Governor's Report on the Capability Enhancement Program

pennsylvania

DEPARTMENT OF ENVIRONMENTAL PROTECTION

Bureau of Safe Drinking Water

September 2020

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 8,193 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 Program (OAP);
- 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 (DSOP); 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.

Efficacy of the Capability Enhancement Program Strategy

Pennsylvania's Capability Enhancement Strategy (Technical Guidance Number 391-0400-001) intends to improve the delivery of services and support of drinking water systems in the commonwealth. The strategy includes the following:

- Methods and criteria to prioritize all public drinking water systems.
- Factors that encourage or impair capacity development.
- Authority and resource allocations to implement the proposed strategy.
- Method of measuring baseline rating and improvement.
- Description of public involvement in strategy development.

The strategy applies a PRS to identify drinking water systems that may have problems. The PRS uses compliance data from both DEP and the U.S. Environmental Protection Agency (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 and nontransient noncommunity water system in the commonwealth. The CEFs then collaborate with field staff to determine which systems would be best served by technical assistance as opposed to only initiating enforcement activities.

The 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. 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 TMF capability over time.

Just as importantly, the strategy reflects integration of other related programs. The CEFs seek 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 encourage improved financial and managerial capabilities at systems when FPPEs identify financial and managerial causes for technical issues. Likewise, the CEFs encourage systems to pursue capital funding through the DWSRF using the services of the PES program, if needed.

The 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.

Capability Enhancement Strategy Implementation Case Studies

Implementation of the capability enhancement strategy takes different paths since no two water systems are exactly alike. The following section will discuss how the capability enhancement strategy was implemented via three case studies. Each case study will contain a brief discussion of system background, the technical assistance approach, and the outcome and/or lesson learned from the approach.

Hillendale-on-the-Delaware Home Owner's Association (HOA), Northampton County

Background

- Small HOA comprised of approximately 50 homes
- System referred to CEP to assist with replacement of antiquated underground finished water storage tank
- Assessment of the system determined management comprised of volunteers with little experience with capital improvement process including asset management planning, engineering, funding, and construction

Approach

- OAP assistance was provided to train the system how to create an asset management plan that included the five core concepts (current state of assets, required level of service, asset criticality, life cycle cost, and funding strategy)
- PES program was also utilized to assist the system:
    - Complete a feasibility study to evaluate storage tank/building options and estimate costs
    - Design of the selected option
    - Assist with funding acquisition, contract administration, and construction oversight of a new finished water storage tank and treatment building

Outcome

- The system constructed a new building with storage tank and 4-log virus inactivation treatment
- Construction was funded by a PENNVEST low interest loan. The completed facility went into service in the Fall of 2019.

- Completion of an asset management plan to enable the system to plan and fund future capital improvements

Lessons Learned

- Various state and local entities were able to collaborate to assist the system with a significant capital improvement that will result in enhanced public health protection at a small water system
- Training on asset management will allow the system to maintain their newly installed infrastructure and successfully plan and fund their next capital improvement project
- HOAs are not municipally owned. Unless sponsored by the local municipality, HOAs are not eligible for some types of funding such as PA Small Water and Sewer Grant Program, H2O Grant Program, or Community Development Block Grant.

Hazel Hurst Water Association, McKean County

Background

- Small water association with 76 connections
- System referred to CEP for assistance in addressing exceedance of EPA health advisory level of 1.0 mg/L for manganese in finished water that resulted in Tier 1 “Do Not Consume” public notice to its customers
- Assessment of the system discovered that, over the previous few years, the source water quality in their sole well source changed and the treatment at the water system was not designed to effectively treat the degraded water quality

Approach

- DSOP conducted sampling within their single or only storage tank to help troubleshoot the manganese problem
- PES program expedited an extensive feasibility study to evaluate options for correcting the excessive manganese in the treated water

Outcome

- The feasibility study was presented to the water system
- The following options are being investigated in the hopes of finding a solution:
    - Replace the existing groundwater source (Funding options are being pursued, including potential grant opportunities)
    - Public and private partnerships are being considered to potentially consolidate with another water system less than a mile away

Lessons Learned

- There is often no easy short-term solution
- Continued engagement and coalition building will hopefully result in a successful outcome

Curryville Water Authority, Blair County

Background

- Small water authority serving a population of 86 people
- System referred to CEP to assist with groundwater rule violation
- Groundwater source heavily impacted by nitrate and current nitrate treatment system near end of useful life

