
Oklahoma Department of Environmental Quality

SFY 2018 Capacity Development
Program Annual Progress Report
to EPA

September 28, 2018

1. Introduction

With the Safe Drinking Water Act (SWDA) Amendments of 1996, Congress put in place a variety of initiatives designed to assist public water systems in providing safe drinking water and complying with the terms of the Act. One of these was the capacity development (CD) initiative, established with the intent of focusing on those systems most in need of assistance, primarily very small systems serving populations of 3,300 or less. CD is the process by which the State of Oklahoma assures that drinking water systems acquire and maintain the *technical, managerial, and financial* (TMF) capabilities to successfully operate.

All states are currently implementing state-specific CD programs tailored to meet water systems' needs. As required in Section 1420 of the Safe Drinking Water Act Amendments of 1996, the Oklahoma Department of Environmental Quality (DEQ) must submit an annual report of CD activities to the United States Environmental Protection Agency (EPA). This report reflects the efficacy of the State's CD Strategy by detailing improvements in the TMF capabilities of the State's public water systems. The annual CD progress report is available on the DEQ's website at <http://www.deq.state.ok.us>.

A *public water system* (PWS) is defined as a system that provides water via piping or other constructed conveyances for human consumption to at least 15 service connections or serves an average of at least 25 people for at least 60 days each year.

There are three types of PWSs:

1. Community Water Supplies (CWS) such as towns and rural water districts;
2. Non-transient non-community (NTNC) systems such as schools or factories; and
3. Non-community (NC) systems such as rest stops or parks.

Of the 1,637 active PWSs in Oklahoma:

- 182 systems use surface water as their primary source;
- 750 use groundwater as their primary source;
- 556 purchase from surface water systems;
- 11 use groundwater under the direct influence of surface water as their primary source;
- 127 purchase from groundwater systems; and
- 11 purchase from groundwater under the direct influence of surface water systems.

Of the 1,637 PWSs in Oklahoma:

- 1,047 are community water systems;
- 89 are non-transient non-community; and
- 501 are non-community water systems.

DEQ has the statutory authority to ensure that all water supply systems have adequate TMF capabilities prior to the construction of a public water facility in Oklahoma.

These capabilities are partly assessed via two DEQ regulatory directives. One directive derives from Oklahoma Administrative Code (OAC) 252-626: Public Water Supply Construction Standards [<http://www.deq.state.ok.us/rules/626.pdf>], which states that a PWS must receive a "Permit-to-Construct" from DEQ prior to initiating construction. Another directive requires all operators of a PWS

to be licensed by DEQ, according to OAC 252:710: Waterworks and Wastewater Works Operator Certification Regulations [<http://www.deq.state.ok.us/rules/710.pdf>].

2. Enforcement and Compliance Mechanisms

DEQ's CD program relies on the success of its enforcement and compliance programs. These two programs are partially funded through the Drinking Water State Revolving Fund (DWSRF) 10% State Program Management Set-Aside, and the 15% Local Assistance and Other State Programs Set-Aside. Funding information is detailed in DEQ's *Final Intended Use Plan, Drinking Water State Revolving Fund, State Fiscal Year 2018*. Note that State's fiscal year is from July 1st to June 30th the following calendar year.

DEQ maintains a strong enforcement program that particularly addresses systems with multiple violations of SDWA requirements. Such systems are referred to DEQ enforcement staff for analysis of the causes behind the violations. When it is determined that enforcement is needed, there are three main legal tools available to the agency to bring about compliance: a Notice of Violation, a Consent Order, and an Administrative Compliance Order. Boil Advisories, while not official enforcement actions, also play a role in addressing SDWA violations.

A **Notice of Violation** (NOV) is the first formal enforcement document issued to facilities upon failure to comply with DEQ rules or regulations. NOV's address matters such as monitoring failures, improper operating procedures, or construction deficiencies. A NOV has a short deadline for compliance, typically fifteen days from the day the water system receives the document.

If it is determined that the system is not likely to regain compliance by the NOV's deadline, DEQ's PWS District Engineer (DE) prepares a **Consent Order** (CO). The CO is a mutual agreement between DEQ and the affected system that cites the system's responsibilities, establishes a longer deadline for returning to compliance (with milestones and deadlines for major steps towards compliance), and specifies fines that may be levied against the system as a result of non-compliance.

An **Administrative Compliance Order** (ACO) is issued when time is limited and there is a significant health hazard, or when a water system refuses to agree to the terms of a CO. In an ACO, DEQ determines what tasks need to be completed and sets deadlines for the completion of these tasks. Both the CO and the ACO stipulate the penalties for failing to meet the required deadlines.

