Governor's Report on the Capability Enhancement Program

pennsylvania

DEPARTMENT OF ENVIRONMENTAL PROTECTION

Bureau of Safe Drinking Water

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Introduction

The 1996 amendments to the federal Safe Drinking Water Act require all states to implement a Capacity Development Program, also known as the Capability Enhancement Program (CEP) in Pennsylvania. The CEP is designed to address the lack of technical, managerial and financial (TMF) abilities of the state's 8,500 public drinking water systems. Limited TMF capability is the root cause for the inability of many systems to meet state and federal health-based drinking water standards. At the request of qualifying systems, the CEP uses facilitators in conjunction with peer-based trainers to assist water systems in improving TMF capability and maximizing public health protection. Pennsylvania's program includes the following components, which are implemented within the Department of Environmental Protection (DEP):

- Capability Enhancement Facilitators (CEF);
- Professional Engineering Services (PES) Program;
- Outreach Assistance Provider Program (OAPP);
- Drinking Water and Wastewater Systems Operators' Certification Program;
- Filter Plant Performance Evaluation Program (FPPE);
- Area Wide Optimization Program (AWOP);
- Partnership for Safe Water Program (PfSW);
- Distribution System Optimization Program; and
- Source Water Assessment and Protection Programs.

The CEP strategy implements a number of basic steps:

1. Developing and maintaining a Priority Ranking System (PRS) to identify and rank public drinking water systems most in need of TMF capability assistance.

2. Evaluating priority drinking water systems to define their specific needs for improvement.

3. Developing "action item" lists to identify needs. Sharing action items and setting milestones at each system that participates in the CEP.

4. Offering the PES Program, which assists small systems with engineering needs that they would otherwise be unable to obtain.

5. Monitoring of drinking water systems while they receive assistance to measure progress.

6. Maintaining a partnership with the Pennsylvania Infrastructure Investment Authority (PENNVEST) to ensure that funding recipients for all Drinking Water State Revolving Loan Funds (DWSRF) have adequate TMF capability to operate and maintain the system.

Condition of Our Drinking Water Infrastructure

In 2011, the national Drinking Water Needs Survey showed that $14.2 billion in construction must be completed over the subsequent 20 years in Pennsylvania to repair or enhance the state's drinking water infrastructure. The previous 2007 survey showed a $12.9 billion need (normalized for 2011 dollars). Reversing this growing infrastructure need represents a worrisome trend that will require a paradigm shift in the way water systems plan and fund needed improvements to protect public health. Awareness of the need is important, but until water systems realize how to utilize proper asset management practices to fund long-term infrastructure needs, the cost will continue to grow.

Based on information garnered from a random sampling of 24 systems assessed by the CEP since 2013, water systems are struggling with implementing proper technical, managerial and financial practices to sustain their systems for the long term.

- 25% of the 24 systems answered that revenues generated by their water system are not sufficient to fund annual expenses associated with the system.
- 63% do not calculate how much it costs their system to produce the water (including all costs such as utilities, labor, chemicals, monitoring, etc.).
- 4% utilize revenues generated by their water system to fund other non-water system needs.
- 38% believe that adjusting user rates is not an option, or they plan to only adjust rates when the system is in deficit or close to a deficit.
- 50% do not have an annual budget.
- 17% have a non-revenue water percentage of at least 20% (lost to leaks, meter error, or otherwise non-billed usage). 46% do not even calculate their non-revenue water rate.
- 25% of the systems evaluated do not know the age, condition and expected life of their water system assets.

The CEFs identify and help systems address the weaknesses mentioned above, among others. Statewide, the CEP is seeing great success in helping system owners who participate in the program. However, if the data garnered in this sub-set of systems is an indication of statewide system capability, there is much work to be done.

In 2015, the DEP conducted The Water and Wastewater Gap study. The study identified all funds that a drinking water system will need over the next 10 years—including capital improvement, operations, maintenance and debt service—and compared that information to the revenues the system could be expected to have over the same time period.

