# Pennsylvania
# Public Water System
# Compliance Report - 2005

## Table of Contents

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## 1. Introduction

### Pennsylvania's Safe Drinking Water Program

Section 1414(c)(3)(A)(i) of the amended federal Safe Drinking Water Act (SDWA) requires States with primacy to prepare and submit to EPA an annual report on public water system violations. This report fulfills that requirement by providing a summary of the incidence of Pennsylvania public water system (PWS) maximum contaminant level (MCL), maximum residual disinfectant level (MRDL), significant monitoring/reporting (M/R), treatment technique (TT), consumer confidence report rule (CCR), and public notification (PN) violations for the calendar year 2005. The level of compliance and efforts being undertaken to provide safe drinking water to the residents and travelers of Pennsylvania are also highlighted. The full report is available on the Department of Environmental Protection (DEP) web site and in hard copy. See the last page of this report for details.

## Public Water System - Definitions

**Public Water System (PWS):** A system that provides piped water 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. PWSs can be community, nontransient noncommunity, or transient noncommunity systems.

**Community Water System (CWS):** A PWS that provides water to the same population year-round. Examples are municipal systems, authorities, and mobile home parks or residential developments with their own water supplies.

**Large CWS** - Serves greater than 50,000 people.

**Medium CWS** - Serves 3,301 - 50,000 people.

**Small CWS** - Serves 3,300 or fewer people.

**Nontransient Noncommunity Water System (NTNCWS):** A PWS that is not a CWS, but that regularly serves at least 25 of the same people at least six months of the year. Examples include schools, factories, and hospitals that have their own water supplies.

**Transient Noncommunity Water System (TNCWS):** A system that caters to transitory customers in non-residential areas such as campgrounds, motels, and restaurants having their own water supplies.

## Background

Under the authority of the 1974 Safe Drinking Water Act (SDWA), the US Environmental Protection Agency (EPA) established the Public Water System Supervision (PWSS) Program. With the 1986 Amendments to the SDWA, EPA set 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 (MCLs). For some regulations, EPA established treatment techniques in lieu of an MCL to control unacceptable levels of contaminants in drinking water. The Agency's regulations also establish how often public water systems monitor their water for contaminants and report the monitoring result to the states or EPA. Generally, the larger the population served by a water system, the more frequent the monitoring and reporting requirements. In addition, EPA requires PWSs to monitor for unregulated contaminants to provide data for future regulatory development. Finally, EPA requires PWSs to notify the public when they have violated these regulations. The 1996 Amendments to the SDWA require public notification to include a clear and understandable explanation of the nature of the violation, its potential adverse health effects, steps that the PWS is undertaking to correct the violation and the possibility of alternative water supplies during the violation.

Drinking water first came under regulation in Pennsylvania in 1905 with the passage of the Public Water Supply Law. The 1905 Law was passed in response to wide spread disease outbreaks that had been attributed to microbiological contamination of public water supplies. Approximately 1,200 systems were regulated under the Law for about 20 contaminants for which the US Public Health Service had established drinking water standards. Public water supplies were regulated under the 1905 Law for almost 80 years when a new wave of waterborne disease outbreaks necessitated the establishment of better authorities to protect public health.

The SDWA allows states and territories to seek EPA approval (primacy) to administer their own PWSS programs. The Pennsylvania Safe Drinking Water Act was signed into law in 1984 after several communities experienced waterborne disease outbreaks caused by the presence of *Giardia* in their drinking water. In the following year Pennsylvania was awarded primacy under the SDWA. The DEP's Bureau of Water Standards and Facility Regulation (formerly the Bureau of Water Supply and Wastewater Management) administered the PWSS program in 2005. Under the 1905 Public Water Supply Law, Pennsylvania led the nation in waterborne disease outbreaks, averaging eight to ten per year. Today, DEP regulates nearly 10,000 public water systems serving over ten million people. Through improved water quality regulation under the 1984 Act, waterborne disease outbreaks are now a very rare occurrence in Pennsylvania's public water systems.

## Sources of Drinking Water Contamination

Contaminants may enter drinking water before, during, or after treatment. The majority of PWSs treat their water, as necessary, to ensure that their customers receive water that is safe to drink. Some sources of drinking water contaminants are as follows:

**Before Treatment**

- Bacteria from human or animal sources
- Turbidity in water caused by suspended matter such as clay, silt, and microscopic organisms
- Overflowing storm sewers
- Defective storage tanks
- Leaking hazardous landfills, ponds, and pits
- Saltwater intruding on depleted aquifers near seashores
- Pesticides, fertilizers, and other agricultural run-off
- Run-off from oil-slicked or salt-treated highways
- Underground injection of hazardous wastes
- Naturally-occurring fluoride and metals such as arsenic and cadmium
- Decay products of radon, radium, and uranium
- Industrial chemicals, such as solvents

**During Treatment**

- By-products of disinfectants such as trihalomethanes and haloacetic acids

**After Treatment**

- Lead, copper, asbestos, and other materials from corroding pipes
- Bacteria and dirt entering through leaking pipes
- Improper connections with other systems or cross-connections with non-potable water that allow contaminants to enter drinking water pipes
- Permeation of contaminants through certain pipe materials

## Improved Public Health Protection

The reduction in waterborne disease outbreaks in Pennsylvania over the last 16 years is due in part to Pennsylvania's filtration requirements. On March 25, 1989, when the Commonwealth of Pennsylvania adopted the filtration regulations, 231 public water systems were using unfiltered surface water sources. These systems ultimately filtered or abandoned the sources. Filtration plants have been constructed for nearly all of the state's unfiltered surface water sources and work on the remaining two sources is scheduled for completion in the near future. To assure that Pennsylvania's 354 filtration plants maximize public health protection for their customers, DEP initiated the Filter Plant Performance Evaluation Program in 1988. The program is a cooperative effort between DEP and plant personnel to

assure workers optimize the removal of disease-causing organisms at their facilities. See Chapter 3 for additional information.