Boil Advisories, while not enforcement actions themselves, are an additional tool used by DEQ to achieve compliance. These notices are issued to systems that have "acute" or "*E. Coli*" bacteriological violations. Boil Advisories require immediate notice to all consumers in order to inform the public of how to produce water that is safe for human consumption.

In calendar year 2017, DEQ issued 3,754 enforcement actions, which consisted of:

- 3,470 informal enforcement letters;
- 273 NOV's and CO's;
- 1 Administrative Compliance Order; and
- 10 Boil Advisories.

A total of 2,253 systems were returned to compliance during calendar year 2017 (some systems returned to compliance more than once).

3. Capacity Development Program Coordinator

The Capacity Development Coordinator (CDC) manages the CD program in Oklahoma. The CDC is responsible for fostering the relationship among the various DEQ drinking water programs, and between DEQ and other state agencies and organizations that are involved with supporting and assisting public water supplies. The overall goal of this effort is maintaining coordinated efforts towards increasing PWS TMF capabilities.

Inside the agency, the CDC chairs the Capacity Development Team, consisting of members from the PWS Enforcement Section, PWS Compliance Tracking Section, Operator Certification Section and the DWSRF Section. The Team’s main goal is to implement DEQ’s Capacity Development Strategy and focus on those systems that have made the Enforcement Targeting Tool (ETT) list and scored 11 points or greater.

Externally, the CDC coordinates with the Oklahoma Water Resources Board (OWRB), Oklahoma Rural Water Association (ORWA), Communities Unlimited (CU), Southwest Environmental Finance Center (SWEFC), Oklahoma Municipal League (OML) and other agencies and organizations that provide TMF training and assistance to water systems. This ensures that open lines of communication exist between the entities and promotes cooperative and complimentary efforts towards achieving water system sustainability.

Table 1 lists the tools currently in use in Oklahoma to assess and enhance TMF capabilities.

Tool	<i>Technical</i>	<i>Managerial</i>	<i>Financial</i>
Construction Permitting	X		
PWS Enforcement	X	X	
Operator Certification	X	X	
SWAP	X	X	
AWOP	X	X	X
DWSRF	X	X	X
CD TMF Assistance	X	X	X
Sanitary Surveys	X		
CUPSS	X	X	X
Regionalization	X	X	X
FACT		X	X
Rate Studies			X
Water Loss Auditing	X	X	X

Table 1: Oklahoma’s Capacity Development Tools.

4. Water Quality Efforts and Participation

A. **Regionalization/Consolidation** - DEQ continued efforts to identify new and existing water systems that may benefit from regionalization and/or consolidation into larger water systems in SFY 2018. Systems were considered for regionalization/consolidation that:

- Have source water capacity limitations (drought);
- Are undergoing DEQ enforcement proceedings;
- Are considering giving away, selling, or abandoning the system; or
- Have expressed interest in regionalization or consolidation.

In SFY 2018, 2 water systems consolidated into neighboring water systems. Both of these systems were small rural water districts that became part of larger neighboring systems. In SFY 2018, no NC water systems were incorporated into neighboring community water systems. The systems that were consolidated were:

- Pryor East Rural Water District 1– now a part of the City of Pryor PWS;
- Osage County Rural Water District 9– now a part of Osage County Rural Water District 15;

Incorporating NC water supplies into CWSs enhances public health by providing the former non-community systems with water that is more thoroughly tested and often more plentiful and reliable than they were able to produce on their own. DEQ will continue to seek out NC water supplies that are struggling with compliance and will help them consider regionalization and/or consolidation, if appropriate for their situations.

The DWSRF has also offered principal forgiveness for entities agreeing to regionalize or consolidate. This satisfies EPA’s requirement that at least 20%, but no more than 30% of the capitalization grant must be utilized as additional subsidies. Subsidization was given as principal forgiveness for projects that regionalize or consolidate water systems that meet specific requirements. In SFY 2018, one water system was offered principal forgiveness for consolidation or regionalization:

- Pittsburg Rural Water District 14 is abandoning an aging and dilapidated surface water treatment plant and will construct a water line and pump station to begin purchasing water from the Pittsburg County Water Authority;

This project will receive \$1,033,500 in principal forgiveness.

This was the last project that the DWSRF will provide principal forgiveness to for regionalization / consolidation. Work towards promoting regionalization and/or consolidation where appropriate will continue, aimed at achieving the best and most reliable service at reasonable rates for the long-term benefit of the customers, but future DWSRF principal forgiveness efforts will focus on disinfection byproduct reduction projects.

