers continue to represent surface water treatment plants or those treating groundwater under the influence of surface water. Therefore, the most accurate means of comparison is to compare the number of *Partnership* utility subscribers in each population category with the total number of active utilities in each category that treat surface water or groundwater under the direct influence of surface water (Figure 3). Estimates of the number of surface water treatment plant utilities were obtained from the USEPA Safe Drinking Water Information System (SDWIS) database for the 2014 Fiscal Year. Changes in percentages from past years are primarily due to minor changes in the population distribution for surface water utilities or reported population changes of subscriber utilities, causing them to cross between population categories. This same comparison was not carried out for Canadian utilities due to the limited number of Canadian subscribers at the current time.

![Figure 3 – Partnership for Safe Water Subscribers as a Percentage of US Surface Water Utilities (6/1/2015 – 5/31/2016)](image-url)
Distribution Program Summary

Similar to the treatment program data described above, a summary of distribution program subscribers by population size is displayed in Figure 4. Although a substantial number of the Partnership distribution program subscriber utilities are among the very largest in the country, more than 50% of subscribers continue to serve fewer than 100,000 customers, which has been consistent over the past several years. Distribution system program subscribers include utilities acting as water wholesalers, utilities that supply water directly to their customers (retailers), and consecutive systems. To date, subscriber feedback indicates that the self-assessment process has been successfully applied to all of these various distribution system formats.

Distribution program subscribers serve a combined population of more than 41 million people, or approximately 14% of the US population served by a community water system (CWS) of any size, which was estimated by EPA at approximately 300 million in 2010.

Figure 4 – Partnership for Safe Water – Percent Distribution of Distribution System Program Subscribers by Population Served (6/1/2016 – 5/31/2016)

To report the number of distribution program subscribers versus the number of utilities eligible to participate in the program, the number of subscribers must be compared to the total number of CWS in the United States, as the program is open to any water system that applies a residual disinfectant. For 2016 reporting, this comparison is limited to utilities located in the United States, due to limited international participation at the current time. The assumption is also made that the majority of CWS serving a population of >500 apply a residual disinfectant in the distribution system. Based on this comparison, distribution program subscribers represent approximately 0.28% of the approximately
52,000 total CWS in the United States. Currently, representation is greatest among the largest utilities, with subscribers representing 18% of eligible CWS in the United States serving a population of greater than 100,000. Representation decreases as CWS population served decreases. Distribution system program subscribers represent only 1.7% of CWS in the United States serving a population between 10,001 and 100,000 and even smaller percentages of smaller system sizes.

![Pie chart showing distribution of utility participation in Partnership for Safe Water programs.](image)

**Figure 5 – Partnership for Safe Water – Program Overlap for 2015 (6/1/2015 – 5/31/2016)**

Figure 5 represents the overlap between utility participation in the treatment plant and distribution system optimization programs. Although the treatment plant optimization program remains the Partnership for Safe Water’s largest program, approximately 30% of Partnership for Safe Water subscribers participate in both the treatment plant and distribution system optimization programs.

Accounting for overlap between the programs, Partnership in Safe Water subscriber utilities, in total, provide water to an estimated population of nearly 100 million across North America. This is nearly one-third of the United States population. There are several notable observations from these data. Program participation varies by the size of the utility, with larger utilities being the most heavily represented in the Partnership. Utility participation decreases as the population served by a water treatment facility or community water system decreases. This indicates that the greatest potential for Partnership for Safe Water program subscriber growth is among small and medium utilities. The Partnership for Safe Water’s strategic plan emphasizes subscriber engagement and growth to ensure the long-term sustainability of the program. More than 20 new utility subscribers made the commitment to
drinking water utility optimization by joining the Partnership’s treatment plant and distribution system optimization programs during 2016.

**Program Growth**

*Partnership for Safe Water* participation, in both the treatment plant and distribution system optimization programs, has increased significantly over the past several years. This reflects the program’s relevancy to today’s drinking water utilities and the recognition that the Partnership’s self-assessment and optimization mindset can help utilities to remain proactive, vigilant, and prepared to address current and future water quality and operational challenges. The Partnership’s subscriber growth from 2013-2016 is illustrated in Figure 6.

![Figure 6 – Partnership for Safe Water Subscriber Growth (2013-2016)](image)

"*The Partnership for Safe Water continues to be valuable to our utility in guiding our process control program. Our staff continue to maintain their tenacity to protect public health by guarding against complacency and ensuring reliability."

*2016 Annual Report Excerpt*
The Partnership Process and Awards

The Partnership for Safe Water program consists of four phases. Each phase is intended to assist utilities in progressing toward optimized treatment plant or distribution system performance and operation as indicated by specific water quality and performance goals. Utility subscribers pursue these performance goals by completing specific tasks associated with each phase of the program. Each phase is described briefly below.

**Phase I**
- **Commitment**
- Utilities agree to participate through Phase III, apply, and submit fees.

**Phase II**
- **Baseline Data Collection**
- Utilities provide baseline data to the Partnership
- Treatment: Turbidity, Distribution: Disinfectant residual/DBPs

**Phase III**
- **Self-Assessment**
- Utilities complete a comprehensive self-assessment of treatment plant or distribution system operations, develop an action plan, and submit a completion report, reviewed by trained experts to become eligible for the Directors Award for Treatment Plant or Distribution System Operation

**Phase IV**
- **Demonstrated Optimization**
- Utilities achieve Phase IV status by submission of a report demonstrating fully optimized operation. There are two levels of performance beyond Phase III - the Presidents Award and the Phase IV Excellence Award levels.

Note that Phase IV Excellence in Distribution System Operation requirements are currently under development for the distribution system optimization program. The requirements for the Presidents Award for Distribution System Operation were released to all Phase III distribution system program utilities during 2014.

Detailed information about the Partnership’s phases and specific requirements may be accessed on the Partnership for Safe Water website (www.awwa.org/partnership) or by contacting Partnership staff directly. Resources, such as self-assessment guidance and data collection software, are available to guide Partnership subscribers through all phases of the program. Progress through the program’s phases is self-paced so that utilities may complete the self-assessment process according to a timeline from which the utility is able to derive the maximum benefit.

Regardless of program or phase, data submissions are an essential component of the Partnership program. Turbidity data are submitted by treatment program subscribers, while disinfectant, pressure, and main break data are submitted by distribution program subscribers. The collection and submission
of baseline data allows utilities to assess their current performance, prior to beginning the self-assessment process. These data are also useful for future comparisons as the utility progresses through the program. The submission of annual data also provides a degree of accountability for utility subscribers, and the aggregate data included in this report provide a basis for performance comparison with other utility subscribers. Finally, the collective data submitted by utilities on an annual basis, allows the impact of a utility's progress through the program phases to be quantified and allows the overall impact of Partnership programs on treatment plant and distribution system performance over time to be quantified. Appreciation and thanks is extended to all Partnership subscriber utilities that have made the effort to submit annual data, many utilities for a period of close to two decades.

2016 Partnership Awards Summary
First-time Directors, Presidents, and Excellence Awards are presented throughout the year as the award levels are achieved. Longevity awards are typically presented at AWWA’s Annual Conference and Exhibition (ACE). Partnership staff frequently works with subscribers to arrange for presentation of awards at local AWWA conferences or utility board/city council meetings. As of December 2016, the following numbers of plants and distribution systems have achieved the Phase III Directors Award level or higher in the program. The table below briefly describes each award level, the total number of awards achieved since the inception of the Partnership, and the number of awards presented in calendar year 2016. Note that not all utilities listed in the total award count are current program subscribers.

<table>
<thead>
<tr>
<th>Award</th>
<th>Description</th>
<th>2016 Awardees</th>
<th>Overall Awardees</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treatment Program</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Directors Award</td>
<td>Awarded to plants that complete a self-assessment report that is successfully peer reviewed (PEAC) and determined to be a “good faith effort” for plant assessment and development of an action plan for future improvement efforts</td>
<td>10</td>
<td>279</td>
</tr>
<tr>
<td>5-Year Directors Award</td>
<td>Awarded to plants that maintain Directors Award status for five years by submitting a staff-reviewed annual update report and data</td>
<td>4</td>
<td>205</td>
</tr>
<tr>
<td>10-Year Directors Award</td>
<td>Awarded to plants that maintain Directors Award status for 10 years by submitting a staff-reviewed annual update report and data</td>
<td>6</td>
<td>164</td>
</tr>
<tr>
<td>15-Year Directors Award</td>
<td>Awarded to plants that maintain Directors Award status for 15 years by submitting a staff-reviewed annual update report and data</td>
<td>27</td>
<td>104</td>
</tr>
<tr>
<td>Presidents Award</td>
<td>Awarded to plants that optimize operations to achieve Phase IV individual filter effluent turbidity optimization goals and are committed to working toward the Excellence Award level using a team-based approach</td>
<td>9</td>
<td>38</td>
</tr>
<tr>
<td>Excellence in Water Treatment Award</td>
<td>Awarded to plants that submit a report demonstrating full optimization has been achieved with regards to water quality goals and the resolution of all performance limiting factors identified in the self-assessment. Report is reviewed by utility peers (PEAC).</td>
<td>1</td>
<td>16</td>
</tr>
<tr>
<td>5-Year Excellence Award</td>
<td>Awarded to plants that maintain Excellence Award level performance for five years and submit staff-reviewed annual data and narrative reports</td>
<td>3</td>
<td>9</td>
</tr>
<tr>
<td>10-Year Excellence Award</td>
<td>Awarded to plants that maintain Excellence Award level performance for 10 years and submit staff-reviewed annual data and narrative reports</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>15-Year Excellence Award</td>
<td>Awarded to plants that maintain Excellence Award level performance for 15 years and submit staff-reviewed annual data and narrative reports</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
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data and narrative reports – awarded for the first time in 2014.