DEP is also helping to prevent waterborne diseases through the Partnership for Safe Water program. The Partnership, which is voluntary, encourages water systems to self-assess and optimize their surface water treatment plants and prepare for new regulations. Partnership participation exemplifies a system's strong commitment to providing safe drinking water to consumers by minimizing breakthrough of disease-causing microorganisms into the finished water. The DEP contract with the Pennsylvania Section of the American Water Works Association to encourage filtered water systems to enroll in the program has resulted in membership for 108 of the state's filter plants. The state holds over 25 percent of the plants enrolled at the national level. In fact, Pennsylvania has more members than any other state in the nation. To date, 44 filter plants have completed detailed self-assessment reports that include action plans to voluntarily correct identified problems and ultimately optimize treatment. Altogether, the 108 filter plants serve about 5.2 million people, which is a large portion of the 8.4 million people who receive some or all of their drinking water from Pennsylvania's surface water systems.

In addition to these special efforts to improve the microbiological safety of drinking water, DEP currently regulates 92 contaminants – an increase from about 20 in 1984. Current regulations are set for 20 inorganic contaminants, 4 radionuclides, turbidity, 8 microbial contaminants or indicator organisms, and 60 organic contaminants. Maximum contaminant levels (MCLs) have been set for 83 contaminants, and nine contaminants have treatment technique requirements. See Chapter 2 for additional information.

## Source Water Assessment and Protection Program

EPA approved Pennsylvania's Source Water Assessment and Protection (SWAP) Program in March 2000. The SWAP Program was required under the 1996 Amendments to the Safe Drinking Water Act and describes how Pennsylvania will assess all sources of public drinking water for their susceptibility to contamination. The keystone to the SWAPP is the state's Wellhead Protection Program (WHPP) that was approved by EPA in March 1999. Ninety-eight percent of the assessments for the active 1999 sources were completed by December 31, 2005.

Projects to support development of local, voluntary source water protection are in place. These include grants with the League of Women Voters of PA Citizen Education Fund to administer community based education grants to coalitions of local and regional organizations involved with water resources education projects and for statewide education and promotion projects, and a grant to the PA Rural Water Association for water supplier assistance in developing local WHPP development. A source water protection grant program has been operating since 2000 and grants have been awarded to 87 public water systems or municipalities to develop and implement local source water protection programs. A guidebook for developing local source water protection is available on CD and on the PA DEP web site. Over 320 Wellhead Protection Programs have been established in Pennsylvania. There are 52 surface water sources with established watershed protection

strategies. In addition to this number, there are another 48 surface water based community water systems participating in early warning and spill detection networks on the major rivers in the state.

## Financial, Technical, and Educational Assistance

To offset the increasing cost of complying with drinking water regulations, Pennsylvania offers a number of financial, technical and educational assistance programs. The largest and most successful assistance initiative is PENNVEST, the Pennsylvania Infrastructure Investment Authority created in 1988. PENNVEST also serves as the financing agency for the drinking water state revolving loan funds (DWSRF) authorized by the 1996 Safe Drinking Water Act Amendments. Since 1988, PENNVEST has funded approximately $1.3 billion in water supply infrastructure improvement projects that benefit Pennsylvania residents. During 2005, PENNVEST funding was approved for 35 drinking water infrastructure projects in a total amount of approximately $68.3 million.

To provide more focused attention toward helping small water systems, the Pennsylvania Legislature established the Technical Assistance Center for Small Water Systems (TAC). An advisory board directs the activities of TAC.

As part of the Operator Assistance Provider Program (OAPP), the Division of Technical and Financial Assistance (TFA) continues to provide on-site technical assistance to drinking water systems. With part time DEP staff, who are also full time employees of water or wastewater treatment systems, on-going assistance services are provided to public and privately owned drinking water systems. Thirty-five drinking water sites and forty wastewater sites received assistance from these people this year. In 2005, the OAPP also provided 4 on-site training courses. These courses cover material in Corrosion Control, Water Math and Water Distribution. This training was provided to approximately 29 potential water system operators this year.

Training modules that reflect the new technology based operator testing have been distributed to numerous approved training providers. Training providers are using these modules to create training courses for delivery to their respective audiences. A recent preliminary evaluation of the impact of the new training modules is promising. For example, initial observations indicate the passing rate for the activated sludge examination has increased 50% over individuals not being trained with our modules.

TFA completed the sixth year of implementing its Capability Enhancement Program. The priority rating of every community and nontransient noncommunity water system was reviewed and revised as needed. Capability Enhancement's Global Outreach Program provided instrumentation verification training this year. Over 150 small water systems were targeted. Approximately 127 individuals representing 77 systems took the training at 10 different sites across the state. HACH Company was the primary partner with the Department in this endeavor. To date, over 61 drinking water systems have participated in the Capability Enhancement Program. Sixteen new systems participated this year.

TFA continues to implement provisions of the Operator Certification Program as defined in the State Water and Wastewater Systems Operator's Certification Act, passed in February 2002. The first three year renewal cycle for operators is starting to end, thus requiring completion of the continuing education requirements. Less than 4% of the first 1000 operators failed to meet this requirement. The State Board for Certification of Water and Wastewater System Operators (Board) denied these applications for certificate renewal. The Board will now process, review and deny renewal applications based on this requirement as part of each quarterly meeting The Approved Examination Providers continued to provide testing services in 2005. Over 900 applicants took the certification examination at over 25 different sessions.