Critical findings of the gap study showed that:

- At current user rates, the updated (2015) total drinking water and wastewater gap over the next 10 years in Pennsylvania is $18.6 billion, $10.2 billion for drinking water and $8.4 billion for wastewater.
- The total could be reduced to $4.2 billion if user rates are increased to 1.5 percent of median household income.
- Based on current funding assistance levels, the state will only have $0.9 billion in subsidy dollars to address the $18.6 billion gap, which suggests that user rates need to exceed 1.5 percent and/or funding needs to be increased.

The findings of the survey and gap analysis clearly indicate the need to develop a strategic approach to improving Pennsylvania's drinking water infrastructure.

Capability Enhancement Program Improvements

The challenges described in the introduction above have been analyzed over the past three years to improve the delivery of services and support to drinking water systems. That effort has resulted in the publication of Pennsylvania's revised Capability Enhancement Strategy (Technical Guidance Number 383-0400-114) on June 20, 2015. The revised strategy includes the following:

- Refined the PRS rating process to improve the method for prioritizing systems for technical assistance;
- Created an assessment tool that staff will use to assess the TMF capability of drinking water systems;
- Implemented "action item" identification of weaknesses, which is used to track progress at drinking water systems;
- Integrated CEF assistance with the PES Program and the OAPP to provide comprehensive assistance; and,
- Sharpened the process used to confirm adequate TMF capability in advance of providing financial support with the federal DWSRF.

The strategy applies an improved rating system to identify drinking water systems that may have problems. The PRS uses compliance data from both DEP and EPA databases to annually rate systems. Information such as monitoring data, violation counts and status of certified operators are used to apply a priority score for each community water system (CWS) and nontransient noncommunity water system (NTNC) in the commonwealth. The CEFs then collaborate with field staff to determine what systems would be best served by the CEP as opposed to only initiating enforcement activities.

The revised strategy also implements an improved method (called the Self-Assessment Tool) to evaluate system needs in detail. The Self-Assessment Tool is a capability self-assessment completed by the utility that provides CEFs with baseline information to

help prepare them for the onsite TMF assessment. In essence, the Self-Assessment Tool provides a formal method to document the TMF capability of the individual system and improves DEP's ability to document improvements in system TMF capability over time.

Just as importantly, the revisions in the strategy better reflect integration of other related programs. The CEFs are now seeking input from DEP Regional Office drinking water program staff by providing draft action items lists for comment as an effort to ensure that all known capability weaknesses have been identified and included in the action items list. CEFs are also pursuing improved financial and managerial capabilities at systems when FPPEs identify financial and managerial causes for technical issues. Likewise, the CEFs are now encouraging systems to pursue capital funding through the DWSRF using the services of the PES contract, if needed.

Lastly, the revised strategy outlines how DEP will evaluate systems for their TMF capability prior to awarding DWSRF capital funding through PENNVEST. For systems requesting funding, EPA requires that DWSRF funds only be provided to systems that are deemed capable or that will become capable as a result of the utilization of the funds. Systems are evaluated for their capability prior to DWSRF funding by the CEF first reviewing the system's PRS score. If the score is below an identified threshold, the system is deemed capable. A score below the threshold ensures that the system does not have major compliance concerns. If a system is above the PRS threshold, they are required to complete the Self-Assessment Tool and are evaluated on-site. A capability check list is given to the system outlining any TMF weaknesses that must be addressed prior to them being considered for DWSRF funding.

Program Goals and Objectives

Program goals and objectives for the CEP are established to protect public health. The goals and objectives continue to encompass enhancements to the following areas:

- Technical capabilities of system operators;
- Financial and managerial expertise of system owners and operators; and,
- Capability of drinking water systems.