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<thead>
<tr>
<th>Distribution Program</th>
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<tbody>
<tr>
<td>Directors Award</td>
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<td></td>
</tr>
<tr>
<td>Presidents Award</td>
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Figure 7 – East Bay Municipal Utility District (California) receives the 10-Year Excellence in Water Treatment Award, for the Orinda Water Treatment Plant, at ACE16. From left are David LaFrance (AWWA CEO), Rick Sakaji (East Bay Municipal Utility District), and Gene Koontz (AWWA Past-President)

All award-winning utilities are commended for their outstanding performance and tenacity for continuous improvement – many have maintained this standard for an extended period. Plants and distribution systems receiving program longevity awards must remain in compliance with all applicable health-based regulations as well as submit annual data and describe progress made towards optimization in annual narrative report submissions. After repeated years of continuous improvement efforts, many of these utilities have made significant progress towards improving and optimizing treatment plant and distribution system performance.
A graphical illustration of the progress of active plants through the Partnership’s treatment program award levels is displayed in Figure 8. This figure displays the total number of currently active plants to achieve each of the program’s phases. Active plants consist of subscribers that pay annual dues and submit annual data reports, as required by their specific program phase. Refer to page 19 for a more detailed description of each program phase. Program retention is greatest for plants that complete the self-assessment process and achieve Phase III Directors Award status. Phase IV is a voluntary phase of the program, with stringent performance standards, representing fully optimized performance. The majority of plants that commit to participating in the program eventually complete the self-assessment process. There is no time requirement associated with completion of the self-assessment.

Figure 8 – Plant Achievements in Partnership for Safe Water History as of December 2016 (Active Plants)

In the distribution system optimization program, 19 utilities have achieved Phase III Directors Award status. At the current time, guidelines for the Presidents Award for Distribution System Operation have been released and Phase IV Excellence in Distribution System Operation Award requirements are under development. As of the time of this report’s preparation, approximately 45% of distribution system program subscribers have progressed to Phase II by submitting baseline disinfectant residual data, while most subscribers remain in Phase I. This is likely to change in future years as a growing number of utilities submit baseline data and distribution system self-assessment reports.
**Partnership Results**

Treatment Program – Combined Filter Effluent Turbidity Results

Water treatment plants that are participating in the *Partnership* submit combined filter effluent turbidity results annually. Data are submitted by plants of varying process configurations. Combined filter effluent turbidity results are entered into the *Partnership* data collection software. The software calculates statistics for the evaluation of plant performance and presents the information in tabular and graphical formats. The calculated monthly 95th percentile values and the monthly maximum values are charted and a frequency distribution plot is constructed using these values.

The annual report data received from all *Partnership* participants (more than 550,000 individual data points are used in this analysis) were analyzed by developing frequency distributions of the monthly 95th percentile turbidity data and the monthly maximum turbidity data. The frequency distribution may be interpreted to represent the percent of monthly turbidity values (either 95th percentile or maximum value) that are less than or equal to a given value. Figure 9 shows the frequency distribution of the annual report data from all participating treatment plants, regardless of phase achieved, for the most recent reporting period (6/1/15 - 5/31/16).

![Figure 9 – Frequency Distribution of Monthly 95th Percentile and Maximum Turbidity Values (6/1/2015 – 5/31/2016)](image)
From these data, many comparisons are possible. Utilities are encouraged to examine the frequency distribution from their annual report submittal and compare it to the one displayed in Figure 9, which represents all data submitted by Partnership treatment plants at all levels of the program. The graph displayed in Figure 9 yields some interesting information:

- Over 99.9% of monthly 95th percentile turbidity values reported by utility subscribers were less than 0.30 NTU.
- Over 99.7% of monthly 95th percentile turbidity values reported by utility subscribers were less than 0.20 NTU.
- Of all 95th percentile monthly turbidity values, 91.7% were less than or equal to 0.10 NTU.
- A total of 98.8% of monthly maximum turbidity values were less than 0.30 NTU.

Note that the y-axis of the graph in Figure 9 was truncated at a value of 0.5 NTU for clarity and to provide additional detail at lower turbidity levels. A total of 16 individual maximum turbidity values (0.4% of all maximum turbidity values) reported were greater than 0.5 NTU. All of the above statistics represent overall improvement over 2015 annual program performance.

The USEPA Surface Water Treatment Rule (SWTR) provides specific requirements for filtered water turbidity. The SWTR requires that surface water treatment systems, or systems treating groundwater under the direct influence of surface water (GWUDI), that use conventional and direct filtration not exceed a combined filter effluent turbidity of 1 NTU at any time. The rule also states that combined filter effluent turbidity values must be less than 0.3 NTU for at least 95 percent of samples in any month. The majority of Partnership utility subscribers employ conventional or direct filtration techniques, so the turbidity data submitted may be compared with USEPA regulatory requirements. These data demonstrate that Partnership treatment program utility subscribers produce water with a lower combined filter effluent turbidity than is required by the USEPA Surface Water Treatment Rule. Similar turbidity regulations have been established by Health Canada and specific provinces for Canadian utilities.

It is a Partnership requirement that treatment plants considered to be in good standing, regardless of their phase of program participation, must maintain compliance with all applicable health-based drinking water regulatory requirements, including the USEPA Surface Water Treatment Rule turbidity requirements. It is expected that plants located internationally will comply with all applicable health-based local and federal regulatory requirements.

“Our goal is always to improve and look for better ways to accomplish our mission of producing a safe, reliable water source for our customers – and we will continue to do so.”

2016 Annual Report Excerpt
Directors Award Finished Water Turbidity Results

Since the inception of the *Partnership* program, a total of 279 plants have completed a self-assessment and achieved the Directors Award level of recognition in the treatment plant optimization program. An additional 19 utilities have received Directors Award recognition in the distribution system optimization program. Figure 10 illustrates the number of award submittals and achievements in the 2016 calendar year for both programs. The peer-review process can take several weeks, and may carry over into the next year for submittals received late in the year. Therefore, the number of award applications received will not necessarily equal, and may exceed, the number of award achievements in each year.

The total number of award applications, including Phase III self-assessment completion reports, continues to increase over previous years, as a growing number of subscribers seek to increase their engagement in the *Partnership for Safe Water* program and work towards demonstrated optimization. The self-assessment process, for both programs, represents a highly beneficial and system-specific learning and improvement opportunity for utility staff. The Presidents Award for Water Treatment remains the program’s most rapidly growing award category.

An increase in the number of trained PEAC volunteers and review team leaders, over the past several years, has helped to support the increase in report submissions that has occurred over the past several years. The *Partnership* currently benefits from the talents of nearly 60 trained utility optimization experts. Several 2016 submittals remain under review at the time of preparation of this report.

![Figure 10 – 2016 Partnership Award Summary](image-url)
Phase III plants have completed a self-assessment and strive to continuously meet the *Partnership* performance goal of a combined filter effluent turbidity of less than 0.10 NTU, at least 95% of the time. Although a limited but increasing number of Phase III plants have achieved the Phase IV Excellence Award, many of these plants are working towards treatment optimization and achievement of the Phase IV numerical goals and Presidents Award recognition which are described in the following section.

The performance results from Directors Award plants reflect those of plants that have completed the self-assessment process. Figure 11 displays the frequency distribution for the monthly 95th percentile turbidity values for plants that have completed Phase III. The “baseline” data (plant performance prior to conducting the self-assessment) for Directors Award plants are compared with the most recent data submittals for these plants (6/1/2015 – 5/31/2016). A comparison of year to year results indicates that Phase III utilities are making steady progress in improving filter effluent turbidity.

This comparison shows that the 95th percentile CFE turbidity of Phase III treatment plants improved by nearly 60% following completion of the *Partnership* self-assessment. This is one way that the effectiveness of the program and its self-assessment process may be demonstrated.

![Graph showing frequency distribution of monthly 95th percentile turbidity values for plants achieving Directors Award status (6/1/2015 – 5/31/2016)](image)

*Figure 11 – Frequency Distribution of Monthly 95th Percentile Turbidity Values for Plants Achieving Directors Award Status (6/1/2015 – 5/31/2016)*

“The operations staff at the treatment plant took great pride in maintaining the *Partnership* turbidity goals up to the very last day of plant operation. All staff have been reassigned to another facility, so their commitment to the *Partnership* program and optimization of treatment processes will continue to benefit utility customers.”

*2016 Phase III Annual Report Excerpt (from a treatment plant since decommissioned)*
Beyond Phase III – Presidents and Excellence in Water Treatment
Turbidity Results

As of December 31, 2016 there are 16 treatment plants that have received the Phase IV Excellence in Water Treatment Award from the Partnership for Safe Water. This award signifies achievement of all Phase IV performance goals and successful demonstration that the treatment plant is fully optimized according to the award guidelines. Data from 15 of these plants are illustrated below, due to the timing of annual submissions received.

During 2016, 9 treatment plants also received the Presidents Award for Water Treatment, based on achieving Phase IV individual filter effluent turbidity performance criteria. The performance of Presidents Award treatment plants is also summarized in this annual report. The performance results from Presidents in Water Treatment Award-winning plants reflect those of plants that have achieved the Partnership’s numerical goals for individual filter effluent turbidity and are working to achieve full, demonstrated optimization, as represented by the Phase IV Excellence in Water Treatment Award requirements. Figure 12 displays the frequency distribution for the monthly 95th percentile turbidity values and monthly maximum turbidity values submitted by Presidents Award-winning plants for the reporting period (6/1/2015 - 5/31/2016).