Approach

- OAP provided training for new board members
- PES program assisted in completing installation of contact piping to achieve groundwater rule compliance
- Concurrent discussions were facilitated with neighboring water system to explore shared management and/or consolidation

Outcome

- A binding intermunicipal agreement was recently signed by Curryville and the neighboring system to complete an interconnection that will provide clean safe drinking water
- The PES program is currently assisting with the design and PENNVEST funding application for the 1-mile line extension and interconnection project

Lessons Learned

- Building on early success allowed the CEP to work with local decision makers to gain support of a long-term regional solution (interconnection)

Statewide Public Water System TMF Improvement

The statewide public water system TMF improvement is measured using the following parameters:

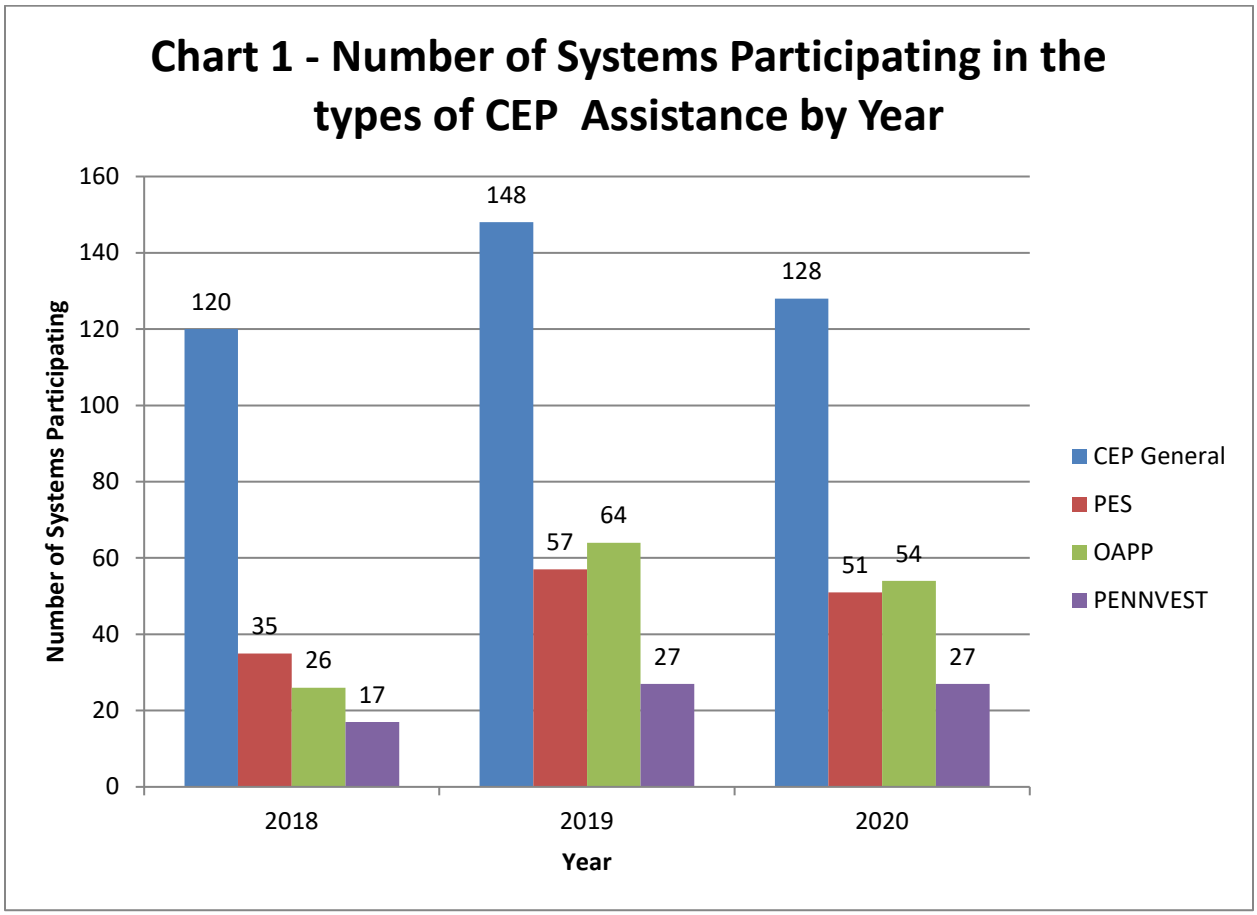
- The number of water systems benefiting from hands-on assistance through the CEP and OAP;
- The number of PES projects that successfully resulted in improved capability;
- The number of systems that do not have a properly certified operator (The goal is to reduce this number.);
- The number of systems that successfully addressed TMF action items noted by the CEFs; and
- The number of surface water treatment plants with a FPPE rating of “Commendable.”