The success of the CEP is measured using the following parameters:

- The number of water systems benefiting from hands-on assistance through the CEP and OAPP;
- The number of PES projects that successfully resulted in improved capability.
- The number of systems that do not have a certified operator/properly certified operator. (The goal is to reduce this number.)
- The number of systems that successfully addressed TMF action items noted by

the CEFs; and,

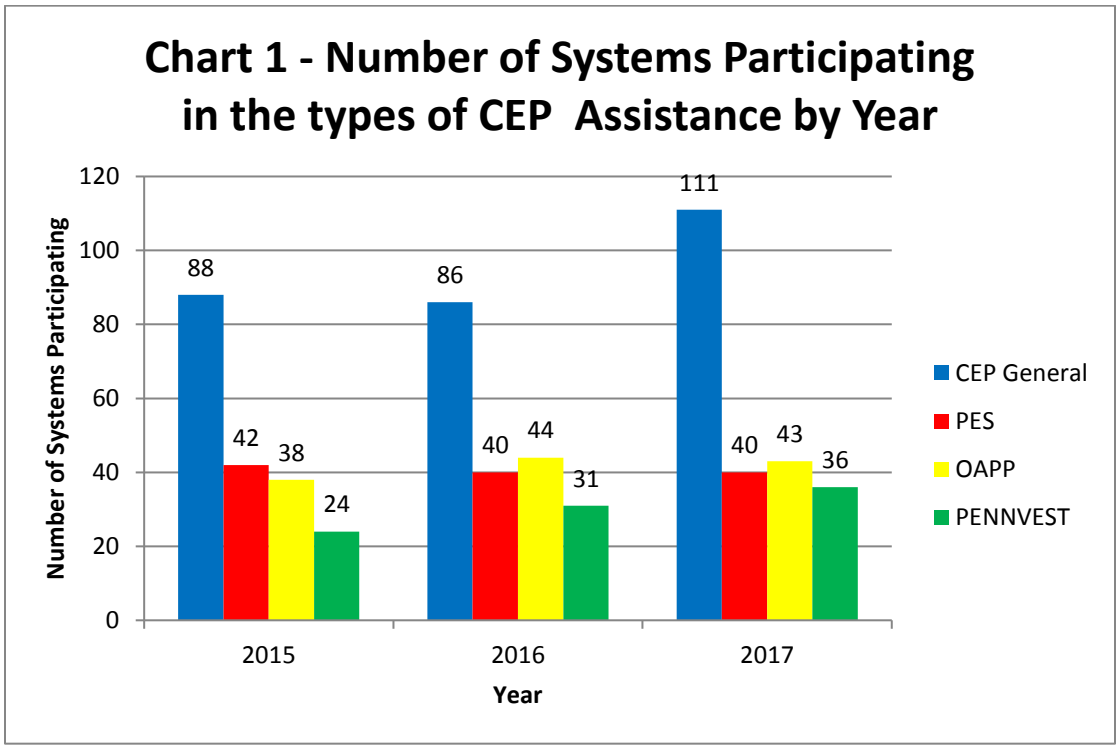
- The number of surface water treatment plants with a FPPE rating of "Commendable."

Effectiveness of the Capability Enhancement Program

Three CEFs coordinate assistance to drinking water systems that participate in the program. They manage the PES contract, refer systems to the OAPP, evaluate systems for PENNVEST funding, and refer systems for operator certification training and testing. Below are some highlights of the CEP.

Capability Enhancement Facilitator Coordinated Assistance

The CEF had direct contact with 111 systems in state FY '16-17. Typically, the assistance type is divided into smaller categories. Some systems may be included in more than one category. Chart 1 depicts the breakdown of the number of systems participating in the CEP by the type of assistance provided.



The CEP has substantially increased the total number of systems it has had contact with over the past few years. This is primarily due to the PES Program gaining momentum while also integrating OAPP assistance with the PES. The number of systems evaluated for DWSRF funding has remained somewhat low during the past few

years compared to historical numbers. DWSRF evaluations are system-driven based upon how many systems apply for funding and are not a measure of CEP effectiveness as much as it is a measure of CEF workload.

Currently, site-specific success is measured by noting systems' completion of action items in their evaluation report on a system-by-system basis. To date, a number of systems assisted have employed a certified operator, implemented standard operating procedures, and are working toward the basics of asset management as a result of action items identified by the CEFs. Concurrently, the PES program is providing needed engineering support to these systems.

Professional Engineering Services Program

The PES Program has become the primary tool in providing assistance to small water systems. PES provides engineering design to small systems that would otherwise not be able to pay for services of a professional engineer. These are long-term projects that involve DEP's contracted engineer in the private sector to provide feasibility and/or design work while the system simultaneously works through TMF recommendations identified by the CEFs. In order to be included in the PES Program, systems must agree to address certain identified TMF weaknesses. In this way, the CEP is able to obtain "buy-in" from the system to make necessary TMF changes to improve their capability while also providing engineering and outreach assistance.