Figure 12 – Frequency Distribution of Monthly Turbidity Values – Presidents Award for Water Treatment Plants (6/1/2015 – 5/31/2016)
The performance results from Excellence in Water Treatment Award-winning plants reflect those of plants that have completed the self-assessment process and then proceeded to reach full optimization. Figure 13 displays the frequency distribution for the monthly 95th percentile turbidity values and monthly maximum turbidity values for the reporting period (6/1/2015 - 5/31/2016).

When comparing data from Presidents and Excellence Award plants, it can be observed that both groups produce water with a comparable filter effluent turbidity that is significantly lower than the Partnership's optimization goals. Excellence Award plants produce water of a slightly lower 95th percentile CFE turbidity, on average, than Presidents Award plants (average of 0.042 NTU for Presidents Award plants versus 0.037 NTU for Excellence Award plants). The 95th percentile CFE turbidity data from Excellence Award plants also appears to demonstrate a higher level of consistency than that from Presidents Award plant (RSD of 36.2% for Presidents Award plants versus 31.8% for Excellence Award plants). These results are consistent with that reported in the Partnership’s 2016 Annual Data Summary Report, which was the first time an analysis of data submitted by Presidents Award recipients was performed.

Figure 14 includes a comparison of “baseline” data (plant performance prior to conducting the self-assessment) for Excellence in Water Treatment Award plants with the most recent turbidity data submitted (6/1/2015 – 5/31/2016). These data indicate that, based on 95th percentile turbidity values, plant performance improved more than 50% over the initial baseline turbidity results. This is even more impressive when it is considered that the 95th percentile baseline turbidity value for this group of plants...
was already <0.10 NTU. This evidence supports that the Phase IV process is an effective tool to further optimize and improve performance, even for well-performing treatment plants.

Figure 14 – Frequency Distribution of Monthly 95th Percentile Turbidity Values – Excellence in Water Treatment Award Plants (Current Year compared to Baseline Year)

“We are proud to have received the Partnership for Safe Water Excellence in Water Treatment Award. The employees have been showcased as the primary reason that we have been successful in keeping our award status. Our Water Plant Operators are licensed professionals and are proud to have the recognition that the Excellence in Water Treatment Award brings. We have also informed our electricians, laborers, and machinists that this award is the direct reflection of the outstanding work that they do. We are all excited and humbled to be one of the best run facilities in the industry.”

2016 Phase IV Annual Report Excerpt
In the process of achieving optimization, Phase IV utilities strive to meet stringent performance goals. These goals include:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Phase IV Optimization Goal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individual Filter Effluent Turbidity</td>
<td>&lt;0.10 NTU, at least 95% of the time, with a maximum individual filter effluent turbidity goal of ≤0.30 NTU</td>
</tr>
<tr>
<td>Individual Sedimentation Basin Turbidity</td>
<td>&lt;1.0 NTU for raw water turbidity averaging ≤10 NTU, &lt;2.0 NTU for raw water turbidity averaging &gt;10 NTU <em>(does not apply to direct filtration or precipitative softening plants)</em></td>
</tr>
<tr>
<td>Filter Backwash Recovery Time</td>
<td>Goal of less than 15 minutes at or above 0.10 NTU following a filter backwash <em>(for plants without filter to waste capabilities)</em></td>
</tr>
</tbody>
</table>

Phase IV plants, like all *Partnership* utility subscribers, are expected to remain in compliance with all applicable health-based drinking water regulations to maintain good standing as a Phase IV plant as well as to justify their continued recognition at this level.

The 16 Phase IV Excellence in Water Treatment Award winning plants represent a wide range of utilities. These utilities serve populations ranging in size from 20,000 to approximately 1.5 million. *Four of the 16 Excellence in Water Treatment Award winners serve a population of less than 100,000. Eight of the 38 Presidents Award winning utilities serve a population of 100,000 or less, and some Presidents Award recipients have water treatment plants with peak flows of less than 2 MGD.* This demonstrates that treatment optimization is not dependent on utility size. Achieving optimization, and its associated improvements in water quality, can be a realistic goal for utilities of all sizes. Smaller utilities with a commitment to achieving optimization have demonstrated success through the *Partnership* program. Additionally, both conventional and direct filtration plant configurations are among the Excellence in Water Treatment award winners, demonstrating that the achievement of treatment optimization is independent of the specific treatment process that is applied at the plant.

“It is well understood that the work we do on a daily basis has a direct impact on the health and safety of customers in the communities we serve as tap water personally affects each individual every day. We consider this an enormous responsibility that cannot be taken lightly. We are considered a leader in water treatment locally, regionally, and nationally, and derive a great sense of pride in our commitment to customers, water quality, and the drinking water industry.”

*2016 Phase IV Annual Report Excerpt*
Distribution Program Data Summary

The first preliminary data summary report for the distribution system optimization program was published in 2013. This report marks the fifth year that results from this program have been compiled. During the 2015-2016 reporting period, a total of 52 utilities submitted annual data for the distribution system program, which is a slight increase from the number of annual data submissions in the previous reporting period. These utilities were evenly split between the use of free chlorine and total chlorine as a distribution system disinfectant. Note that this continues to represent a very limited number of utilities and caution should be used when interpreting results. Although a limited amount of data was received, some general observations could be made regarding disinfectant residual and DBP performance. Annual data continues to be collected from distribution system program subscribers to continue to build the database, allowing the program’s impact to be better quantified in the future. The Partnership continues to have a goal of 100% utility participation in the annual reporting process.

Free Chlorine
A frequency distribution of monthly entry point average free chlorine concentrations is presented in Figure 15.

![Figure 15 – Frequency Distribution of Monthly Entry Point Average Free Chlorine Concentrations (6/1/2015 – 5/31/2016)](image)

Based on these data, the monthly average entry point free chlorine concentration submitted by utility subscribers maintaining a free chlorine residual in their distribution systems was 1.36 mg/L, with a standard deviation of 0.42 mg/L. The monthly minimum distribution system sample concentrations...
ranged from non-detectable (ND) to 1.19 mg/L. The average minimum distribution system free chlorine residual concentration was 0.36 mg/L. The free chlorine results are comparable with those of the previous year’s annual report.

For systems maintaining a free chlorine residual in the distribution system, the percentage of all reported samples not meeting the Partnership’s minimum concentration goal of ≥0.20 mg/L or maximum concentration goal of ≤ 4.0 mg/L was 9.2%. This means that of the 46,701 free chlorine sample data points compiled by utility subscribers, approximately 4,281 individual free chlorine samples did not meet the Partnership’s optimization goals for free chlorine. This is an increase from previous years, most likely due to increased reporting by new Phase II systems. None of the entry point average data points exceeded the Partnership’s maximum concentration goal and EPA MRDL of 4.0 mg/L (as Cl₂). Utilities also report the optimization rating of distribution system sample site locations on a scale of 1-5, based on the utilization of optimized sampling locations as defined in the program’s self-assessment guidance. The average disinfectant residual sample collection site optimization ranking for free chlorine systems was 3.0.

Total Chlorine
A frequency distribution of monthly entry point average total chlorine concentrations is presented in Figure 16.

Based on these data, the monthly average entry point total chlorine residual concentration submitted by utility subscribers that maintain a total chlorine residual in the distribution system was 2.52 mg/L, with a standard deviation of 0.88 mg/L. The monthly minimum distribution system sample concentrations

![Figure 16 - Frequency Distribution of Monthly Entry Point Average Total Chlorine Concentrations (6/1/2015 – 5/31/2016)](image-url)
reported ranged from ND to 2.54 mg/L. The average minimum total chlorine concentration was 0.91 mg/L. Approximately 3.2% of entry point average monthly total chlorine residual concentrations reported were higher than the Partnership maximum goal and EPA MRDL of 4.0 mg/L (as Cl₂). The total chlorine results are comparable with those of the previous year’s annual report.

For total chlorine systems, the annual average percentage of all reported samples not meeting the Partnership’s target concentration goals was 2.97%. This means that of the 71,238 individual total chlorine sample data points compiled by participating utilities, approximately 2,118 total chlorine samples did not meet the Partnership’s target total chlorine concentration range of ≥0.50 mg/L and ≤4.0 mg/L. The average disinfectant residual sample collection site optimization ranking for total chlorine systems was 3.6.

Disinfection By-Products (DBPs)
Partnership distribution system program utility subscribers also submit disinfection by-product data for TTHM and HAA5. Although the majority of utilities submitted quarterly DBP data, the Partnership’s data collection software allows for the entry of the maximum TTHM and HAA5 value on any given day and compiles the information into a monthly maximum value, which is reported to the Partnership. The data included in this report are an aggregation of these monthly maximum values. LRAA data is not currently submitted by utilities nor included in the following summaries, although it is typically considered in the distribution system self-assessment process.

The Partnership’s optimization criteria for disinfection by-product concentrations are based on test results used to satisfy current local regulatory requirements. Since the majority of utilities reporting data during the 2015-2016 reporting period are from the US, the current USEPA MCLs for TTHM and HAA5 under the Stage 2 D/DBP Rule are as follows:

- TTHM – MCL of 80 µg/L
- HAA5 – MCL of 60 µg/L

Both MCLs are calculated as locational running annual averages (LRAA). Additional information pertaining to EPA DBP regulations can be obtained from the EPA website. Note that DBP regulations vary across the geographical locations of utility subscribers and that samples reported to the Partnership for Safe Water for DBPs may exceed the frequency and number of samples locations required for regulatory reporting.