B. The **Funding Agency Coordinating Team (FACT)**, hosted by ORWA, is comprised of the following state and federal agencies and organizations:

- DEQ;

- Oklahoma Department of Commerce;
- Oklahoma Water Resources Board;
- Indian Health Service;
- U.S. Department of Agriculture – Rural Development;
- Oklahoma Association of Regional Councils;
- Communities Unlimited;
- EPA;
- Cherokee Nation; and
- Chickasaw Nation.

FACT meets quarterly to discuss the status of Oklahoma community water supplies identified in DEQ's enforcement list and to coordinate water and wastewater project funding. Before each meeting, invitations are extended to a few water and/or wastewater systems from across the state that are contending with severe problems and have the greatest *financial* need. Guests are invited for the purpose of helping them identify the best source of project funding as efficiently and effectively as possible.

With every public financing agency present at FACT, communication barriers are reduced and application processes are streamlined, resulting in rapid assistance. FACT provides a single uniform method for requesting funding and regulatory approvals, and it offers guides, checklists, and forms that are accepted by all FACT-participating agencies. DEQ has been a member of FACT since its inception in the early 1990s and has been instrumental in crafting an organization that helps to correct some of Oklahoma's most difficult to solve public water supply issues. The CDC is an important member of FACT and serves by coordinating the process of inviting water and wastewater systems to FACT, distributing background information about the invited guests to FACT members, and assisting with logistics and questions invited guests may have during the meetings.

The assistance provided by FACT has been universally praised by invited water systems, which provide feedback by voluntarily completing a brief survey immediately following the FACT meeting and a follow-up survey a few months later. Survey responses are used to fine-tune the assistance provided by FACT and help plan the direction of subsequent FACT meetings.

5. Water Quality Programs

A. The ***Construction Permitting Program*** assures *technical* adequacy by reviewing water system construction plans and specifications. This *technical* review helps determine the sufficiency of the source water and the water system infrastructure.

B. The ***PWS Enforcement Program*** also assures the *technical* capabilities of water systems by providing *technical* training to water systems on operations and security and addresses *managerial* capabilities by providing training to water system managers.

C. The ***Operator Certification Program*** is charged with training and licensing persons working in water and wastewater facilities in the State. Programmatic oversight helps to ensure that operators have the proper *technical* training to properly treat and monitor drinking water supplied to the public. Also, with oversight from the DEQ Operator Certification section, ORWA provides study material and training for

operators of all classifications of water facilities, as well as *managerial* training for system managers and board members. The examinations for operators are administered by the ORWA by means of a DEQ contract, and during SFY18, 967 individual water operator exams and 165 water laboratory operator exams were given. Also during SFY 2018, all 1,637 public water supply systems had available an appropriately licensed operator in responsible charge.

In addition to the training offered by ORWA, training is available in classroom settings (taught by DEQ and other certified instructors/agencies) and via the internet several times during the year. Online classes and exams for operators and other environmental professionals are available at any place with an internet connection.

D. The **Source Water Assessment Program (SWAP)** provides a focus on water quality anti-degradation and protection of beneficial uses for both surface and ground waters.

The SDWA Amendments require development and implementation of a SWAP to analyze existing and potential threats to the quality of the public drinking water throughout the state. DEQ maintains approval from EPA to administer the SWAP program. The SWAP program in Oklahoma was developed utilizing EPA's *Source Water Assessment and Protection Programs Guidance*, and SWAP assessments include the following:

- Delineation of the source water protection area;
- Inventory of the potential contaminant sources within the area;
- Determination of the susceptibility of the PWS to contamination from the inventoried sources; and
- Release of the results of the assessments to the public.