Baseline numbers are difficult to assign for measuring abstract improvements in TMF capability. The CEFs conduct monthly status meetings with the PES contractor to monitor the progress of each system that is receiving PES assistance. This allows the CEFs to stay informed with project progress and ensure systems are addressing their action items while also receiving PES assistance. Since the PES program's inception in FY '11-12, 87 PES projects have reached completion and 16 are still progressing. Table 1 denotes a count of projects that were completed through the PES program since FY '11-12.

Table 1 – Count of Completed PES Projects since Program Inception

No. of Projects	General Project Type
19	Groundwater Rule 4-log design and permitting
18	Source evaluation, exploration, and/or siting
7	Leak Detection
6	Corrosion control treatment feasibility study
5	Funding Support
5	Distribution Line Replacement/Addition

5	Finished water storage
4	Feasibility Study
4	Engineering Evaluation/Report
3	Interconnection
3	Construction oversight
2	Fe & Mn Treatment Design/Permitting
2	System Mapping
2	Bid/Contract Administration
1	Spring Rehabilitation
1	Tracer study

Of special note is the Stockton Water System 'Interconnection design and permitting' project. The project interconnected the Stockton Water System to a more capable neighboring system, Hazelton City Authority. This project is significant since Stockton had previously provided unfiltered and un-disinfected surface water to their customers. Stockton was also the highest ranked priority system in Pennsylvania based upon both Pennsylvania's PRS and EPA's Enforcement Tracking Tool (ETT) score. Stockton's most recent ETT score was 324, with 27 consecutive months with an ETT score greater than 11. The interconnection project was just recently completed, therefore the Stockton Water System ceases to exist, and most importantly, their former customers now receive safe drinking water.

Outreach Assistance Provider Program

The OAPP provides both direct assistance to system operators or management and assistance via small-group workshops. Individual assistance was provided for plant operations (jar testing, chemical feed pump calibration, iron and manganese removal, particle counter loans), lead and copper rule compliance, asset management plan development, and line locating. Small group workshops include introductory water loss control, Emergency Response Plan (ERP) development, and operator certification exam preparation. During FY '15-16, individual assistance was provided to 15 water systems. Exam preparation courses served 71 participants. The introductory Water Loss Control course served 77 individuals and the ERP Workshop served 52 participants from 29 water systems.

The following examples highlight some of Pennsylvania's approaches to providing assistance and addressing needs:

- Pennsylvania has plotted operator certification information through Geographic Information System data. We utilize the map to target areas with concentrations of uncertified or under-certified operators for training and testing through our Approved Examination Provider program.

- In 2012, we piloted a program to target less populated areas that have uncertified or under-certified operators through DEP's OAPP. The pilot program proved highly successful, and OAPP continues to provide training and certification for trainees from small systems in remote parts of the state to enable those systems to comply with Operator Certification regulations.
- During a review of Action Item Lists that were developed as a result of the TMF evaluation in the PES process, several items appeared to be common deficiencies:

    - ERP
    - Operations and Maintenance Plan
    - Asset Management Plan

To address these deficiencies, we developed and delivered an ERP workshop, focusing on response to emergencies, available resources, and coordination. To provide an incentive for water systems to complete and review their ERP, we award drinking water operator contact hours only on verification of plan completion and review. The smaller group workshop atmosphere lends to discussion and networking with peers and helps facilitate cooperation. In addition to providing the workshops to the PES program participants, we use a geographic analysis with data from our Pennsylvania Drinking Water Information System database to target water systems with missing or aging ERPs. We encourage a team that includes both the operator and the responsible official to attend the workshop.

We are also in the process of developing an Operations and Maintenance Plan workshop and Asset Management Plan workshop to deliver in 2017-18. We have also worked with our Great Lakes Program to develop a three-part intermediate water loss control workshop. The first workshop focuses on using the free American Water Works Association Water Audit Software to compile a water audit. The second workshop focuses on Metering and Billing, and the third workshop focuses on leakage management. We piloted these workshops in the Lake Erie Basin, and have since delivered the workshops in other parts of the state.