Three CEFs coordinate assistance to drinking water systems that participate in the program. The CEFs manage the PES contract, refer systems to the OAP, 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 CEP had direct contact with 128 systems in state FY '19-20. 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 saw a consistent trend in the total number of systems it had contact with during the three-year period which can be attributed to the PES program building on success and integrating OAP assistance with each PES project. The number of systems evaluated for DWSRF(PENNVEST) funding has remained somewhat consistent 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, several systems receiving assistance 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 and acting as entrance to other technical assistance options.

Professional Engineering Services Program

The PES Program has become the primary tool in assisting 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 can 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 engineering assistance. This allows the CEFs to stay informed with project progress and ensure systems are addressing their action items while also receiving engineering support. Since the PES program's inception in FY '11-12, 113 PES projects have reached completion and 23 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
21	Source evaluation, exploration, and/or siting
9	Leak Detection
7	Corrosion control treatment feasibility study
7	Funding Support
6	Distribution Line Replacement/Addition
5	Finished water storage
5	Feasibility Study
6	Engineering Evaluation/Report
4	Interconnection

6	Construction oversight
4	Fe & Mn Treatment Design
5	System Mapping
6	Bid/Contract Administration
2	Spring Rehabilitation
1	Tracer study

Outreach Assistance Program

The OAP 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, disinfection by-products control), lead and copper rule compliance, asset management plan development, and water loss control. Small group workshops include introductory water auditing, nitrification control plan development, and operator certification exam preparation.

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. DEP utilizes 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, the OAP piloted a program to target less populated areas that have uncertified or under-certified operators through DEP's OAP. The pilot program proved highly successful, and OAP 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.

- The OAP designed and delivered a very successful tailor-made Operator Certification training and testing program for the Pittsburgh Water and Sewer Authority and trained at least 65 non- or under-certified operators currently working in the system. The training included Operator Certification examinations for General, Distribution, and 7 treatment subclasses and general mathematics. Based on the success of increasing the number of certified operators in one training effort, the OAP is actively seeking similar training opportunities in other parts of the state to achieve efficient results.

- 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:

    - Asset management plan
    - Water loss control
    - Plant process control

    As a result, the OAP has recruited assistance providers with expertise in these areas to better address the needs of water systems entering the PES program. In addition, where gaps exist either in expertise and/or geographical state coverage, the OAP is seeking partnerships with other technical assistance providers (Rural Communities Assistance Partnership (RCAP), Susquehanna River Basin Commission (SRBC), American Water Works Association (AWWA), Pennsylvania Rural Water Association (PRWA), University of Pennsylvania Water Center and other entities) to build resources available for water systems lacking TMF capability receive the assistance they need to become more sustainable.

- The OAP has partnered with the 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. The workshops were piloted in the Lake Erie Basin, and OAP has since delivered the workshops in other regions of the state in partnership with the Southwest PA Commission, SRBC, and Bucks County Community College.

- In 2019, the OAP piloted a collaborative effort to assist parent and consecutive water systems to complete nitrification control plans. The effort included a joint training session detailing chloramination disinfection and how nitrification occurs in distribution systems. An expert then assisted the parent system and each consecutive system to complete their nitrification control plan and set realistic goals and response actions to prevent nitrification. The training enabled parent and consecutive systems to not only discuss their individual challenges in maintaining water quality in their distribution systems but also determine how they could work together to achieve their individual goals through coordinated flushing and storage tank management. The training received very positive feedback, so the OAP is seeking other parent/consecutive systems willing to start a dialog.