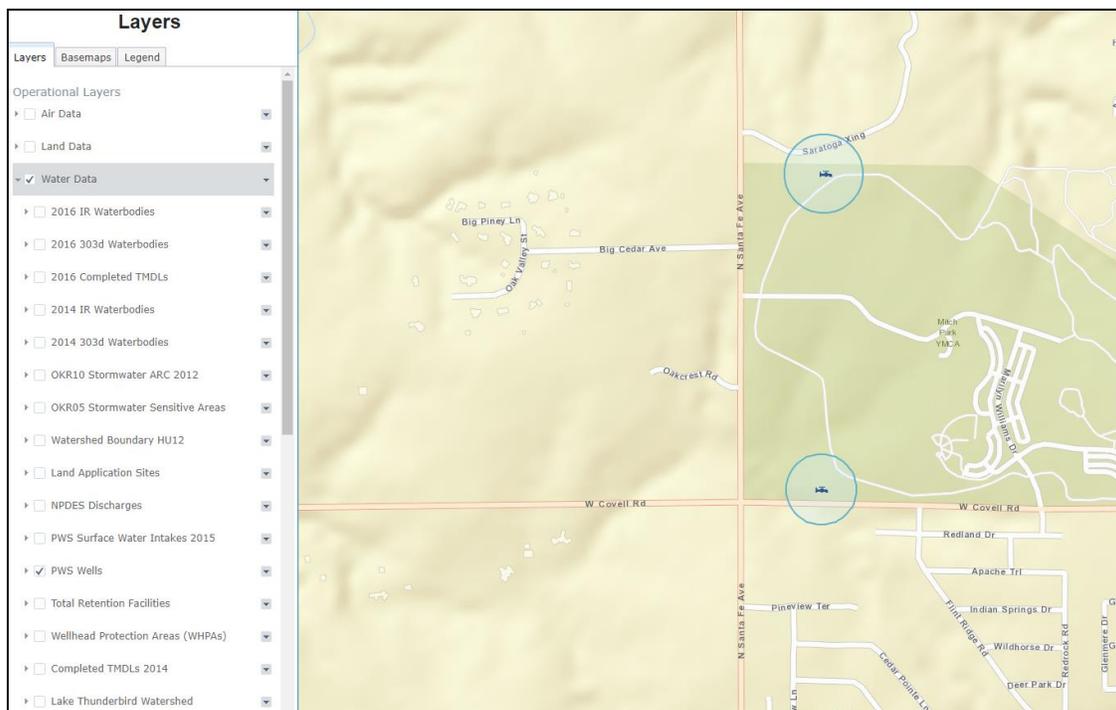


Figure 1: Sample map indicating location of well and wellhead protection areas.

The data collected from a SWAP is summarized in the water system's annual Consumer Confidence Report, which identifies the system's vulnerability and susceptibility score. This report is available for public review.

Much of data found in a SWAP is also available via a geographic information system on the DEQ website. All DEQ-regulated discharges, wells, surface intakes, and other planning information can be found through an interactive mapping system that allows the user to view any combination of items on the map. A map may be viewed that includes the system's water source (ground or surface) and all known contaminants located within a defined distance from the proposed well site.

E. The *Area-Wide Optimization Program (AWOP)* was piloted in April 1999 in Oklahoma by EPA Region 6. This program started as a multi-state effort to optimize particle removal and disinfection capabilities of filtration water treatment plants. The goal of AWOP is to maximize public health protection from disease-causing microbial contaminants by identifying performance problems in the water treatment and distribution system. Following the AWOP model is one of the most cost-effective and economical ways a PWS can improve their ability to produce safe drinking water. Water systems having the most trouble with their filtration treatment are identified and prioritized in terms of their need for assistance.

EPA Region 6 and Process Applications, Inc. in Fort Collins, CO, have assisted in the development of AWOP. The States of Arkansas, Iowa, Louisiana, Missouri, New Mexico, Oklahoma, and Texas are participants in the EPA Region 6 AWOP group, and a larger AWOP "super" group has been created with states from Region 7 (Missouri, Iowa, and Kansas). DEQ continues its involvement in AWOP by attending quarterly regional and biennial national meetings and by participating in and hosting multi-state comprehensive performance evaluations (CPE) and training workshops.



Figure 2: Conducting a Filter Study during the Wagoner RWD 4 CPE.

Since 1997, DEQ has conducted 23 optimization and two mandatory CPEs of water systems in the state. The original scope of the CPE effort was and continues to be to assist the community and to train

engineers in understanding the intricacies of optimizing water treatment. A CPE provides analysis of the facility's design capabilities and a system's administrative, operational, and maintenance practices, leading to a report that addresses the *TMF* aspects of the water system. Following the CPE, the participating water system receives a report within 60 days from DEQ that outlines factors that may influence the optimization of its treatment operations.

In Oklahoma, the AWOP Coordinator and the CDC have been collaborating to find ways to further the incorporation of *TMF* concepts in the CPE process, with a focus on bolstering the administrative review with elements from the capacity development program, including *TMF* assessments and water loss audits.

F. The ***Drinking Water State Revolving Fund Loan Program*** was established by the 1996 SDWA Amendments, which allowed EPA to make a capitalization grant to Oklahoma to fund the DWSRF loan program. This program, co-managed by DEQ and OWRB, is dedicated to providing low-interest loans to upgrade public water system infrastructures. It is designed to help those in greatest need based on a priority system that places a primary emphasis on drinking water quality. DWSRF Project Engineers assure the *technical* capabilities of water systems by reviewing engineering reports on proposed construction projects. Borrowers also receive *technical*, *managerial*, and *financial* assistance from the CDC, who conducts a capacity development assessment and water loss audit on each borrower, providing assistance and guidance to correct any found deficiencies.