A summary of the average monthly maximum DBP data submitted, separated by disinfectant type, is displayed in Figure 17.
The average monthly maximum TTHM concentration for utilities using maintaining a free chlorine residual in the distribution system was 55.3 µg/L, while this value was 36.9 µg/L for utilities using total chlorine as a residual distribution system disinfectant. For HAA5, the average monthly maximum concentration was 31.9 µg/L for utilities using free chlorine and 27.5 µg/L for utilities using total chlorine as a residual disinfectant.

Frequency distributions of DBP data are displayed in Figures 18 and 19. Utilities may wish to compare their DBP results with those of other distribution program subscribers. The data includes DBP concentrations submitted by both groundwater and surface water systems.
The average of the monthly maximum TTHM concentrations submitted by free chlorine systems was 55.3 µg/L, with a standard deviation of 33.9 µg/L. The average of the monthly maximum HAA5 concentrations submitted by free chlorine systems was 31.9 µg/L, with a standard deviation of 21.3 µg/L. The range of monthly maximum TTHM concentrations submitted by free chlorine systems was 2.9 µg/L to 190 µg/L, and the range of monthly maximum HAA5 concentrations was 2 µg/L to 93.8 µg/L. Note that the datasets contain data from water utilities located outside the United States, with varying regulatory requirements for disinfection by-products and that samples for Partnership reporting may have been collected at frequencies and locations that exceed regulatory requirements.
The average of the monthly maximum TTHM concentrations submitted by total chlorine systems was 36.9 µg/L, with a standard deviation of 23.0 µg/L. The average of the monthly maximum HAA5 concentrations submitted by free chlorine systems was 27.5 µg/L, with a standard deviation of 25.9 µg/L. The range of monthly maximum TTHM concentrations submitted by total chlorine systems was 1.1 µg/L to 101 µg/L, and the range of monthly maximum HAA5 concentrations was 1.4 µg/L to 183 µg/L. Note that the y-axis of the above graph has been truncated to 120 µg/L to improve clarity in the lower range of concentrations. There were two HAA5 data points greater than 120 µg/L.

**Pressure**

While not a component of the Phase II baseline data submission, pressure data are evaluated as part of the distribution system self-assessment process. These data are submitted, on an annual basis, by distribution systems that have achieved Phase III status in the distribution system optimization program. The optimization goals for pressure are described below:

- Maintaining a minimum pressure of 20 psi in 99.5% of measurements
- Maximum pressure does not exceed utility specified maximum in 95% of measurements
- Pressure fluctuations do not exceed utility specified maximum in 95% of measurements

Optimized systems monitor pressure at the high and low pressure locations within each pressure zone, using properly maintained and calibrated pressure monitoring equipment. This annual report marks the
first year that pressure data has been summarized by the Partnership for Safe Water. A summary of pressure data is anticipated to be included as a standard component of the Annual Data Summary Report in future years.

Utilities that reported data for the 2015-2016 data reporting period had an average of 3.4 pressure zones. These utilities reported the use of an average of 6.6 pressure sensors in the system, with the number of pressure sensors ranging from 1 to 20. Systems reported an average pressure monitoring site optimization ranking of 3.4, on a scale of 1 to 5.

A frequency distribution of the monthly summary of average daily system minimum pressure values reported by systems is displayed in Figure 20.

![Figure 20 – Frequency Distribution of Average Daily System Minimum Pressure (6/1/2015 – 5/31/2016)](image)

An average of 5.9% of the reported daily minimum pressure values were less than the goal of 20 psi. A frequency distribution of the monthly average daily system minimum pressures is displayed in Figure 20. The average daily minimum pressures reported ranged from 18.3 psi to 76.5 psi, with an average of 41.7 psi. A total of 26.9% of average daily pressure maximum measurements exceeded the individual utility set goals for this parameter. Average daily pressure maximum readings ranged from 54.1 psi to 241 psi, with an average of 109 psi. A total of 3.5% of daily pressure measurements did not meet the utility set goal for maximum single site pressure fluctuation range. Reported maximum single site pressure fluctuations ranged from 1.4 psi to 43.2 psi, with an average of 14.3 psi. This data should be considered preliminary and will be updated to include a greater number of distribution systems in future years.
Main Breaks
Main breaks are used as the Partnership for Safe Water’s indicator of the physical integrity of the distribution system. The optimization goal for main breaks is no more than 15 reported breaks or leaks per 100 miles of utility owned distribution or transmission pipeline per year. This number does not include breaks or leaks identified through a utility’s leak detection program, which is considered a component of an optimized system. A five-year declining main break frequency trend indicates progress being made toward achieving optimization. Main break data is a component of the Phase III reporting process and is not required for a utility’s baseline data submission. At minimum, utilities report the number of reported breaks and leaks and the total miles of utility-controlled distribution system pipeline on an annual basis.

The table below displays a summary of main break data for the 2016 reporting compared with historical data submitted by systems. Note that historical data, in some cases, reaches back to 1988 and is not included for all systems that have submitted data for the 2016 reporting period.

<table>
<thead>
<tr>
<th>Reporting Period</th>
<th>Reported Breaks (Number/100 miles of pipe/year)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AVG</td>
</tr>
<tr>
<td>2016</td>
<td>11.0</td>
</tr>
<tr>
<td>All Years (1988-2016)</td>
<td>17.7</td>
</tr>
</tbody>
</table>

With respect to main break data, note that very small distribution systems, in terms of linear miles of pipe, can disproportionately impact maximum reported main break and leak values. Distribution systems reporting main break data in 2016, on average, met the Partnership’s optimization goal of 15 reported breaks and leak per 100 miles of utility controlled pipeline, with an average of 11 main breaks reported. The number of annual main breaks reported for the 2016 reporting period ranged from a minimum of 1.1 to a maximum of 66.2 per 100 miles of utility controlled pipeline. This represents an improvement from data averaged over the entire reporting period, running from 1988 through 2016. Note that this data is preliminary and represents the first year that distribution system main break data has been reported by the Partnership. A more comprehensive analysis will be presented in future years.

Caution should be used when evaluating the data from distribution system program subscribers that is included in this report. Data reports were submitted by a total of 52 utilities during 2016, and the data should continue to be considered preliminary. The Partnership continues to collect annual data from both treatment and distribution system program subscribers to continue to quantify the long-term impact of the Partnership’s optimization programs.

“The utility is fully committed to the Partnership’s Distribution System Optimization Program with involvement at all levels of the organization…. the utility continues to identify areas that may require further improvements in achieving the ultimate level of distribution system optimization in order to deliver the highest quality water to its customers. Our resolve to strive for improvement is based not only on our participation in the Partnership, but also on our commitment to safeguarding public health.”

2016 Distribution System Annual Report Excerpt
**Partnership Roadmap – 2017**

Key elements of the *Partnership’s* 2017 goals are outlined below. The *Partnership for Safe Water* strategic plan, finalized and distributed in 2014, will serve to direct future program operations.

<table>
<thead>
<tr>
<th>Partnership for Safe Water: Overall Program Elements</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Subscriber growth for both programs</td>
</tr>
<tr>
<td>• Increase utility outreach and marketing efforts</td>
</tr>
<tr>
<td>• Continue collaboration with AWWA Sections, utilities, and Partner organizations</td>
</tr>
<tr>
<td>• International growth</td>
</tr>
<tr>
<td>• Implementation of the <em>Partnership</em> strategic plan</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Distribution Program</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Continue to develop and refine program guidance, tools, and software</td>
</tr>
<tr>
<td>• Develop, release, and pilot Excellence Award level guidelines</td>
</tr>
<tr>
<td>• Recruit and provide training for additional PEAC volunteers</td>
</tr>
<tr>
<td>• Increase outreach to grow membership, increase engagement, and encourage data submission.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Treatment Program</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Continue to provide resources and tools to utility subscribers</td>
</tr>
<tr>
<td>• Increase outreach to encourage subscriber growth and increase engagement</td>
</tr>
<tr>
<td>• Engage groundwater treatment plants in the program</td>
</tr>
<tr>
<td>• Recruit and provide training for PEAC volunteers</td>
</tr>
</tbody>
</table>
Partnership Budget – 2016

Operation of the Partnership for Safe Water is supported by utility subscriber fees. Utilities pay a subscription fee based on population served. Subscriber fees cost utility customers, on average, less than one penny per year for the benefits of the Partnership program. The chart below provides a breakdown of the areas supported by subscriber fees during 2016. The total Partnership program budget for 2016 was approximately $400K. The most significant program expenses are those associated with AWWA’s dedicated program staff, as well as indirect expenses, allocated to AWWA for services provided in accordance with the Partnership for Safe Water’s operating Charter.

The Partnership for Safe Water is a program that is operated primarily by volunteers who contribute their time and expertise to the program. The six Partnership organizations all provide support to help keep the program affordable and increase the value to participants. The total value of the time and in-kind support provided by Partnership volunteers and Partner organizations is estimated at nearly $150,000 annually. This provides value to subscribers and allows program subscription fees to remain affordable, averaging less than one penny per year to the average customer of a utility subscriber.

Partnership volunteers contribute significantly to the program’s success. The members of the Steering Committee, the Program Coordinating Committee, the PEAC-T, the PEAC-D, the distribution system and treatment plant self-assessment guidance handbook development teams, and other volunteers dedicate their talent and many hours of their time to make the Partnership for Safe Water a successful and affordable program. The Partnership is fortunate to benefit from the expertise and generosity of nearly 60 volunteer that choose to contribute to the program. Partnership staff and the six Partnership organizations thank the volunteers and their employers for their many hours of dedicated service.

Partnership for Safe Water
2016 PEAC Distribution System Training attendees and instructors pictured at Citizen Energy Group’s White River Water Treatment Plant.
**Partnership Resources**

The *Partnership* implements several program features designed to enhance the benefits of treatment or distribution Program membership to utility subscribers. Resources available to program subscribers include the following and are limited only by the creativity of subscribers!