Although DEP continues to offer technical and regulatory training to help the regulated community comply with appropriate drinking water laws, rules and regulations, most training responsibility has been handed over to private training providers. In 2005, with training content created by DEP, the Pennsylvania Section of the American Water Works Association delivered training to small water suppliers across the state on the Radiological Rule. DEP staff assisted with delivery of the training.

In 2005, DEP officially launched its on-line university, EarthWise Academy. Through EarthWise Academy, DEP is providing training, mainly on regulatory topics, over the Internet to help water suppliers comply with the regulations. To date, 18 courses are published on EarthWise Academy covering topics such as the DBPR, TCR, and LCR. Another 24 courses are under various stages of design and development, including a series on public notification. EarthWise Academy also serves two other very important services for operators. It provides a menu of all approved continuing education courses from all training providers, and a place for operators to go on-line to view their continuing education transcripts.

DEP is continuing to provide operation and maintenance support to the Penn State Environmental Training Center, which provides a multitude of hands-on training courses for water operators. The training center is assisting DEP in the development of a number of training modules for certified operators.

The Small Drinking Water Systems Engineering Services Program (ESP) continues to provide various engineering services/activities to assist small drinking water systems with compliance issues. This is a partnership approach where representatives of the water system, DEP, and alfred benesch, a contracted engineering firm, work together to address technical problems.

An ESP web site containing more detailed information on the program has been developed. It can be accessed from the DEP home page by clicking on Keywords and then clicking on ESP, or use the link: http://www.depweb.state.pa.us/watersupply/esp
The web site is a one-stop location for up to date information on the ESP.

June 30th, 2005 marked the end of the fifth and final year of the ESP contract. Consequently, no new projects were added during the first six months of 2005 and most of

our effort was placed on completing the work that was already in progress. The Request for Proposals process was completed and Alfred Benesch was again awarded the contract to provide engineering services for the next five years.

Forty-nine small drinking water systems have expressed an interest in the program to date. From these 49 inquiries, project-scoping meetings and field visits were held with the 28 systems that qualified for participation in the program, resulting in 21 active projects. After project-scoping meetings were held, it was determined that seven of the systems did not meet the criteria to participate in the program, are on hold due to timing or funding issues, or have elected not to participate in the program at this time. There are currently 18 active projects involving one source yield study, seven GUDI source projects, and ten capability enhancement projects. The capability enhancement category covers a broad range of projects including interconnections, feasibility studies, development of new ground water sources to replace unfiltered surface sources, and waterline replacements to eliminate major distribution system leaks. Another nine projects have been completed. There are currently eight potential projects on the waiting list, in addition to the currently active systems.

As small systems continue to call in requesting assistance they will be asked to complete and return the ESP Information Request Form and a self-assessment guide worksheet before a project-scoping meeting is scheduled. Based on recent requests for assistance it is anticipated that six to eight new projects will be initiated in the next six months.

TFA began implementing the Certified Operator Assistance Program (COAPs) this year. COAPs provides targeted assistance to water systems that do not have a certified operator. COAPs , with the assistance of the Rural Community Assistance Program, organizes geographically centered water systems for the purpose of obtaining a qualified certified operator. COAPs provides:

- financial grants for training and certification,
- grants for regionalization of services and authorities,
- technical assistance to treatment and distribution systems,
- management training support,
- Engineering Services Program (ESP) participation,
- general Capability Enhancement Program services.

Water system participation in COAPs is in lieu of enforcement and compliance action by the Department. The program is loading compliance data at this time. This data shows which water systems do not have an appropriately certified operator. Bedford County has been selected to pilot the prototype of COAPs. Once the prototype program is executed, it will be expanded to other priority counties in the state.

## Eliminating Lead Sources

Water coolers and home plumbing have been identified as sources of lead in drinking water. In cooperation with federal and other state agencies, DEP has been educating the public about the dangers of lead. For example, DEP has been implementing the Pennsylvania Lead Ban and Public Notification Act since 1991.

Under this legislative initiative, materials not meeting the definition of "lead-free" are banned from sale or use in all plumbing systems in Pennsylvania. Lead Ban surveillance has been done throughout the state by summer interns to locate retail facilities in which banned lead solder is still available for sale. This effort has resulted in fewer violations over the years as the retail facilities are educated and then periodically reminded about the law. Under the Lead and Copper Rule, DEP is also working with water systems to further reduce lead levels that may be contributed by the distribution system and house plumbing fixtures. **Lead Ban Surveillance Project - 2005**, PDF file.

## Monitoring/Reporting (M/R) Requirements

All PWSs are required to supply drinking water that complies with the primary and secondary MCLs. However, monitoring and reporting requirements are specific to each system type. All PWSs, at a minimum, conduct routine monitoring for total coliform bacteria, nitrate and nitrite. In addition, CWSs and NTNCWSs conduct routine monitoring for other microbiological contaminants, chemicals and radiological contaminants. DEP may require any PWS to conduct additional monitoring if the Department has reason to believe that the PWS is not in compliance with the MCLs, MRDLs, or treatment technique requirements.

In addition to MCL, MRDL and TT violations, this Annual Compliance Report summarizes the number of *significant* M/R violations that occurred during the report year. For this report, significant M/R violations are generally defined as having taken no samples or no results were submitted during a compliance period for a particular contaminant. For the Surface Water Treatment Rule, a significant M/R violation occurs when fewer than 10% of the required samples are taken or no results are reported during a reporting interval. Also included are the M/R violations for large systems under the Interim Enhanced Surface Water Treatment Rule.