Currently, 16 water systems are on the DWSRF Project Priority List for a total of over \$103 Million in projects to be funded within the next few years. DWSRF applicants are assisted throughout the planning, design, bidding, contracting and construction phases of their project by DEQ engineers, environmental specialists, and the CDC. Applications for the DWSRF program are accepted at any time throughout the year.

From 1998 to the present, the program has entered into binding commitments totaling over \$1,134,423,636 to fund a total of 179 water system upgrades. In addition to funding infrastructure improvements, the program funds the CD, Small System Technical Assistance, and SWAP programs, partially funds the PWS Program, and is funding the agency's water loss auditing work.

G. The PWS ***Sanitary Survey Program*** is implemented by DEQ, in cooperation with EPA Region 6. In the course of conducting inspections, field staffs from the Environmental Complaints and Local Services (ECLS) and WQD divisions of DEQ provide *technical* assistance to PWS system personnel in resolving compliance issues. Across the state, ECLS staff members inspect surface water systems quarterly and ground water systems semiannually. A total of 1,869 PWS monitoring inspections were performed by ECLS in SFY 2018.

6. Challenges to Oklahoma's Capacity Development Strategy

Mile for mile, Oklahoma offers the nation's most diverse terrain. It is one of only four states with more than ten ecoregions, and has by far the most changes in ecoregions per mile in America. Oklahoma's ecoregions, terrains, and subclimates include everything from Rocky Mountain foothills to cypress swamps, from tallgrass prairies to hardwood forests, and pine-covered mountains. Each is graced with wide blue lakes, tumbling freshwater rivers, and peaceful country streams. Additionally, there is one

man-made type of terrain: urban turf. This wide variety of ecoregions creates source waters with a correspondingly wide range of quality and conditions. This variability in source water quality creates a correspondingly wide variety of treatment challenges for public water supplies.

EPA sets national limits on contaminant levels in drinking water to ensure that the water is safe for human consumption; these limits are known as maximum contaminant levels (MCL). For some regulations, EPA establishes treatment techniques (TT) in lieu of an MCL to control unacceptable levels of contaminants.

Figure 3 shows the yearly trend in the percentage of systems in Oklahoma reporting no MCL or TT violations.

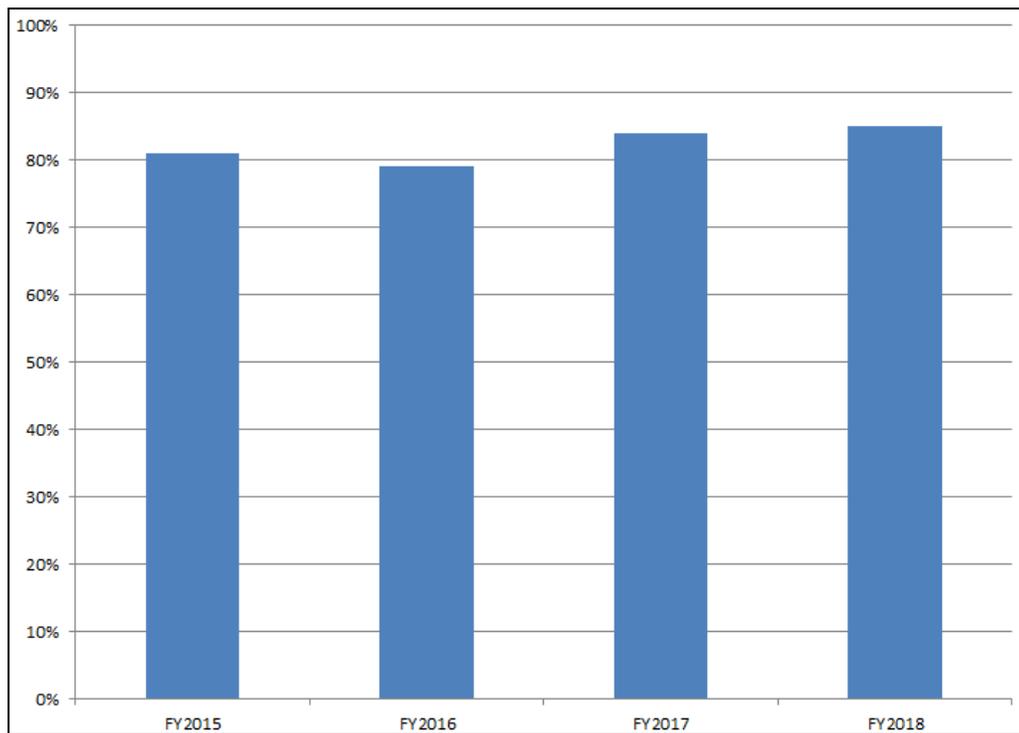


Figure 3: Percent of Systems Reporting No Violations

The State of Oklahoma’s PWS Program currently oversees 1,637 active entities that meet the federal definition of a PWS. Of these, 1,391, or approximately 85%, reported no MCL or TT violations.