<table>
<thead>
<tr>
<th><strong>Partnership Resources for Subscriber Utilities and Award Winners</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Award recognition at the AWWA Annual Conference and local venues – including 5, 10, and 15-year longevity awards</td>
</tr>
<tr>
<td>Customized press releases for award winning plants and distribution systems</td>
</tr>
<tr>
<td>A communications kit for award winning utilities</td>
</tr>
<tr>
<td>Press releases to local media by AWWA</td>
</tr>
<tr>
<td>Press releases to social media, upon utility request</td>
</tr>
<tr>
<td>Electronic <em>Partnership</em> logos (Official logo items available for purchase)</td>
</tr>
<tr>
<td>Annual data summary report to compare plant and distribution system performance with aggregate data trends of program subscribers</td>
</tr>
<tr>
<td><em>Partnership for Safe Water</em> data collection software</td>
</tr>
<tr>
<td>Articles in AWWA publications to raise program visibility and provide recognition</td>
</tr>
<tr>
<td>Ads and articles in water publications to recognize award-winning utilities</td>
</tr>
<tr>
<td>Recognition for award-winning utilities in AWWA section publications and at section conferences</td>
</tr>
<tr>
<td>Presentations and outreach at water utility conferences</td>
</tr>
<tr>
<td>Network of <em>Partnership</em> volunteers and support</td>
</tr>
<tr>
<td>Volunteer opportunities to support the <em>Partnership</em> while gaining experience, knowledge, and access to a network of water utility professionals</td>
</tr>
<tr>
<td>Resources to assist with data collection, starting and accomplishing the self-assessment process and self-assessment report completion</td>
</tr>
<tr>
<td>Utility subscriber Case Studies and Technical Tips published regularly</td>
</tr>
<tr>
<td>Informative quarterly newsletter and newly improved website</td>
</tr>
<tr>
<td>Notices of awards to local and state elected officials, upon request</td>
</tr>
</tbody>
</table>

Partnership for Safe Water 42
In Closing – *Partnership* is:

**Effective:**
The *Partnership for Safe Water* program has been effective for more than twenty years in improving water quality for over 100 million people served by utilities participating in the program. This represents over 40% of the US population served by surface water. Data submitted by participating utilities provides undeniable evidence that the program results in measurable treatment plant performance improvement. This improvement in water quality has a direct association with decreased risk from exposure to pathogenic microorganisms.

**Proven:**
As evidenced by the data in this report, the program has proven effective for all size utilities. Utilities serving less than 100,000 customers comprise approximately 50% of utility subscribers for both the treatment plant and distribution system optimization programs. The results from all utilities consistently reflect that as the participants progress through the program, treatment plant performance improves. Four of the 16 Phase IV Excellence in Water Treatment Award-winning utilities and eight of the 38 Presidents Award-winning treatment plants serve a population of less than 100,000.

**Real:**
Utilities participating in the program cite major benefits including systematically improving water quality, enhancing operations staff responsibility, improving teamwork, and providing a customer communication tool. The program is highly cost-effective. *Partnership* utility subscriber fees cost customers less than one penny per year for a quantifiable improvement in their water quality. The *Partnership for Safe Water* continues to demonstrate the value of a voluntary program that produces measurable water quality improvement.

*Partner with us*

For more information about the *Partnership for Safe Water* program, or to subscribe, visit [www.awwa.org/partnership](http://www.awwa.org/partnership) or contact *Partnership* staff at [partnership@awwa.org](mailto:partnership@awwa.org) or by calling 303-347-6169.
The Partnership celebrates the following award-winning utilities for their long-term commitment to optimization and the delivery of superior quality drinking water to customers.

### 2016 Partnership Award Winners (Awards Presented CY 2016)

#### PHASE IV EXCELLENCE in Water Treatment Awards

<table>
<thead>
<tr>
<th>10-Year Excellence Award</th>
<th>5-Year Excellence Award</th>
<th>Excellence in Water Treatment Award</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>California</strong></td>
<td><strong>Kentucky</strong></td>
<td><strong>Colorado</strong></td>
</tr>
<tr>
<td>East Bay Municipal Utilities District</td>
<td>Louisville Water Company</td>
<td>Aurora Water</td>
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<td>Orinda Water Treatment Plant</td>
<td>B.E. Payne Water Treatment Plant</td>
<td>Binney Water Purification Facility</td>
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<td>South Carolina</td>
<td>Orange Water &amp; Sewer Authority</td>
<td>North Carolina</td>
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<tr>
<td>Greenwood Commissioners of Public Works</td>
<td>Jones Ferry Road Water Treatment Plant</td>
<td>Kentucky</td>
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<tr>
<td>W.R. Wise Water Treatment Plant</td>
<td>Carlisle Borough Municipal Authority</td>
<td>North Carolina</td>
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#### PRESIDENTS AWARD for Water Treatment

<table>
<thead>
<tr>
<th>Alabama</th>
<th>California</th>
<th>Colorado</th>
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<tbody>
<tr>
<td>Water Works Board of the City of Birmingham</td>
<td>Metropolitan Water District of Southern California</td>
<td>Fort Collins Utilities</td>
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<tr>
<td>H.Y. Carson Filter Plant</td>
<td>Robert B. Diemer Filtration Plant</td>
<td>Fort Collins Water Treatment Plant</td>
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<tr>
<td>Putnam Filter Plant</td>
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<td>Nevada</td>
<td>Pennsylvania</td>
<td>South Carolina</td>
</tr>
<tr>
<td>Southern Nevada Water Authority</td>
<td>Aqua Pennsylvania</td>
<td>Charleston Water System</td>
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<tr>
<td>Alfred Merritt Smith Water Treatment Facility</td>
<td>Roaring Creek Water Filtration Plant</td>
<td>Pennsylvania</td>
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<td>River Mountains Water Treatment Facility</td>
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<tr>
<td>Texas</td>
<td>Texas</td>
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<tr>
<td>Austin Water Utility</td>
<td>Austin Water Utility</td>
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<tr>
<td>Albert H. Ullrich Water Treatment Plant</td>
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</tbody>
</table>
15-Year Directors Award - Treatment Program

- California
  - East Bay Municipal Utility District
  - Lafayette Water Treatment Plant
  - Upper San Leandro Water Treatment Plant
  - Walnut Creek Water Treatment Plant
  - Modesto Irrigation District
  - Modesto Regional Water Treatment Plant
- Illinois
  - Illinois American Water
    - Illinois River Water Treatment Plant
    - (Peoria District Water Treatment Plant)
- Indiana
  - Indiana American Water
    - Muncie-White River Water Treatment Plant

- Iowa
  - Iowa American Water
    - East River Station Water Treatment Plant
  - New Jersey
    - Middlesex Water Company
      - C.J. Olsen Water Treatment Plant
    - New Jersey American Water
      - Jumping Brook Water Treatment Plant
  - North Carolina
    - Fayetteville Public Works Commission
      - Glenville Lake Water Treatment Facility
      - P.O. Hoffer Water Treatment Facility
  - Oregon
    - City of the Dalles
      - Wicks Water Treatment Plant

10-Year Directors Award - Treatment Program

- Alabama
  - Water Works Board of the City of Birmingham
    - H.Y. Carson Filter Plant
- Colorado
  - Aurora Water
    - Griswold Water Treatment Plant
    - Wemlinger Water Treatment Plant
- Michigan
  - Great Lakes Water Authority
    - Lake Huron Plant
    - Northeast Plant
    - Southwest Water Treatment Plant

5-Year Directors Award - Treatment Program

- Georgia
  - Atlanta-Fulton County Water Resource Commission
    - Atlanta-Fulton County Water Treatment Plant
- Pennsylvania
  - Aqua Pennsylvania
    - Roaring Creek Division Filtration Plant
  - Pennsylvania American Water
    - Stony Garden Water Treatment Plant
      - (Blue Mountain System)
  - Western Berks Water Authority
    - Western Berks Water Treatment Plant

Directors Award - Treatment Program

- California
  - Long Beach Water Department
    - Long Beach Water Department Groundwater Treatment Plant
- Colorado
  - City of Grand Junction
    - City of Grand Junction Water Treatment Plant
- Georgia
  - City of Thomaston
    - City of Thomaston Water Treatment Plant
- Iowa
  - Marshalltown Water Works
    - Marshalltown Water Works Water Treatment Plant
- Kansas
  - WaterOne – Water District No. 1 of Johnson County
    - Hansen Water Treatment Plant
    - Wolcott Water Treatment Plant
- New York
  - Monroe County Water Authority
    - Webster Water Treatment Plant
- Ohio
  - Lake County Department of Utilities
    - Aquarius (West) Water Treatment Plant
    - Bacon Road (East) Water Treatment Plant
- Pennsylvania
  - Kittanning Suburban Joint Water Authority
    - Tarrtown Water Treatment Plant

Directors Award - Distribution Program

- Iowa
  - Marshalltown Water Works
- New Mexico
  - Albuquerque Bernalillo County Water Utility Authority
- Texas
  - San Jacinto River Authority – The Woodlands Division
### All Time Partnership Award Winners (as of December 31, 2016)

The following utilities and plants have been recognized for their optimization efforts since the inception of the Partnership in 1997. Organizations listed at their highest recognition level.