## Variances and Exemptions

Variances and exemptions to specific requirements under the Safe Drinking Water Act may be granted under certain circumstances. If a PWS cannot meet the MCL (due to the characteristics of the raw water sources reasonably available), a primacy state can grant the PWS a variance from the applicable primary drinking water regulation upon finding that the system has installed and is using the best available technology, treatment techniques, or other means which the EPA Administrator finds are available (cost is not a consideration in PA). The state must find that the variance will not result in an unreasonable risk to health, and

shall prescribe (at the time the variance is granted) a schedule in accordance with which the PWS must come into compliance with the MCL. In 2005, DEP received two applications for an exemption from the new Arsenic MCL. However, both applications were later withdrawn. There were no variances and exemptions in effect for any Pennsylvania PWSs during the 2005 report period.

## Consumer Confidence Reports

To ensure that customers are aware of the quality of the drinking water supplied to them, community water systems have been required by Federal regulations to prepare an annual Consumer Confidence Report (CCR) since 1999. The CCR covering calendar year 2004 was due by July 1, 2005 and 85% of the community systems voluntarily met that deadline. Through follow-up compliance efforts, the percentage improved to 96% by the end of 2005. DEP continued to work with water suppliers to improve the timeliness and quality of CCRs.

## Public Notification

Public water systems are required to issue public notification (PN) to their consumers in response to a violation of an MCL, MRDL or TT requirement; for monitoring/reporting violations; and for other emergency situations. Public notices must contain minimum elements, including a description of the violation, actions consumers should take, and when the supplier expects to return to compliance. A system can incur a public notification violation for failure to issue a complete notice that is delivered on time and in a manner appropriate to the violation/situation. In 2005, there were 90 PN violations at community water systems, 45 PN violations at nontransient noncommunity water systems, and 180 PN violations at transient noncommunity water systems. Charts and tables in following sections of this report show the PN violation count by the rule violated.

## Regulation Development

The radionuclides rule affects all community water systems in Pennsylvania. The rule establishes a new MCL for uranium, revises the monitoring frequencies for gross alpha particle activity and combined radium, and requires beta particle monitoring only for systems designated as vulnerable or as systems utilizing waters contaminated by effluents from nuclear facilities.

The final radionuclides rule was published in the Pennsylvania Bulletin on April 3, 2004 and was incorporated into Title 25, Pa Code, Chapter 109, Safe Drinking Water Regulations, printed on June 4, 2004.

The DEP provided training in January and February 2005 to each system that has been classified as vulnerable to contamination from nuclear facilities. This training was held in several locations throughout the state, including Leesport, Williamsport, and Beaver.

Monitoring for vulnerable systems is being implemented in a three-year period. Systems that were required to begin monitoring in 2005 were notified in December 2004. Systems that were required to begin monitoring in 2006 were notified in December 2005. Systems that are required to begin monitoring in 2007 will be notified in the fourth quarter of 2006.

DEP continued work on a General Update to Chapter 109 to: (1) incorporate necessary federal requirements needed to obtain and/or maintain primacy for the Phase II/IIB/V, FBRR, LCR and RAD Rules; (2) amend several sections to improve data quality; (3) coordinate efforts with several other drinking water regulatory packages, including Operator Certification and Environmental Laboratory Accreditation; and (4) clarify several other existing requirements in order to improve compliance. Pre-draft language was submitted to DEP's advisory committee, TAC, for review/comment in November 2005.

The Environmental Protection Agency (EPA) promulgated the final Stage 2 Disinfectants and Disinfection Byproducts Rule (DBPR) on January 4, 2006. The Stage 2 DBPR arguments the Stage 1 DBPR and provides increased protection against the potential risks for cancer and reproductive and developmental health effects associated with disinfection byproducts (DBPs). The final Stage 2 DBPR contains maximum contaminant level goals for chloroform, monochloroacetic acid and trichloroacetic acid; National Primary Drinking Water Regulations, which consist of maximum contaminant levels (MCLs) and monitoring, reporting, and public notification requirements for total trihalomethanes (TTHM) and haloacetic acids (HAA5); and revisions to the reduced monitoring requirements for bromate. The rule also specifies the best available technologies for the final MCLs. The Stage 2 DBPR will reduce the potential risks of cancer and reproductive and developmental health effects associated with DBPs by reducing peak and average levels of DBPs in drinking water supplies. The Stage 2 DBPR applies to public water systems (PWSs) that are community water systems (CWSs) or nontransient noncommunity water systems (NTNCWs) that add a primary or residual disinfectant other than ultraviolet light or deliver water that has been treated with a primary or residual disinfectant other than ultraviolet light. DEP is initiating development of Pennsylvania Stage 2 DBPR that will be similar to the federal regulations.

# 2. PWS Profile and Compliance Summary

The following pages display some fundamental Pennsylvania PWS statistics, a table of the incidence of MCL, MRDL, TT, and significant monitoring violations, and graphics to illustrate the general picture of PWS compliance in Pennsylvania in 2005.

The violation data for Pennsylvania is transmitted by DEP to the EPA several times a year. Although the federal data (SDWIS) has its origin in the Pennsylvania data (PADWIS) some differences will be found when extracts made at different times are compared. This report is based on the PADWIS database as of April 19, 2006.