Of the 1,637 PWSs in Oklahoma during the calendar year 2017:

- Five systems had 21 violations for exceeding the MCL for arsenic;
- Three systems had violations for arsenic monitoring;
- One system had five violations for exceeding the MCL of the Inorganic Contaminant (IOC) group;
- No systems had violations for IOC group monitoring;
- 26 systems had 68 violations for exceeding the nitrate MCL in at least one of their wells;
- 61 systems had 70 nitrate monitoring violations;
- No systems had Synthetic Organic Contaminant (SOC) group MCL violations;

- Three systems had four SOC group monitoring violations;
- Two systems had four violations of Volatile Organic Carbon (VOC) MCLs;
- 20 systems had 721 violations of VOC monitoring;
- Six systems had 27 Radionuclide MCL violations;
- 24 systems had 148 violations for Radionuclides monitoring;
- 204 systems had 1,021 violations of the Disinfection Byproducts Rule (DBPR) MCL;
- 28 systems had 71 violations of the DBPR Treatment Technique requirement;
- 218 systems had 658 DBPR monitoring violations;
- Six systems had seven Revised Total Coliform Rule (RTCR) acute MCL violations, leading to seven mandatory boil orders that were issued based on positive fecal coliform or E-coli test results;
- 305 systems had 705 RTCR MCL violations that indicated a confirmed coliform positive sample;
- 22 systems had 94 violations of the Surface Water Treatment Rule (SWTR) monitoring requirements;
- 13 surface water PWS systems had 35 Surface Water Treatment Rule (SWTR) Treatment Technique violations;
- One system had a treatment technique violations of the Lead and Copper Rule;
- 41 systems had 63 Lead and Copper Rule Monitoring violations; and
- Five systems had 38 violations related to failure to perform public notice and 132 systems had failure to submit a Consumer Confidence Report (CCR) and/or their CCR certification.

Per Section I of The State of Oklahoma Capacity Development Strategy, DEQ ensures that new systems have *TMF* capabilities to provide safe and affordable drinking water. All new systems are referred to the CDC, who then assesses the system's *TMF* capabilities. The CDC then ensures that the system has an appropriately certified operator, notes the dates of sanitary surveys/inspections, determines if plans & specifications were submitted to and approved by DEQ, and makes TA referrals as indicated. One new community system was identified by DEQ in SFY 2018.

7. ETT Implementation

At the direction of EPA, DEQ has implemented an Enforcement Response Policy (ERP) and Enforcement Target Tool (ETT) aimed to identify PWSs with health-based violations as opposed to the previous approach, where all the significant non-compliance (SNC) systems were treated equally regardless of the severity of the violation.

This approach utilizes the ETT formula as a basis for determining a PWS's enforcement priority points. It will also be used to help identify and prioritize systems for enforcement response. In the formula, violations that pose a greater risk to public health are given greater importance. The formula calculates a score for each system based on open-ended violations and violations that have occurred over the past 5 years, but does not include violations that have returned to compliance or are on the "path to compliance" through a specified enforcement action.

Under this policy, violation types are "weighted" with points being assigned for each violation type based on its threat to public health. Points for each "unaddressed" violation are added together to

provide total score for each water system. Water systems whose scores exceed “11” are considered priority systems for enforcement unless the violations can be returned to compliance within six months.

ETT scores for PWS systems are available at <https://echo.epa.gov>.

Table 2 lists four community and non-transient non-community PWS systems that were created during the SFY 2015.

PWS ID Number	System Name
OK2005883	Wyandotte Tribe of Oklahoma
OK4007082	Tri-County Electric Cooperative
OK3006034	Hilltop MHP (Payne Co)
OK5001413	Pottawatomie Co RWD #3 (Dale Plant)

Table 2: The five community and non-transient non-community systems that became active during SFY 2015.

None of the above-listed PWSs were assessed ETT scores of greater than or equal to 11 during their first three years of operation. One of the systems, Hilltop MHP (Payne Co), was placed on the ETT list starting in SFY 2019 (7/1/18); however, this is outside of the “first three years of operation” specification required by this report. Hilltop MHP (Payne Co) is a purchase system buying water from the City of Stillwater PWS, and may soon be inactivated due to a change in the Oklahoma’s definition of PWS.

8. Program Initiatives

A. Water Loss Auditing - For SFY 2019 and beyond, DEQ is continuing efforts to promote water loss auditing at water supplies across the state. The water loss audits, conducted according to the American Water Works Association (AWWA) M36 method, are part of an initiative where local DEQ inspectors both conduct the audit for the system free of charge and teach the water system operators how the process works so that they can conduct their own auditing in the future.