#### 15-Year Excellence in Water Treatment Award (Phase IV)
- **Vermont**
  - Champlain Water District
  - Peter L. Jacob Water Treatment Facility

#### 10-Year Excellence in Water Treatment Award (Phase IV)
- **California**
  - East Bay Municipal Utility District
  - Orinda WTP
- **Illinois**
  - Central Lake County Joint Action Water Agency
  - Paul M. Neal Water Treatment Facility
- **South Carolina**
  - Greenwood Commissioners of Public Works
  - W. R. Wise WTP
- **Utah**
  - Central Utah Water Conservancy District
  - Don A. Christiansen Water Treatment Plant

#### 5-Year Excellence in Water Treatment Award (Phase IV)
- **Colorado**
  - Aurora Water
  - Wemlinger WTP
- **Kentucky**
  - Louisville Water Company
  - B.E. Payne WTP
- **North Carolina**
  - Orange Water & Sewer Authority
  - Jones Ferry Road WTP
- **Pennsylvania**
  - Carlisle Borough MA
  - Carlisle WTP

#### Excellence in Water Treatment Award (Phase IV)
- **Alabama**
  - WW Board of the City of Birmingham
  - Western Filter Plant
- **Colorado**
  - Aurora Water
  - Griswold WTP
  - Peter D. Binney WPF
- **Kentucky**
  - Louisville Water Company
  - Crescent Hill WTP
- **Ohio**
  - Cleveland Division of Water
  - Crown WTP
- **Pennsylvania**
  - Chester Water Auth.
  - Octoraro WTP

#### Presidents Award for Water Treatment
- **Alabama**
  - Water Works Board of the City of Birmingham
  - H.Y. Carson Filter Plant
  - Putnam Filter Plant
- **California**
  - City of Fairfield
  - North Bay Regional Water Treatment Plant
  - City of San Diego
  - Miramar WTP
  - Metropolitan Water District of Southern California
  - Joseph Jensen Water Treatment Plant
  - Robert B. Diemer Filtration Plant
  - Weymouth Filtration Plant
  - Modesto Irrigation District
  - Modesto Regional Water Treatment Plant
- **Colorado**
  - Fort Collins Utilities
  - Fort Collins Water Treatment Plant
- **Georgia**
  - Atlanta-Fulton County Water Resources Commission
  - Atlanta-Fulton County Water Treatment Plant
- **Illinois**
  - City of Aurora
  - City of Aurora Water Treatment Plant
  - Village of Wilmette
  - Wilmette Water Treatment Plant
- **Maryland**
  - Patuxent Water Treatment Plant
- **Minnesota**
  - St. Paul Regional Water Services
  - Mccarons Water Treatment Plant
- **Nevada**
  - Southern Nevada Water Authority
  - Alfred Merritt Smith WTP
  - River Mountains Water WTP
  - Truckee Meadows Water Authority
  - Chalk Bluff Water Treatment Plant
- **South Carolina**
  - Charleston Water System
  - Hanahan Water Treatment Plant
  - Greenville Water System
  - Adkins & Stovall Water Treatment Plants
  - Texas
  - Austin Water Utility
  - Albert H. Ullrich Water Treatment Plant
  - Wisconsin
  - Oak Creek Water & Sewer Utility
  - Oak Creek Water Treatment Plant
### PRESIDENTS Award - Distribution System Program

<table>
<thead>
<tr>
<th>California</th>
<th>California</th>
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<tbody>
<tr>
<td>Metropolitan Water District of Southern California</td>
<td>Long Beach Water Department</td>
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### Directors Award - Distribution System Program (Phase III)

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<th>Illinois</th>
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<tr>
<td>City of Tempe</td>
<td>Long Beach Water Department</td>
<td>Fort Collins Utilities</td>
<td>American Water Military Services</td>
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<td>Marshalltown Water Works</td>
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<td>Scott Air Force Base</td>
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<td>San Jose Water Company</td>
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<td>Iowa</td>
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<td>Louisville Water Company</td>
<td>Albuquerque Bernalillo County Water</td>
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<td>Fort Leavenworth</td>
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<td>Utility Authority</td>
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<td>City of Rochester</td>
<td>Charlotte Mecklenburg Utilities</td>
<td>American Water Military Services</td>
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<td>American Water Military Services</td>
<td>Newport News Waterworks</td>
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<td>San Jacinto River Authority</td>
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<td>Woodlands Division</td>
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### 15-Year Directors Award – Treatment (Phase III)

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<td>Pennsylvania American Water</td>
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<td>Lafayette WTP</td>
<td>Aldrich Water Treatment Plant</td>
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<td>Orinda WTP</td>
<td>Bangor Water Treatment Plant</td>
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<td>Sobrante WTP</td>
<td>Brownell Water Treatment Plant</td>
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<td>Upper San Leandro WTP</td>
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<td>Walnut Creek WTP</td>
<td>Butler Water Treatment Plant</td>
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<td>Metropolitan Water District of Southern California</td>
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<td>Henry J. Mills Water Treatment Plant</td>
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<td>Joseph Jensen Water Treatment Plant</td>
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<td>Gerald C. Smith (Hershey) Water Treatment Plant</td>
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<td>Sunol Valley Water Treatment Plant</td>
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<td>Zone 7 Water Agency</td>
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<td>Philipsburg Water Treatment Plant</td>
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<td>Punsatwayn Filter Plant (Big Run)</td>
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<td>Watres Water Treatment Plant</td>
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<td>White Deer Creek Water Treatment Plant</td>
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<td>Philadelphia Water Department</td>
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<td>Baxter Water Treatment Plant</td>
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<td>Belmont Water Treatment Plant</td>
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<td>Queen Lane Water Treatment Plant</td>
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</table>
## 15-Year Directors Award – Treatment (Phase III) - continued

**Georgia**  
Columbus Water Works  
North Columbus Water Resource Facility

**Illinois**  
Illinois American Water  
Illinois River Water Treatment Plant (Peoria District)  
Pontiac Water Treatment Plant  
Streator Water Treatment Plant

**Indiana**  
Fort Wayne City Utilities  
Three Rivers Filtration Plant  
Indiana American Water  
Muncie-White River Water Treatment Plant

**Iowa**  
Iowa American Water  
East River Station WTP

**Kentucky**  
Louisville Water Company  
B.E. Payne Water Treatment Plant  
Crescent Hill Water Treatment Plant  
Kentucky American Water  
Kentucky River Station Water Treatment Plant  
Richmond Road Station Water Treatment Plant

**Ohio**  
Cleveland Division of Water  
Nottingham Water Treatment Plant

**Oregon**  
City of The Dalles  
Wicks Water Treatment Plant

**South Carolina**  
Georgetown County Water and Sewer Authority  
Waccamaw Neck Regional Water Treatment Plant  
Santee Cooper Regional Water Authority  
Lake Moultrie Water Treatment Plant  
Spartanburg Water  
R.B. Simms Water Treatment Plant

**Tennessee**  
Knoxville Utilities Board  
Mark B. Whitaker Water Treatment Plant  
Tennessee American Water  
Citicco Water Treatment Plant

**Texas**  
Austin Water Utility  
Albert R. Davis Water Treatment Plant  
Ullrich Water Treatment Plant  
City of Houston  
East Water Purification Plant  
East Water Purification Plant #3  
Dallas Water Utilities  
Bachman, East Side, & Elm Fork Water Treatment Plants

**Utah**  
Central Utah Water Conservancy District  
Ashley Valley Water Treatment Plant  
Don A. Christiansen Water Treatment Plant  
Duchesne Valley Water Treatment Plant  
Metro. Water District of Salt Lake & Sandy  
Little Cottonwood Water Treatment Plant  
Salt Lake City Public Utilities  
Big Cottonwood Water Treatment Plant  
City Creek Treatment Plant  
Parleys Water Treatment Facility

**Vermont**  
Burlington Public Works Division  
Francis J. O’Brien Water Treatment Facility  
Champlain Water District  
Peter L. Jacob Water Treatment Facility

**Virginia**  
Chesterfield County Utilities  
Addison-Evans Water Prod. & Lab

**Washington**  
City of Bellingham  
Whatcom Falls Water Treatment Plant  
City of Everett  
Everett Water Treatment Plant

**West Virginia**  
West Virginia American Water  
Huntington Water Treatment Plant

**Wisconsin**  
Oak Creek Water & Sewer Utility  
Oak Creek Water Treatment Plant
## 10-Year Directors Award – Treatment (Phase III)

**Alabama**
- Water Works Board of the City of Birmingham
- H.Y. Carson Filter Plant
- Putnam Filter Plant

**California**
- Contra Costa Water District
  - Bollman WTP
  - Randall-Bold WTP
- San Francisco Public Utilities Commission
  - Harry Tracy WTP
- Montezuma Water Co.
  - Montezuma WTP
- Ute Water Conservancy District
  - Ute WTP

**Colorado**
- Aurora Water
  - Griswold WTP
  - Wemlinger WTP
- City of Golden
  - City of Golden WTP

**Connecticut**
- Aquarion Water Co. of CT
  - Putnam WFP
  - Mianus Filter Plant

**Illinois**
- Central Lake County Joint Action Water Agency
  - Paul M. Neal WTP
- Illinois American Water
  - Alton District WTP
  - Cairo District WTP
  - East St. Louis WTP
  - Granite City WTP

**Indiana**
- Indiana American Water
  - Borman Park WTP
  - Kokomo (Wildcat) WTP
  - Middle Fork WTP
  - Ogden Dunes WTP
  - Richmond Main WTP

**Louisiana**
- City of Bossier City
  - Bossier Water Treatment Plant

**Michigan**
- Great Lakes Water Authority
  - Lake Huron Plant
  - Northeast Plant
  - Southwest Water Treatment Plant

**Missouri**
- City of St. Louis Department of Public Utilities
  - Chain of Rocks WTP
  - Howard Bend WTP
- Missouri American Water
  - Central WTP
  - Jefferson City WTP
  - Joplin Blendeville WTP
  - Meramec WTP
  - North WTP
  - South WTP