## General Statistics

- Total Population of Pennsylvania: 12,406,000
- Percent of Population Served by Individual Wells: 12%
- Percent of Population Served by Community Water Systems: 84%
- 95 of 104 drainage basins in Pennsylvania are used as sources for public water systems. Major river basins include the Delaware, Susquehanna, Potomac and Ohio.
- There are 478 ground water basins in Pennsylvania.
- 23.8% of the population was covered by source protection programs.
- 97% of all CWSs have received a source water infiltration (SWIP) evaluation.
- There were no confirmed water-borne disease outbreaks during 2005
- 2,743 On-Site Assessments (Full Inspections) were performed.
- 98.7% of the population served by CWSs with surface-water sources or ground water under the direct influence of surface water receive filtered water.
- 79% of all surface-water systems have optimized filtration treatment.
- 97 Filter Plant Performance Evaluations were performed.
- 97.7% of the population served by CWSs are protected by optimized corrosion control .
- 91.9% of all children at day-care and school facilities which have their own water supply are protected by optimized corrosion control treatment.
- Over 99.9% of the population served by CWSs are protected from nitrate/nitrite.
- Over 99.9% of the population of CWSs are protected from carcinogenic contaminants

## Compliance Actions

| Action | Number |
|---|---|
| Compliance Letters | 8,986 |
| Consent & Administrative Orders | 69 |
| Consent Assessments | 179 |
| Boil Water Advisories (Community Systems) | 5 |
| Boil Water Advisories (Noncommunity Systems) | 60 |
| Civil Penalties Collected | $39,430.00 |

This year, compliance actions in the table above, are counted just once for each contaminant group for a public water system on a given date.

## PA PWS Profile - 2005

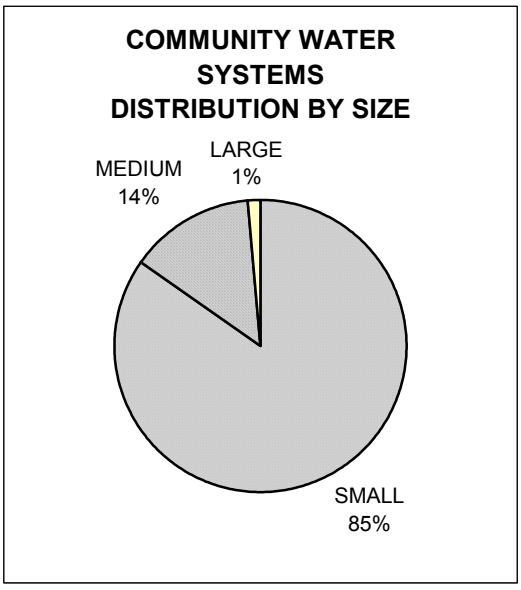
**Figure 1. Number of Systems and Population Served by Size Category**

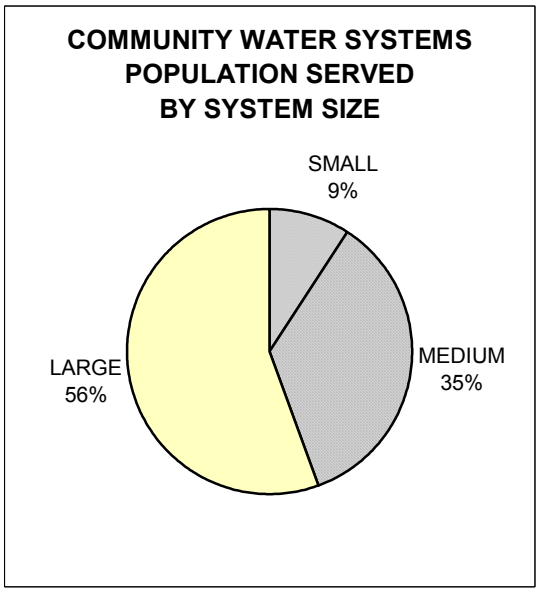
**NUMBER OF PWSs**

| | CWS | NTNC | TNC |
|---|---|---|---|
| SMALL | 1,785 | 1,167 | 6,428 |
| MEDIUM | 293 | 12 | 7 |
| LARGE | 31 | 0 | 0 |
| TOTAL | 2,109 | 1,179 | 6,435 |

**POPULATION SERVED**

| | CWS | NTNC | TNC |
|---|---|---|---|
| SMALL | 952,790 | 423,908 | 793,375 |
| MEDIUM | 3,697,125 | 70,853 | 34,100 |
| LARGE | 5,829,159 | 0 | 0 |
| TOTAL | 10,479,074 | 494,761 | 827,475 |



## Figure 2. Number of Systems by Source Type

**PWSs BY SOURCE AND SYSTEM TYPE**

| | CWS | | NTNC | | TNC | | TOTAL | |
|---|---|---|---|---|---|---|---|---|
| | NUMBER | PERCENT | NUMBER | PERCENT | NUMBER | PERCENT | NUMBER | PERCENT |
| **GROUND** | 1,621 | 76.9% | 1,156 | 98.0% | 6,371 | 99.0% | 9,148 | 94.1% |
| **SURFACE** | 488 | 23.1% | 23 | 2.0% | 64 | 1.0% | 575 | 5.9% |
| **TOTAL** | 2,109 | 100.0% | 1,179 | 100.0% | 6,435 | 100.0% | 9,723 | 100.0% |