With the recent drought and ever tightening budgets significantly impacting the state’s water systems, efficient use of water resources has become a primary concern. Water loss auditing is rapidly becoming one of the most effective tools in the agency’s capacity development toolkit for addressing this concern by promoting water system sustainability.

The value of water loss auditing is two-fold. First, it provides an accurate assessment of the levels of real and apparent water loss occurring in a PWS, which in most cases is a significant improvement in the quality and accuracy of the system’s water loss information. Secondly, the result of a water loss audit is the roadmap for taking action to reduce the loss, guiding what steps are needed to keep more water in the pipes, and more revenue in the water system budget.

Water systems that begin regular water loss auditing and start a program of addressing water loss can enhance their sustainability by:

- *Delaying or eliminating the need to develop additional sources of water* – a water system may be able to delay the costly development of new water sources and can serve additional customers with the water sources at hand.
- *Increasing Revenue Collections* - addressing water loss can help a system recover revenue lost through under-registering meters, theft, and by reducing operations and repair costs.
- *Improving System Operations* - reducing water loss can also improve system operations by helping to increase operator knowledge of the distribution system, reducing service outages and the potential for cross-contamination.
- *Improving System Integrity* – implementing a water loss program can improve system data accuracy and integrity by finding and correcting problems with metering, record keeping, and data management.

In SFY 2018, 52 water loss audits were conducted, contributing to a total of 119 completed since the beginning of the program in SFY 2015. In the past year, 1.6 billion gallons/year of real loss and 200 million gallons/year of apparent loss were identified by water loss auditing.

B. Capacity Development Baseline Assessments - During SFY 2018, DEQ began conducting a state-wide Capacity Development Assessment of all Oklahoma municipal water supplies and rural water districts serving 10,000 or fewer people. The ultimate goal of this project will be a benchmark Capacity Development score, based on the cumulative result of the assessment, that will serve as a metric of the state of *Technical, Managerial, and Financial* capacity at Oklahoma community water supplies.

The project is being completed in stages and relies on staff from the ECLS division of DEQ conducting CD assessments at one-third of the 711 qualifying PWS each year. At the end of the third year, the results of the CD assessments will be compiled to calculate the CD benchmark score. After the third year and on each subsequent year, ECLS inspectors will return to a third of the assessed PWSs to conduct a follow-up CD assessment, creating an opportunity to gauge improvement at individual systems and leading to an updated CD benchmark score each year.

The results of the project are being used to more accurately determine the current *Technical, Managerial, and Financial* CD needs of Oklahoma's PWSs, leading to more targeted and relevant guidance for the agency and its technical assistance-providing partners. The results will also provide valuable feedback on the effectiveness of current technical assistance efforts and suggest areas for improvement.

As of the end of SFY 2018, 192 of the 711 targeted systems have been assessed. Table 3 on the next page summarizes the top ten *TMF* issues discovered during the assessment:

Technical / Managerial / Financial Capacity Need	Percentage and Number of Systems Needing Assistance.
No mutual aid assistance available	76.88% / 148
No plan for regular backflow preventer maintenance	69.95% / 135
Have not conducted an energy audit	66.32% / 128
No plan to eliminate dead ends where feasible	57.71% / 116
No regular water loss auditing / tracking	57.51 % / 111
No board review of O&M plans	56.99% / 110
No communication policy	48.70% / 94
No strategic plan	48.7% / 94
No requirement for backflow preventers where potential for contamination is high	45.6% / 88
No operations and maintenance plan	45.6% / 88

Table 3: Top Ten TMF Issues Found During the First Year of the CD Baseline Assessment Project

The issues identified during the first year of the CD baseline assessment will be used to guide technical assistance efforts at DEQ and will be shared with ORWA, CU, EFC, and other organizations that regularly provide help to Oklahoma PWS systems.

9. Success

A. Water Loss Reduction via Leak Detection and Meter Analysis - The results of DEQ’s water loss auditing work across the state indicated that several of the audited PWSs were dealing with significant levels of either real loss, apparent loss, or both. When coupled with high data validity, these results are both reflective of actual conditions at the PWS and indicators that leak detection and/or meter analysis would help pinpoint areas where PWSs could take physical steps to reduce water loss.

To help bridge the gap between identifying water loss and correcting it, DEQ contracted with the ORWA to conduct leak detection and meter analysis at audited PWSs where the audit results indicated a data validity score of greater than 50 and either non-revenue water (as percentage of supply) at 20% or greater, apparent losses greater than 10 gallon/customer/meter/day, or both. During SFY 2018, ORWA conducted on-site technical assistance with 14 audited PWSs, helping 12 systems locate water leaks and two conduct meter analysis. The technical assistance provided by ORWA was similar to DEQ’s water loss audit training in that ORWA staff both conducted leak detection and meter analysis work and training PWSs system staff how to do the work themselves.