Drinking Water Operator Certification Program

As indicated in Chart 2, information from the most recently available data shows that 87% of the NTNC and 98% of CWS have designated their available operator(s) in 2016. This represents a 6% decrease in compliance for NTNC when compared to the previous two years. More data will need to be collected to determine if the decrease in NTNC compliance is part of a trend or an abnormality. Regardless, NTNC compliance will need to be monitored closely. Meanwhile, compliance for CWS has remained stable and robust for the past three years.

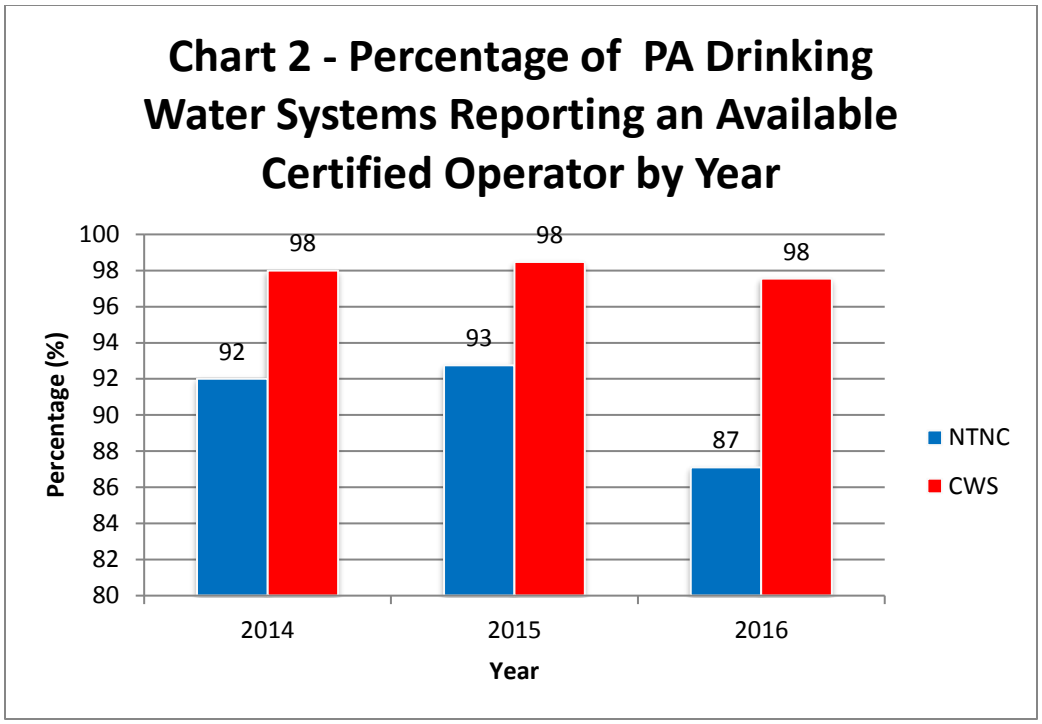
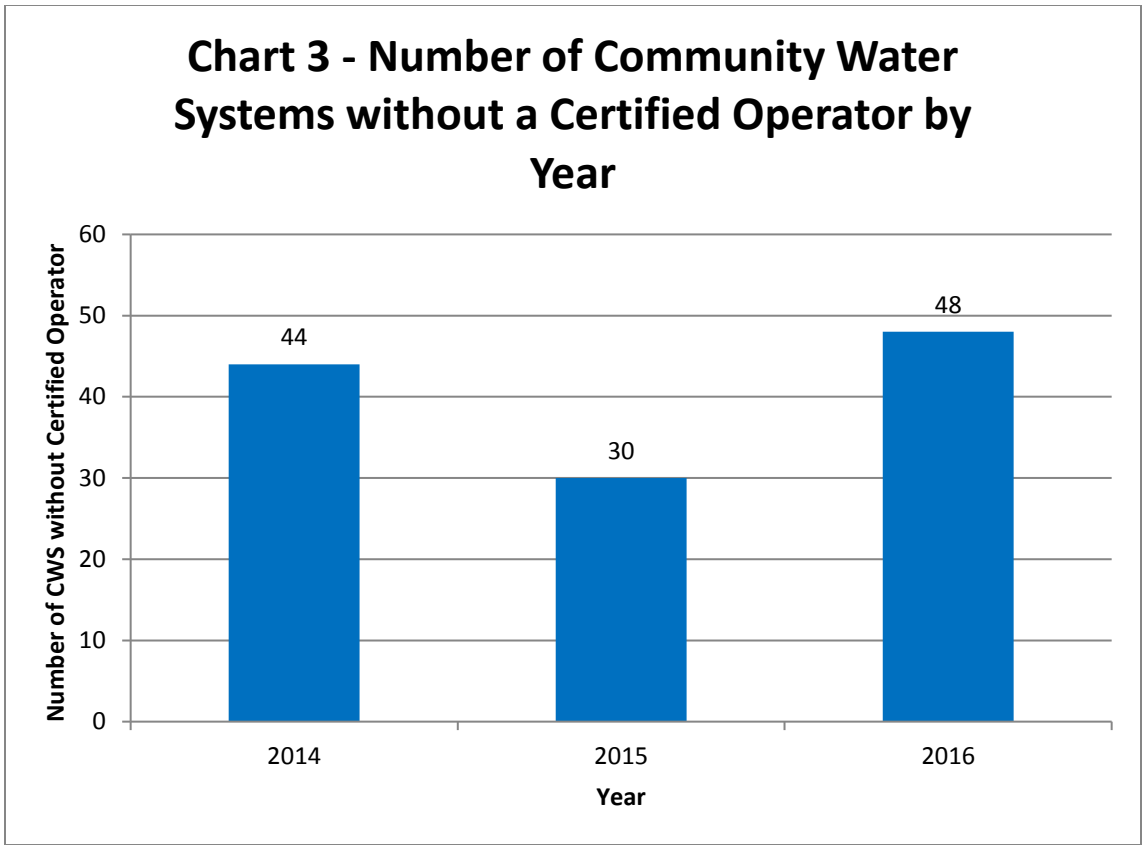
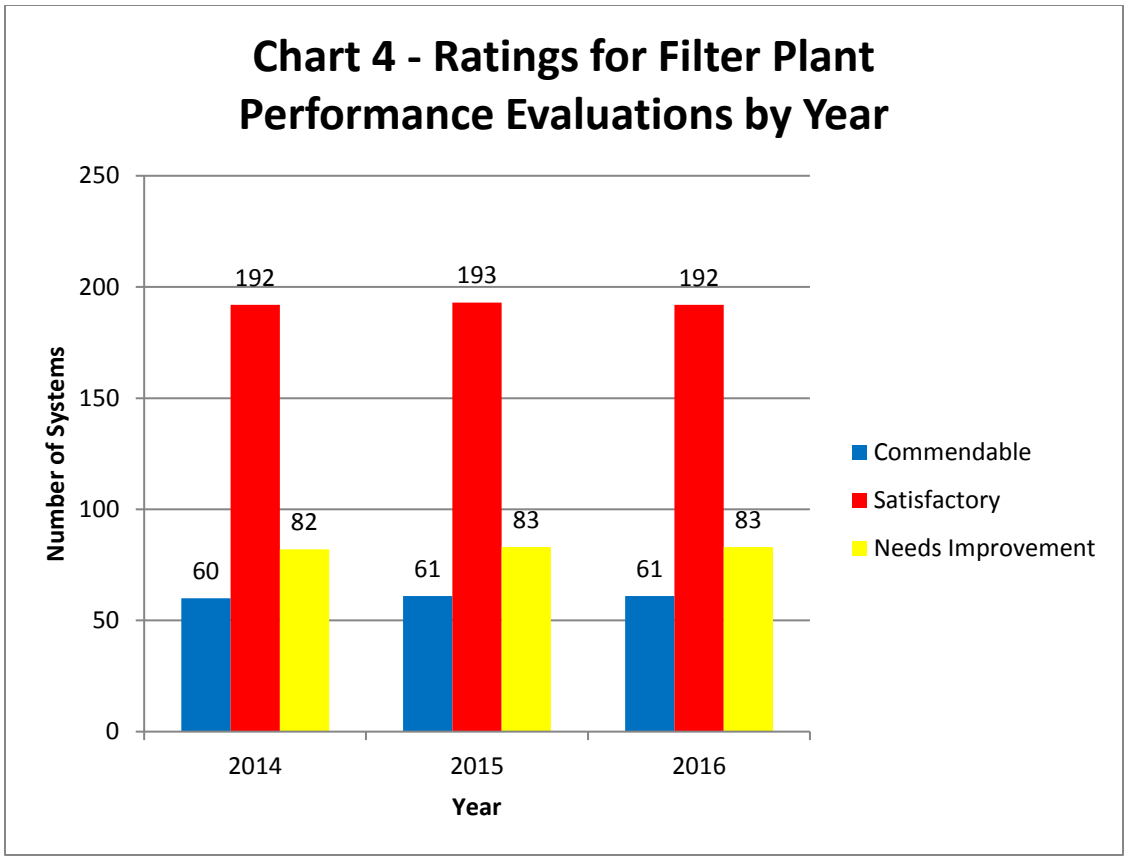