**New Hampshire**
- Manchester Water Works
  - Lake Massabesic WTP

**New Jersey**
- New Jersey American Water
  - Canal Road WTP
  - Swimming River WTP

**New York**
- City Rochester Water & Lighting Bureau
  - Hemlock Lake WFP

**North Carolina**
- Harnett County Department of Public Utilities
  - Harnett County Regional WTP
  - Orange Water & Sewer Authority
  - Jones Ferry Road WTP
- Town of Cary
  - Cary Apex WTP

**Ohio**
- Aqua Ohio Water Company
  - Marion District WTP
  - Tiffin WTP

**Pennsylvania**
- Blossburg Water Authority
  - Bellman Water Treatment Plant
- Brodhead Creek Regional Water Authority
  - Brodhead Creek Regional WTP
- Capital Region Water
  - Dr. Robert E. Young Water Services Center
  - Carlisle Borough Municipal Authority
  - Carlisle WTP
- Pennsylvania
  - Chester Water Authority
    - Octoraro WTP
    - Downington MWA
    - Vincent J. DiEuliss WTP
    - E. Greenville Boro Water Department
    - East Greenville WTP
    - Jersey Shore Area Joint Water Authority
    - Larrys Creek Filter Plant
    - North Penn/North Wales Water Authority
    - Forest Park WTP
    - Oakmont Water Authority
    - Hulton WTP
    - Schuylkill County Municipal Authority
    - Mount Laurel WTP
    - Shenandoah Municipal Water Authority
    - Shenandoah WTP
- South Carolina
  - Beaufort Jasper Water and Sewer Authority
    - Chelsea WTP

**Texas**
- City of Houston
  - Southeast WTP
- El Paso Water Utilities
  - Jonathan W. Rogers WTP
  - Robertson/Umbehauer WTP

**Virginia**
- Appomattox River Water Authority
  - Appomattox River WTP

**West Virginia**
- W. Virginia American Water
  - Ada WTP (Bluefield)
  - Bluestone WTP
  - Gassaway WTP
  - Weston WTP (West Fork)
### 5-Year Directors Award – Treatment (Phase III)

<table>
<thead>
<tr>
<th>State</th>
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<tbody>
<tr>
<td>Alabama</td>
<td>WW Board of the City of Birmingham, Western WFP</td>
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<tr>
<td>California</td>
<td>City of San Diego, Otay WTP</td>
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<td>Colorado</td>
<td>Clifton Water District, Charles A. Strain (Clifton) WTP</td>
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<tr>
<td>Georgia</td>
<td>Atlanta-Fulton County Water Resources Commission, Atlanta-Fulton County Water Treatment Plant</td>
</tr>
<tr>
<td>Illinois</td>
<td>City of Aurora, City of Aurora WTP, Village of Wilmette, Wilmette WTP</td>
</tr>
<tr>
<td>Kansas</td>
<td>Kansas City Board of Public Utilities, Nearman WTP</td>
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<tr>
<td>New York</td>
<td>City of Troy Department of Public Utilities, John P. Buckley WTP</td>
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<tr>
<td>Monroe County Water Authority</td>
<td>Shoremont Treatment Plant</td>
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<tr>
<td>Pennsylvania</td>
<td>Aqua Pennsylvania, Roaring Creek Filtration Plant</td>
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<tr>
<td>Pennsylvania</td>
<td>Pennsylvania American Water, Clarion Regional WTP, Huntsville WTP, Stony Garden WTP (Blue Mountain System)</td>
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<td>Pennsylvania</td>
<td>Robinson Township, Robinson Township WTP</td>
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<td>Williamsport Municipal Water Authority, Williamsport MWA WTP</td>
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<td>South Carolina</td>
<td>Beaufort Jasper Water &amp; Sewer Authority, Purrysburg WTP</td>
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<td>South Carolina</td>
<td>Greenville Water System, Adkins WTP, Stovall WTP</td>
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<td>Tennessee</td>
<td>City of Kingsport Water Services, City of Kingsport WTP</td>
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### Directors Award – Treatment (Phase III)

<table>
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<tr>
<th>State</th>
<th>Location</th>
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<tr>
<td>Arizona</td>
<td>EPCOR Water Arizona, Anthem WTP</td>
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<td>Arkansas</td>
<td>Beaver Water District, Beaver Water District WTP</td>
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<td>California</td>
<td>City of Fairfield, North Bay Regional WTP</td>
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<tr>
<td>Colorado</td>
<td>Aurora Water, Peter D. Binney WPP, Wemlinger WTP</td>
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<tr>
<td>Colorado</td>
<td>City of Boulder, Betasso WTP, Boulder Reservoir/63rd St. WTP</td>
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<td>Colorado</td>
<td>City of Grand Junction, City of Grand Junction WTP</td>
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<td>Colorado</td>
<td>Denver Water, Moffat WTP</td>
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<td>Maryland</td>
<td>City of Rockville, Rockville WTP</td>
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<td>Montana</td>
<td>Washington Suburban Sanitary Commission, Patuxent WTP, Potomac River WTP</td>
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<td>Nebraska</td>
<td>Aqua Pennsylvania, Inc., Ingram’s Mill WTP</td>
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<td>Ephrata Area Joint Authority, Ephrata Area Joint Authority WTP</td>
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<td>Kittanning Suburban Joint Water Authority, Tarrentown Water Treatment Plant</td>
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<td>Pennsylvania American Water, Rock Run WTP</td>
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<td>Virginia, Town of Culpeper, Culpeper WTP</td>
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<td>So. Nevada Water Authority, River Mountains WTP</td>
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<td>American Water (North Brunswick NJ), North Brunswick WTP</td>
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<td>Metro. Water Board of Onondaga County, Metro. Water Board of Onondaga County WTP</td>
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<td>Monroe County Water Authority, Webster Water Treatment Plant</td>
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<td>City of Greensboro, N.L. Mitchell WTP, Lake Townsend WTP</td>
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<td>North Carolina</td>
<td>Charlotte Water, Franklin WTP, Vest WTP</td>
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<td>City of Raleigh, D.E. Benton WTP, E.M. Johnson WTP</td>
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<tr>
<td>Ohio</td>
<td>Lake County Dept. of Utilities, Aquarius (West) WTP, Bacon Road (East) WTP</td>
</tr>
<tr>
<td>South Carolina</td>
<td>Greenville Water System, Stovall WTP</td>
</tr>
<tr>
<td>South Carolina</td>
<td>Orangeburg Dept. of Public Utilities, John H. Pearson WTP</td>
</tr>
<tr>
<td>South Carolina</td>
<td>Virginia, Town of Culpeper, Culpeper WTP</td>
</tr>
</tbody>
</table>

Partnership for Safe Water  50
Partnership for Safe Water Subscribers

The following utilities represent current Partnership for Safe Water subscribers. These utilities are recognized for their leadership in the water community. Listing is of active subscribers as of 12/31/16.

T – Indicates participation in the treatment plant optimization program
D – Indicates participation in the distribution system optimization program

Alabama
The Water Works Board of the City of Birmingham (T/D)
American Water Military Services – Fort Rucker (D)

Alaska
Anchorage Water and Wastewater Utility (T/D)

Alberta
City of Calgary (D)

Arizona
City of Chandler (T)
City of Phoenix (T)
City of Tempe (D)
EPCOR Water Arizona (T/D)

Arkansas
Beaver Water District (T)
Central Arkansas Water (T/D)

California
Alameda County Water District (T)
Apple Valley Ranchos Water Company (D)
California American Water Company (D)
California Water Service Company (T/D)
City of Antioch (T)
City of Escondido (T)
City of Fairfield (T)
City of Fresno (T)
City of Napa (T)
City of Redding (T)
City of San Diego (T/D)
City of Santa Monica Water Department (D)
City of Vallejo (T)
Contra Costa Water District (T/D)
East Bay Municipal Utility District (T)
Golden State Water Company (T/D)
Long Beach Water Department (T/D)
Marina Coast Water District (D)
Metropolitan Water District of Southern California (T/D)
Modesto Irrigation District (T)
San Francisco Public Utilities Commission (T)
San Jose Water Company (D)
Yucaipa Valley Water District (T/D)
Zone 7 Water Agency (T)

Colorado
Aurora Water (T/D)
Centennial Water and Sanitation District (T)
City and County of Broomfield (T)
City of Boulder (T/D)
City of Golden (T/D)
City of Grand Junction (T)
City of Longmont (T)
City of Loveland (T)
City of Thornton (T)
City of Westminster (T/D)
Clifton Water District (T)
Colorado Springs Utilities (T)
Denver Water (T/D)
Eagle River Water and Sanitation District (D)
Erie Water Department (T)
Fort Collins Utilities (T/D)
Left Hand Water District (T)
Montezuma Water Company (T)
North Table Mountain Water and Sanitation District (D)
Parker Water & Sanitation District (T)
Upper Eagle Regional Water Authority (T/D)
Ute Water Conservancy District (T)

Connecticut
Aquarion Water Company (T)
Connecticut Water Company (T)

Delaware
City of Wilmington (T/D)

District of Columbia
DC Water (D)
Washington Aqueduct Division (T)

Florida
City of Tampa (T)
Palm Bay Utilities (D)
Pinellas County Utilities (D)
Georgia
Atlanta-Fulton County Water Resources Commission (T)
City of Cartersville (T)
City of Thomaston (T/D)
Columbus Water Works (T/D)
Douglasville-Douglas County Water & Sewer Authority (T/D)
Macon Water Authority (T)