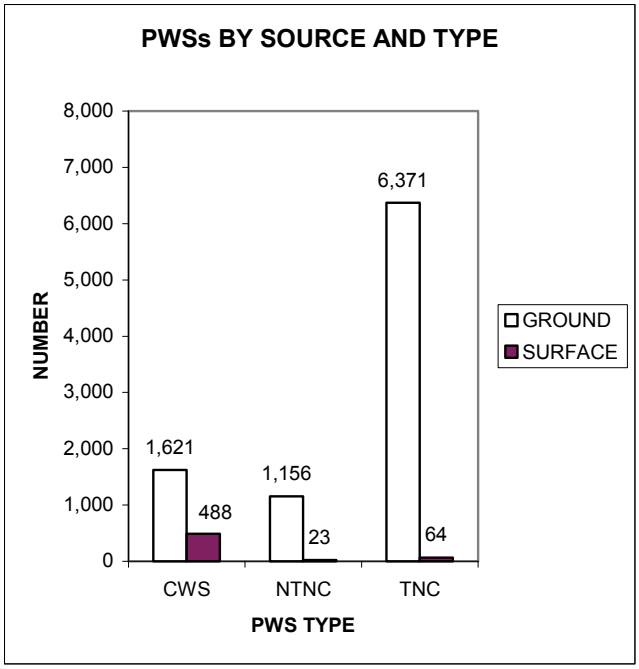
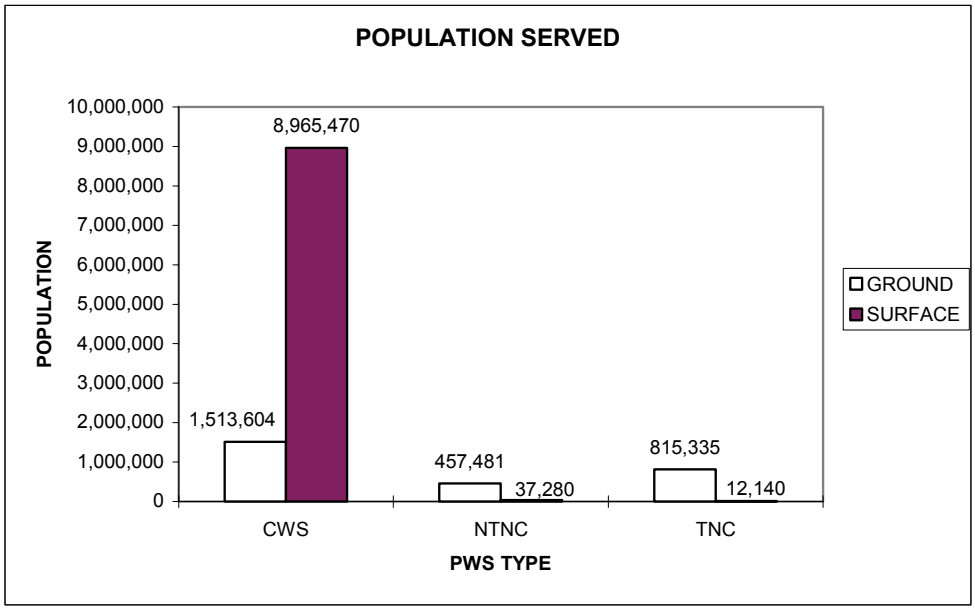


**Figure 3. Population Served by Source Type**

**PWSs BY SOURCE AND SYSTEM TYPE**

| | CWS | | NTNC | | TNC | | TOTAL | |
|---|---|---|---|---|---|---|---|---|
| | POPL SERVED | PER CENT | POPL SERVED | PER CENT | POPL SERVED | PER CENT | POPL SERVED | PER CENT |
| **GROUND** | 1,513,604 | 14.4% | 457,481 | 92.5% | 815,335 | 98.5% | 2,786,420 | 23.6% |
| **SURFACE** | 8,965,470 | 85.6% | 37,280 | 7.5% | 12,140 | 1.5% | 9,014,890 | 76.4% |
| **TOTAL** | 10,479,074 | 100.0% | 494,761 | 100.0% | 827,475 | 100.0% | 11,801,310 | 100.0% |




## Summary of Violations

**Definitions:** The following definitions apply to the Summary of Violations table.

**Consumer Confidence Reports:** Community water systems must prepare annual water quality reports (consumer confidence reports or drinking water quality reports) for their customers. The first reports were due by October 1999. Subsequent reports are due each year by July 1. The reports tell where drinking water comes from, what's in it, and how consumers can help protect it. Violations associated with CCRs include late and missing reports and certification forms.

**Stage 1 Disinfectants and Disinfection Byproducts Rule:** Beginning in January 2004, the Stage 1 Disinfectants and Disinfection Byproducts Rule (DBPR) applies to community water systems and non-transient non-community systems that add a disinfectant or oxidant to the drinking water during any part of the treatment process. Violations of the DBPR are reported for the following categories: M/R, MCL and MRDL.

**Filtered Systems:** Water systems that have installed filtration treatment [40 CFR 141, Subpart H].

**Inorganic Contaminants**: Non-carbon-based compounds such as metals, nitrates, and asbestos. These contaminants are naturally-occurring in some water, but can get into water through farming, chemical manufacturing, and other human activities. EPA has established MCLs for 15 inorganic contaminants [40 CFR 141.62].

**Lead and Copper Rule:** This rule established national limits on lead and copper in drinking water [40 CFR 141.80-91]. Lead and copper corrosion pose various health risks when ingested at any level, and can enter drinking water from household pipes and plumbing fixtures. Pennsylvania reports violations of the Lead and Copper Rule in the following six categories:

*Initial lead and copper tap M/R:* A violation where a system did not meet initial lead and copper testing requirements, or failed to report the results of those tests to the State.

*Follow-up or routine lead and copper tap M/R:* A violation where a system did not meet follow-up or routine lead and copper tap testing requirements, or failed to report the results.

*Treatment installation:* Violations for a failure to install optimal corrosion control treatment system or source water treatment system which would reduce lead and copper levels in water at the tap. [One number is to be reported for the sum of violations in both categories].