Drinking Water Operator Certification Program

As indicated in Chart 2, information from the most recently available data shows that 93% of the nontransient noncommunity water systems (NTNC) and 98% of community water systems (CWS) have designated their available operator(s) in 2019. These recent percentages are consistent when compared to the previous two years and represent a stable and robust trend. While there remains room for improvement in the percentage of NTNC and CWS designating an available operator, the coordination efforts of the operator certification program, training section, and regional operations staff have yielded solid results in improving public health protection by ensuring water systems have properly certified operators operating their facilities.

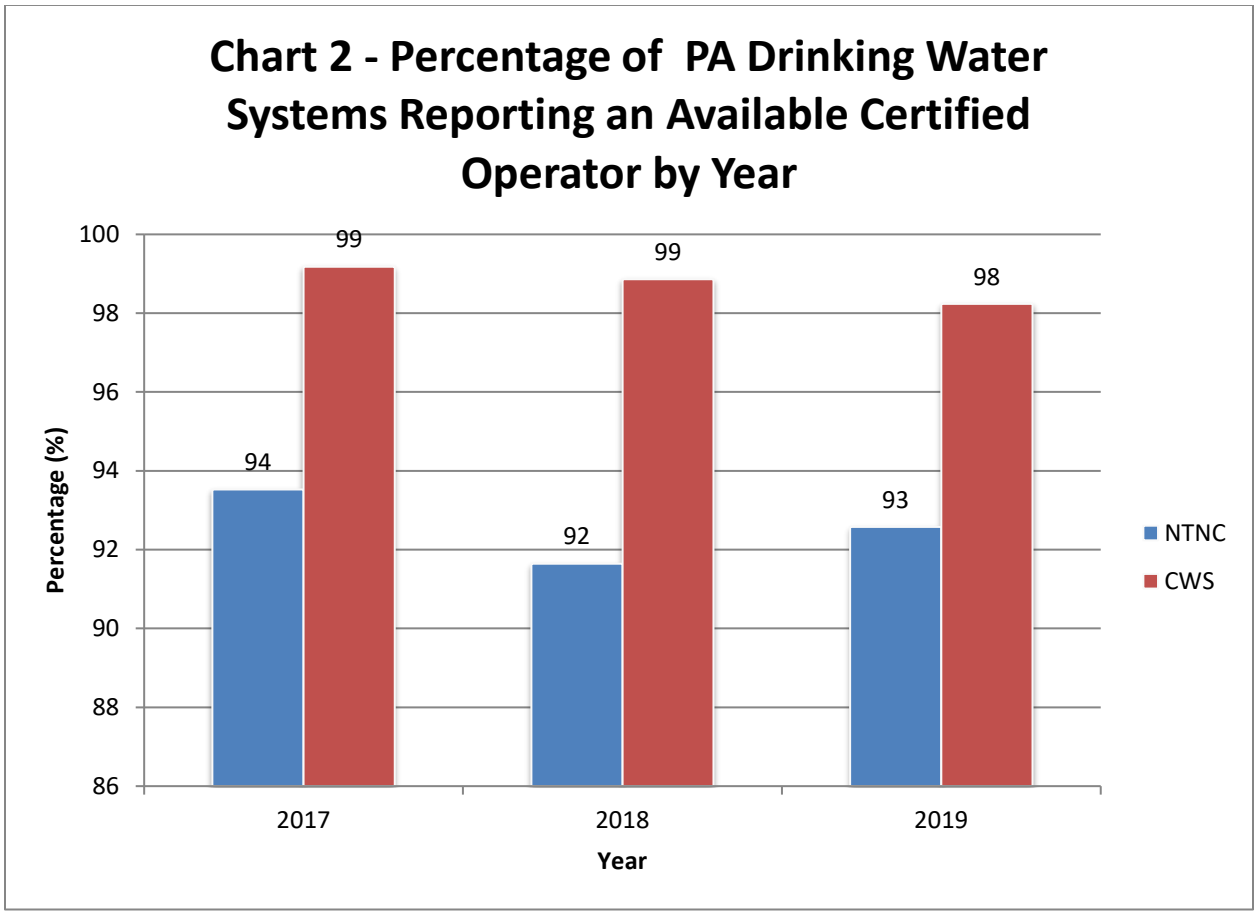
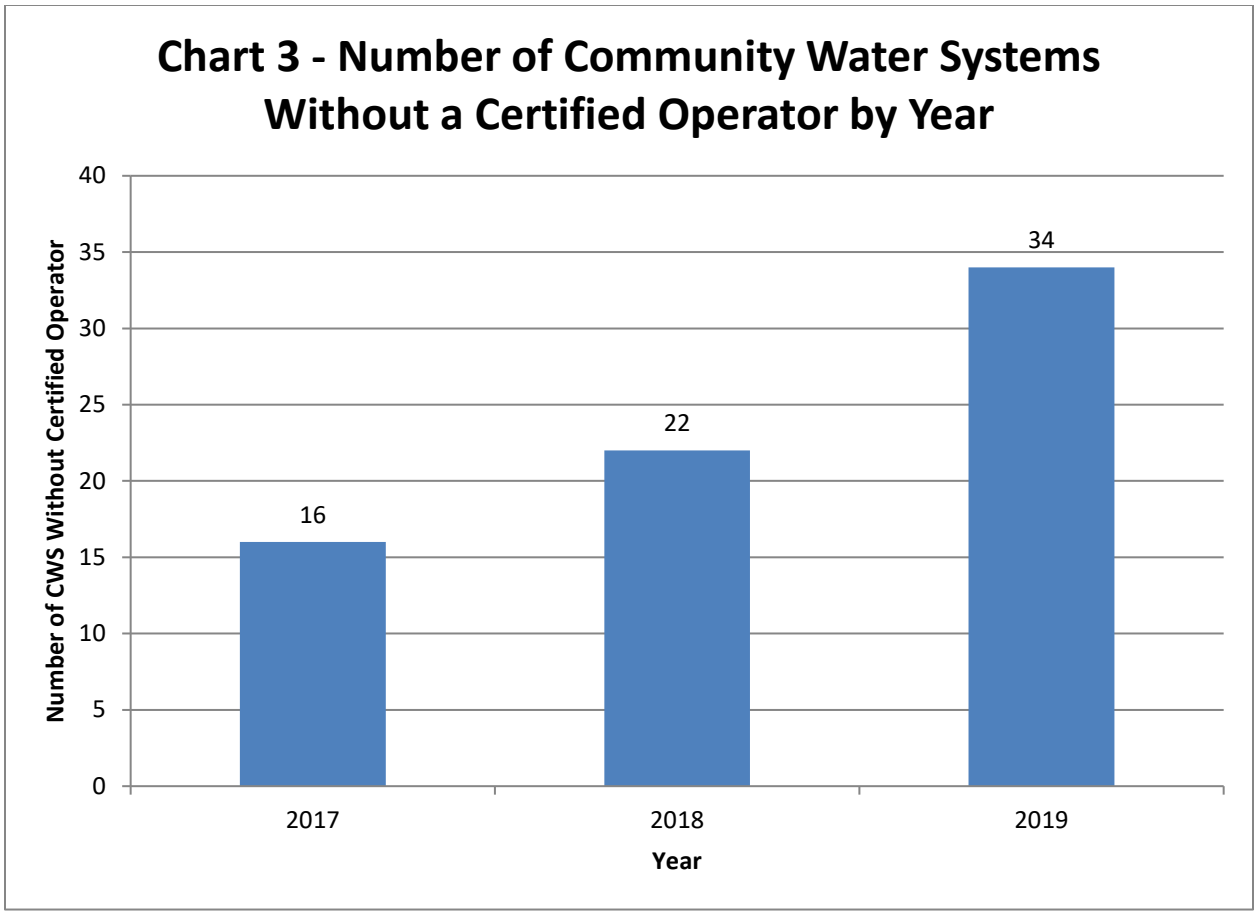
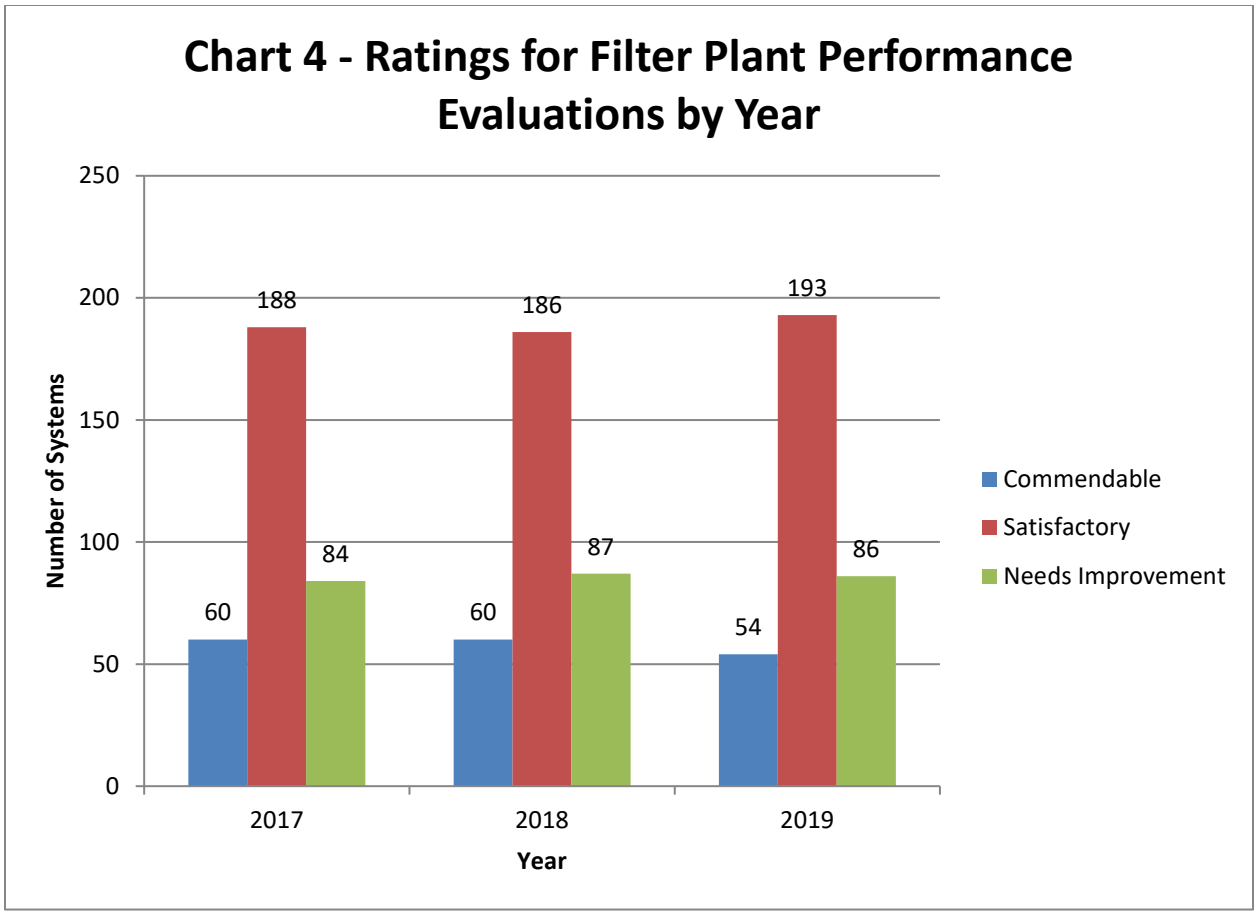