Illinois
Aqua Illinois (T)
American Water Military Services – Scott Air Force Base (D)
Central Lake County Joint Action Water Agency (T/D)
City of Aurora (T)
City of Chicago (T)
City of Moline (T)
Illinois American Water (T/D)
Village of Glencoe (T)
Village of Gurnee (D)
Village of Westmont (T)
Village of Wilmette (T)

Indiana
Citizens Energy Group (T/D)
Fort Wayne City Utilities (T/D)
Indiana American Water (T/D)

Iowa
City of Wahpeton (T)
Iowa American Water (T)
Iowa City Water Division (D)
Marshalltown Water Works (T/D)

Kansas
American Water Military Services - Fort Leavenworth (D)
City of Lawrence (T)
City of Wichita (T)
City of Olathe (D)
Kansas City Board of Public Utilities (T)
WaterOne (T)

Kentucky
Frankfort Electric and Water Plant Board (T)
Hardin County Water District No. 1 (T)
Henderson Water Utility (T/D)
Kentucky American Water (T/D)
Louisville Water Company (T/D)
Paducah Water (T)

Louisiana
American Water Military Services - Fort Polk (D)
City of Bossier City (T)
City of Monroe Water System (D)

Maine
Portland Water District (D)

Maryland
American Water Military Services - Fort George G. Meade (D)
City of Rockville (T)
Easton Utilities Commission (T/D)
Maryland American Water (T)
Washington Suburban Sanitary Commission (T/D)

Massachusetts
Town of Canton Water Department (D)

Michigan
City of Ann Arbor (T)
City of Saginaw (T)
Great Lakes Water Authority (T)
Little River Band of Ottawa Indians Utilities (D)

Minnesota
City of Bloomington Utilities Division (D)
Minneapolis Water Works (D)
St. Cloud Public Utilities (D)
Saint Paul Regional Water Services (T/D)

Missouri
City of Liberty (D)
City of St. Louis Water Division (T/D)
City Utilities of Springfield (T/D)
Kansas City Water Services (T/D)
Missouri American Water (T/D)

Montana
City of Bozeman Water and Sewer Dept. (D)
Mountain Water Company (D)

Nebraska
Metropolitan Utilities District (T/D)

Nevada
Southern Nevada Water Authority (T)
Truckee Meadows Water Authority (T)
New Hampshire
City of Concord (T)
Manchester Water Works (T/D)
Pennichuck Water Works (T)

New Jersey
American Water New Jersey – New Brunswick (T)
Brick Township Municipal Utilities Authority (T)
Middlesex Water Company (T/D)
New Jersey American Water Company (T/D)
Passaic Valley Water Commission (T/D)
United Water New Jersey (T)

New Mexico
Albuquerque Bernalillo County Water Utility Authority (T/D)

New York
City of Rochester Water Bureau (T/D)
Erie County Water Authority (T)
Monroe County Water Authority (T/D)
Onondaga County Water Authority (T)
Plainview Water District (D)
Town of Queensbury (T)
Village of Ossining (T)
Village of Waterloo (D)

North Carolina
Brunswick County Public Works (T)
Cape Fear Public Utilities Authority (T)
Charlotte Water (T/D)
City of Durham (T)
City of Greensboro (T)
City of Henderson (T/D)
City of Morganton (T/D)
City of Mount Holly (T)
City of Raleigh Public Utilities (T/D)
City of Sanford (T/D)
Fayetteville Public Works Commission (T/D)
Greenville Utilities Commission (T)
Harnett County Department of Public Utilities (T)
Orange Water and Sewer Authority (T/D)
Town of Cary (T/D)

North Dakota
Grand Forks Water Utility (D)

Nova Scotia
Halifax Water (T/D)

Ohio
Aqua Ohio (T)
Cleveland Division of Water (T/D)
Greater Cincinnati Water Works (D)
Lake County Department of Utilities (T/D)

Oklahoma
American Water Military Services – Fort Sill (D)
City of Oklahoma City (T/D)
City of Tulsa (T/D)
Shawnee Municipal Authority (T/D)

Ontario
Chatham-Kent Public Utilities (T)
Regional Municipality of Halton (T)

Oregon
City of Grants Pass (T)
City of Gresham (D)
City of The Dalles (T)
West Slope Water District (D)

Pennsylvania
Aqua Pennsylvania (T/D)
Birdsboro Municipal Authority (T)
Blossburg Water Authority (T)
Borough of Chambersburg (T)
Brodhead Creek Regional Authority (T/D)
Cambria Township Water Authority (T)
Capital Region Water (T)
Carlisle Borough Municipal Authority (T)
Chester Water Authority (T/D)
City of Bethlehem (T/D)
City of Lancaster (T/D)
Conemaugh Township Municipal Authority (T)
Cranberry Township (D)
Dover Township Water Department (D)
Downingtown Municipal Water Authority (T)
East Greenville Borough Water Department (T)
Easton Suburban Water Authority (T)
Elizabethtown Area Water Authority (T/D)
Ephrata Area Joint Authority (T/D)
Galetown Borough Authority (T)
Gallitzin Water Authority (T)
Gettysburg Municipal Authority (T)
Greencastle Area, Franklin County Water Authority (T)
Harrison Township/Natrona Water Authority (T)
Highland Sewer & Water Authority (T)
Hooversville Borough Municipal Authority (T/D)
Huntingdon Borough Water (T/D)
Jersey Shore Area Joint Water Authority (T)
Jim Thorpe Water Department (T)
Kittanning Suburban Joint Water Authority (T)
Lehigh County Authority (T/D)
Mahanoy Township Authority (T)
Mansfield Borough Municipal Authority (T)
Meyersdale Municipal Authority (T)
Middleburg Municipal Authority (T)
Mifflintown Municipal Authority (T)
Millsburg Area Authority (T)
Moon Township Municipal Authority (T)
Municipal Authority of Portage (T)
Municipal Authority of the Borough of Derry (T)
Municipal Authority of the Borough of Lewistown (T)
Municipal Authority of the Borough of Robinson (T)
North East Borough (T)
North Penn Water Authority (T/D)
Northampton Borough Municipal Authority (T)
Oakmont Water Authority (T/D)
Pennsylvania American Water (T)
Philadelphia Water Department (T/D)
Pike Township Municipal Authority (T)
Pittsburgh Water and Sewer Authority (T)
Pottstown Utilities Department (T)
Reading Area Water Authority (T/D)
Red Lion Municipal Authority (T)
Schuylkill County Municipal Authority (T)
Shamokin Dam Borough (T)
Shenandoah Municipal Water Authority (T)
Shippensburg Water Authority (T)
Spring Township Municipal Authority (T)
State College Borough Water Authority (T)
Union City Municipal Authority (T)
Upper Saucon Township (D)
Waynesburg, Borough of (T)
Western Berks Water Authority (T/D)
Williamsport Municipal Water Authority (T/D)
Williamstown Borough Authority (T)
Wrightsville Water (T/D)
York Water Company (T)

Rhode Island
Pawtucket Water Supply Board (D)

South Carolina
Beaufort Jasper Water and Sewer Authority (T/D)
Charleston Water System (T/D)
City of Clinton (T)
City of Columbia (T)
City of Newberry (T)
City of North Augusta (T)
City of Goose Creek (D)
Easley Combined Utilities (T)
Georgetown County Water and Sewer District (T/D)
Grand Strand Water and Sewer Authority (T)
Greenville Water System (T)
Greenwood Commissioners of Public Works (T/D)
Hilton Head #1 Public Service District (D)
Mount Pleasant Waterworks (D)
Orangeburg Department of Public Utilities (T)
Powdersville Water (D)
Santee Cooper Regional Water System (T)
Sartex-Jackson-Wellford-Duncan Water District (T/D)
Spartanburg Water (T)
Woodruff-Roebuck Water District (T)

Tennessee
City of Alcoa (D)
City of Bristol Water Department (T)
City of Johnson City (T)
City of Kingsport Water Services Division (T)
Clarksville Gas and Water Department (T)
Fayetteville Water and Sewer System (T)
Knoxville Utilities Board (T)
Metro Water Services – Nashville (T/D)
Murfreesboro Water & Sewer Department (T)
Tennessee American Water (T/D)

Texas
American Water Military Services - South Fort Hood (D)
Austin Water Utility (T/D)
City of Houston (T/D)
City of Kilgore (T/D)
Dallas Water Utilities (T)
El Paso Water Utilities Public Service Board (T/D)
Fort Worth Water Department (D)
San Jacinto River Authority – Woodlands Division (D)

Utah
Central Utah Water Conservancy District (T)
Jordanelle Special Service District (T)
Metropolitan Water District of Salt Lake & Sandy (T)
Salt Lake City Public Utilities (T)
Twin Creeks Special Service District (D)

Vermont
Burlington Public Works – Water Division (T)
Champlain Water District (T)
Champlain Water District & Retail Dept. (D)

Victoria (Australia)
Coliban Water (D)
Virginia
American Water Military Services – Fort AP Hill (D)
American Water Military Services – Fort Belvoir (D)
Appomattox River Water Authority (T)
Aqua Virginia (T)
Chesterfield County Utilities Dept. (T/D)
City of Chesapeake Department of Public Utilities (T)
City of Virginia Beach Department of Public Utilities (D)
Gloucester County Department of Public Utilities (T)
Newport News Waterworks (T/D)
Prince William County Service Authority (D)
Spotsylvania County Utilities Department (T/D)
Town of Culpeper (T)
Washington County Service Authority (D)
Winchester Public Utilities Department (T)

Washington
City of Bellingham Department of Public Works (T)
City of Everett Public Works Department (T)

West Virginia
Clarksburg Water Board (T)
West Virginia American Water (T)

Wisconsin
Cudahy Water Utility (T)
Milwaukee Water Works (D)
Oak Creek Water and Sewer Utility (T/D)