*Lead service line replacement:* A violation for a system's failure to replace lead service lines on the schedule required by the regulation.

*Public education:* A violation where a system did not provide required public education about reducing or avoiding lead intake from water.

**Maximum Contaminant Level (MCL):** The highest amount of a contaminant that EPA allows in drinking water. MCLs ensure that drinking water does not pose either a short-term or long-term health risk. MCLs are defined in milligrams per liter (parts per million) unless otherwise specified.

**Maximum Residual Disinfectant Level (MRDL):** The maximum permissible level of a disinfectant added for water treatment that may not be exceeded at the consumer's tap without an unacceptable possibility of adverse health effects. MRDLs are defined in milligrams per liter (parts per million) unless otherwise specified.

**Monitoring:** EPA specifies which water testing methods the water systems must use, and sets schedules for the frequency of testing. A water system that does not follow EPA's schedule or methodology is in violation [40 CFR 141].

States must report monitoring violations that are significant as determined by the EPA Administrator in consultation with the States. For purposes of this report, significant

monitoring violations are major violations and they occur when no samples are taken or no results are reported during a compliance period. A major monitoring violation for the surface water treatment rule occurs when at least 90% of the required samples are not taken or results are not reported during the compliance period.

**Organic Contaminants:** Carbon-based compounds, such as industrial solvents and pesticides. These contaminants generally get into water through runoff from cropland or discharge from factories. EPA has set legal limits on 54 organic contaminants that are to be reported [40 CFR 141.61].

**Radionuclides:** Radioactive particles which can occur naturally in water or result from human activity. EPA has set legal limits on four types of radionuclides: radium-226, radium-228, gross alpha, and beta particle/photon radioactivity [40 CFR 141]. Violations for these contaminants are to be reported using the following three categories:

*Gross alpha:* A violation for alpha radiation above MCL of 15 picocuries/liter. Gross alpha includes radium-226 but excludes radon and uranium.

*Combined radium-226 and radium-228:* A violation for combined radiation from these two isotopes above MCL of 5 pCi/L.

*Gross beta:* A violation for beta particle and photon radioactivity from man-made radionuclides above 4 millirem/year.

**Reporting Interval:** Annual Compliance Reports are to be submitted to EPA by July 1 for the preceding calendar year.

**Surface Water Treatment Rule:** The Surface Water Treatment Rule establishes criteria under which water systems supplied by surface-water sources, or ground-water sources under the direct influence of surface water, must filter and disinfect their water [40 CFR 141, Subpart H]. The Surface Water Treatment Rule was amended in 2001 to include the Interim Enhanced Surface Water Treatment Rule requirements for surface water and GUDI systems serving at least 10,000 people. Violations of the "Surface Water Treatment Rule" (labeled "Filter Rule" in Figures 9, 13, and 14) are to be reported for the following four categories:

*Monitoring, routine/repeat (for filtered systems):* A violation for a system's failure to carry out required tests, or to report the results of those tests.

*Treatment techniques (for filtered systems):* A violation for a system's failure to properly treat its water.

*Monitoring, routine/repeat (for unfiltered systems):* A violation for a system's failure to carry out required water tests, or to report the results of those tests.

*Failure to filter (for unfiltered systems):* A violation for a system's failure to properly treat

its water. Data for this violation code will be supplied to the States by EPA.

**Total Coliform Rule (TCR):** The Total Coliform Rule establishes regulations for microbiological contaminants in drinking water. These contaminants can cause short-term health problems. If no samples are collected during the one month compliance period, a significant monitoring violation occurs. States are to report four categories of violations:

*Acute MCL violation:* A violation where the system found fecal coliform or *E. coli*, potentially harmful bacteria, in its water, thereby violating the rule.

*Non-acute MCL violation:* A violation where the system found total coliform in samples of its water at a frequency or at a level that violates the rule. For systems collecting fewer than 40 samples per month, more than one positive sample for total coliform is a violation. For systems collecting 40 or more samples per month, more than 5% of the samples positive for total coliform is a violation.

*Major routine and follow-up monitoring:* A violation where a system did not perform any monitoring. [One number is to be reported for the sum of violations in these two categories.]

*Sanitary Survey:* A major monitoring violation if a system fails to collect 5 routine monthly samples if sanitary survey is not performed.

**Treatment Techniques:** A water disinfection process that EPA requires instead of an MCL for contaminants that laboratories cannot adequately measure. Failure to meet other operational and system requirements under the Surface Water Treatment and the Lead and Copper Rules have also been included in this category of violation for purposes of this report.

**Unfiltered Systems:** Water systems that do not need to filter their water before disinfecting it because the source is very clean [40 CFR, Subpart H].

**Violation:** A failure to meet any state or federal drinking water regulation.

**Figure 4.**

**Pennsylvania -- SUMMARY OF VIOLATIONS**
**MCL and MCL Significant Monitoring/Reporting**
**Annual Compliance Report -- January 1, 2005 to December 31, 2005**