ORWA field personnel and PWS system staff identified and located leaks using zone metering, night listening, and leak correlators, and in many instances were able to assist the PWS in uncovering and repairing the line leaks at the time of discovery or shortly thereafter. For systems with high suspected levels of apparent loss, 10% of the oldest customer meters were tested by comparing flows with a meter of known accuracy, and meters with an error percentage greater than 2% (+/-) were identified with recommendations for replacement.

Table 4 below summarizes the findings observed during the latest year of ORWA leak detection and meter analysis technical assistance:

Leaks Located by Field Work	52
Real Loss Identified by Field Work	296 MG/year
Leaks Repaired During Field Work	12
Real Loss Eliminated By Repair	82 MG/year
Value of Real Loss Eliminated by Repair	\$176,317/year
Percentage of Real Loss Identified by Audit Found by Leak Detection	108%
Customer Meters Out of Compliance	42% of tested meters

Table 4: Summary of ORWA Leak Detection and Meter Analysis Technical Assistance in SFY 2018.

The success of the ORWA leak detection and meter analysis project lies is two-fold. Primarily, the work being conducted by ORWA is creating real water and revenue savings for the participating systems; more water is staying in system pipes and more money is staying in system budgets. Secondly, and perhaps more importantly, the work is completing the link between the time and effort investing in water loss auditing and the real savings that can be achieved by acting on the audit results.

In making a PWS system aware of its water loss problems, giving it the information they need to solve them, and demonstrating how to mitigate those problems to save water and money, DEQ and ORWA is enhancing sustainability and helping to create water systems that are more resilient to natural disasters, climate change, and anything else that may impact them.

10. Summary and Future Plans

Enhancing the *technical, managerial, and financial* capacities of Oklahoma’s water supplies is a group effort. The continued success of the DEQ CD program is dependent on the efforts of the PWS Enforcement Section the PWS Engineering Section, Operator Certification Section, DWSRF staff, and the various agencies that represent FACT. This cooperative effort is very effective at promoting CD enhancement, but we believe it can be made more effective when efforts are targeted to where they are needed most. To this end, we are looking forward to utilizing the results of the state-wide CD assessments to guide technical assistance efforts and to target systems that need the most assistance.

Also, DEQ will continue to build on the success of the water loss control program by performing additional water loss audits at PWS that request the help and by continuing funding for ORWA’s work conducting leak detection and meter analysis technical assistance. In contrast to other states where water loss auditing and control is involuntary, we believe we can obtain significant cooperating and meaningful results via voluntary participation and free technical assistance. Our future results should bear out this belief.

But determining which systems have the most problems and offering help is only part of the solution. DEQ is also looking to promote systems that have high levels of TMF capacity via a new program called the **AWOP Awards Program**. The AWOP Awards program builds off of the successes of the AWOP, CD, and Water Loss Auditing programs by promoting complete adaptation of the tenets of each. PWS

systems that volunteer to participate in the program work to maximize drinking water quality and system efficiency by optimizing water treatment processes and system operations.

All Oklahoma PWS systems are encouraged to participate in the AWOP Awards program, and participants are divided into three categories:

- Surface Water / Groundwater Under the Direct Influence of Surface Water (GWUDI) Systems,
- Groundwater Systems, and
- Purchase Water Systems.



Figure 4: AWOP Awards Program Logo

In each division, systems are scored according to performance on the following criteria:

- Surface Water / GWUDI Systems:
 - CDA
 - Water Loss
 - Monitoring and Reporting
 - MCL Violations
 - Distribution System Monitoring
 - Turbidity (including all IFE, CFE, and settled water turbidity data)
 - Concentration Time (inactivation of Giardia and Viruses)
- Groundwater and Purchase Systems:
 - CDA
 - Water Loss
 - Monitoring and Reporting
 - MCL Violations
 - Distribution System Monitoring

One PWS system in each division will be recognized as the most highly optimized PWS in the state, and will receive exclusive recognition including a flag to fly above the facility or display in the facility's office, recognition on the DEQ's website and via press releases, and personal presentation of the awards by DEQ staff. However, all participants in the program who complete the requirements will receive a certificate of optimization as proof and recognition that the system has completed optimization and is a member of an elite group of the best PWS in the state.

11. References

Oklahoma Capacity Development Strategy Document

2017 DWSRF Intended Use Plan

2017 State of Oklahoma Public Water Supply Program Annual Compliance Report