Chart 3 shows that the number of CWS without a properly certified operator has been relatively consistent over the last three years. Efforts by DEP's Operator Certification Program staff and Regional Office staff have helped maintain consistent system compliance. The CEP program's targeted trainings and certification exams have also helped systems have properly certified operators.



Filter Plant Performance Evaluation, Area Wide Optimization and Partnership for Safe Water Programs

The national AWOP and the PfSW Program is intended to help states and water systems with the implementation of optimization programs. Both programs are intended to assist filter plants in improving performance and maximizing public health protection. The programs are closely integrated with DEP's FPPE Program. Chart 4 shows a comparison of FPPE ratings for 2014 to 2016. Through this comparison, DEP can measure performance improvements at individual filter plants.



Source Water Assessment and Protection Programs

The CEP integrates source water evaluation, protection, rehabilitation and exploration into its evaluation of each system. When a system is determined as needing assistance with source issues, the CEF facilitates the assistance through either the OAPP or PES Programs. The CEF can also refer the system to DEP's source water protection facilitators, who are located regionally for assistance with source water assessment and protection.

Conclusions and Outlook

The need for infrastructure improvements to Pennsylvania's drinking water systems is great and growing. Safe drinking water regulations primarily address technical issues that can immediately impact a system's quantity or quality of water provided to the public. However, technical compliance issues are often caused by underlying weaknesses in the managerial and financial capability of the decision-makers of the system (i.e., Board members, Authority members, etc.). There are very few avenues to ensure that system management is planning for the future needs of its water system and ensuring adequate revenues will be available to pay for those needs.

As stated previously, a paradigm shift will be needed for water systems and the public they serve to embrace the idea of water as a valuable commodity. With that realization, management of the systems can transition to operate more as a business, such as other utilities. The CEP is doing its part to assist water systems in understanding what capability really means.

While the CEP is successfully doing its part to ensure systems are more technically, managerially and financially capable, water system participation in the program is voluntary. The three CEFs can only facilitate assistance at a limited number of sites. The CEP will continue to build on the successes it has achieved by completing the following activities:

- Quantify and document the needs of Pennsylvania's public water systems;
- Deliver assistance to as many water systems that resources allow; and,
- Partner with PENNVEST to ensure funding recipients have adequate technical, managerial and financial capability.

DEP's CEP has expanded its statewide services and support to drinking water systems and operators since the 2014 *Governor's Report on the Capability Enhancement Program*. In FY '17-18 and beyond, DEP's CEP will continue to assist water systems with improving their longer term TMF capability and public health protection.

Contacts

More information about the contents of this report and the CEP is available by contacting DEP's Division of Training and Technical Services at (717) 787-0122 or at the mailing address below. Information may also be obtained from the DEP's website at http://www.dep.pa.gov/Business/Water/BureauSafeDrinkingWater/CapabilityEnhancement/Pages/default.aspx.

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