Chart 3 shows that the number of CWS without a properly certified operator has been relatively consistent over the last three years. Efforts by DEP's Operator Certification Program staff and Regional Office staff have helped maintain consistent system compliance. The CEP program's targeted trainings and certification exams have also helped systems obtain and maintain 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 2017 to 2019. Through this comparison, DEP can measure performance improvements at individual filter plants.



Asset Management Incentives and Assistance

DEP is in the process of revising its Capability Enhancement Strategy to incorporate the Asset Management requirements of the 2018 America's Water Infrastructure Act (AWIA). Draft revisions have been shared with EPA Region 3 and the Small Water Systems Technical Assistance Center (TAC) Advisory Board. All comments have been incorporated into the draft strategy and DEP is currently on track to finalize the strategy by the EPA deadline of September 30, 2023.

Additional Capacity Development Initiatives

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.

Distribution System Optimization Program (DSOP)

The aim of the DSOP is to identify and address distribution system water quality and quantity limiting factors related to disinfectant residual, disinfection by-product (DBP) formation, microbial activity, chemical characteristics, distribution operations, and security. The intent of the program is to not only address regulatory requirements, but to also encourage distribution system optimization. Optimization refers to the process of voluntarily striving to improve the effectiveness of treatment processes and operations to improve drinking water quality to the highest levels possible, often exceeding the regulatory requirements. Water systems that choose to pursue optimization believe that doing so will allow them to provide an increased degree of public health protection to their customers.

Public Availability of Report

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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