| | MCL (mg/L) | MCL Violations | | Significant Monitoring/Reporting Violations | |
|---|---|---|---|---|---|
| | | Number of Violations | Number of Systems With Violations | Number of Violations | Number of Systems With Violations |
| **ORGANIC CONTAMINANTS** | | | | | |
| 1,1,1-Trichloroethane | 0.2 | 0 | 0 | 204 | 158 |
| 1,1,2-Trichloroethane | 0.005 | 0 | 0 | 204 | 158 |
| 1,1-Dichloroethylene | 0.007 | 0 | 0 | 204 | 158 |
| 1,2-Dichloroethane | 0.005 | 5 | 1 | 209 | 159 |
| 1,2-Dichloropropane | 0.005 | 0 | 0 | 204 | 158 |
| 1,2 Dibromo-3-Chloropropane (DBCP) | 0.0002 | 0 | 0 | 29 | 16 |
| 1,2,4-Trichlorobenzene | 0.07 | 0 | 0 | 204 | 158 |
| 2,3,7,8-TCDD (Dioxin) | $3X10^{-6}$ | 0 | 0 | 2 | 1 |
| 2,4,5-TP (Silvex) | 0.05 | 0 | 0 | 1 | 1 |
| 2,4-D | 0.07 | 0 | 0 | 36 | 26 |
| Alachlor (Lasso) | 0.002 | 0 | 0 | 36 | 22 |
| Atrazine | 0.003 | 0 | 0 | 43 | 30 |
| Benzene | 0.005 | 5 | 1 | 209 | 159 |
| Benzo (A) Pyrene | 0.0002 | 0 | 0 | 27 | 16 |
| BHC-gamma (Lindane) | 0.0002 | 0 | 0 | 27 | 17 |
| Carbofuran | 0.04 | 0 | 0 | 26 | 17 |
| Carbon Tetrachloride | 0.005 | 1 | 1 | 205 | 159 |
| Chlordane | 0.002 | 0 | 0 | 22 | 13 |
| cis-1,2-Dichloroethylene | 0.07 | 0 | 0 | 204 | 158 |
| Dalapon | 0.2 | 0 | 0 | 1 | 1 |
| Di(2-Ethylhexyl) Adipate | 0.4 | 0 | 0 | 28 | 17 |
| Di(2-Ethylhexyl) Phthalate | 0.006 | 2 | 1 | 29 | 17 |
| Dichloromethane (Methylene Chloride) | 0.005 | 0 | 0 | 203 | 157 |
| Dinoseb | 0.007 | 0 | 0 | 1 | 1 |
| Diquat | 0.02 | 0 | 0 | 1 | 1 |
| Endothall | 0.1 | 0 | 0 | 24 | 16 |
| Endrin | 0.002 | 0 | 0 | 2 | 2 |
| Ethylbenzene | 0.7 | 0 | 0 | 204 | 158 |
| Ethylene Dibromide (EDB) | 0.00005 | 0 | 0 | 27 | 15 |

| | MCL (mg/L) | MCL Violations | | Significant Monitoring/Reporting Violations | |
|---|---|---|---|---|---|
| | | Number of Violations | Number of Systems With Violations | Number of Violations | Number of Systems With Violations |
| Glyphosate | 0.7 | 0 | 0 | 7 | 5 |
| Heptachlor | 0.0004 | 0 | 0 | 2 | 2 |
| Heptachlor Epoxide | 0.0002 | 0 | 0 | 1 | 1 |
| Hexachlorobenzene (HCB) | 0.001 | 0 | 0 | 2 | 2 |
| Hexachlorocyclopentadiene | 0.05 | 0 | 0 | 29 | 17 |
| Methoxychlor | 0.04 | 0 | 0 | 27 | 18 |
| Monochlorobenzene (Chlorobenzene) | 0.1 | 0 | 0 | 204 | 158 |
| o-Dichlorobenzene | 0.6 | 0 | 0 | 203 | 157 |
| Oxamyl (Vydate) | 0.2 | 0 | 0 | 25 | 16 |
| p-Dichlorobenzene | 0.075 | 0 | 0 | 204 | 158 |
| Pentachlorophenol | 0.001 | 0 | 0 | 31 | 19 |
| Picloram | 0.5 | 0 | 0 | 29 | 19 |
| Simazine | 0.004 | 0 | 0 | 32 | 20 |
| Styrene | 0.1 | 0 | 0 | 205 | 159 |
| Tetrachloroethylene | 0.005 | 2 | 2 | 204 | 158 |
| Toluene | 1 | 0 | 0 | 204 | 158 |
| Total Polychlorinated Biphenyls (PCB) | 0.0005 | 0 | 0 | 3 | 2 |
| Toxaphene | 0.003 | 0 | 0 | 2 | 2 |
| trans-1,2-Dichloroethylene | 0.1 | 0 | 0 | 204 | 158 |
| Trichloroethylene | 0.005 | 2 | 1 | 204 | 159 |
| Vinyl Chloride | 0.002 | 0 | 0 | 1 | 1 |
| Xylenes, Total | 10 | 0 | 0 | 203 | 157 |
| **Subtotal** | | **17** | **6** | **4,642** | **202** |
| **INORGANIC CONTAMINANTS** | | | | | |
| Antimony, Total | 0.006 | 0 | 0 | 3 | 3 |
| Arsenic | 0.05 | 0 | 0 | 3 | 3 |
| Barium | 2 | 5 | 2 | 5 | 5 |
| Beryllium, Total | 0.004 | 0 | 0 | 3 | 3 |
| Cadmium | 0.005 | 0 | 0 | 6 | 4 |
| Chromium | 0.1 | 0 | 0 | 3 | 3 |
| Cyanide | 0.2 | 0 | 0 | 3 | 3 |
| Fluoride | 2 | 0 | 0 | 3 | 3 |
| Mercury | 0.002 | 0 | 0 | 4 | 4 |
| Nickel | 0.1 | 0 | 0 | 3 | 3 |
| Nitrate | 10 (as Nitrogen) | 101 | 64 | 507 | 411 |

| | MCL (mg/L) | MCL Violations | | Significant Monitoring/Reporting Violations | |
|---|---|---|---|---|---|
| | | Number of Violations | Number of Systems With Violations | Number of Violations | Number of Systems With Violations |
| Nitrite | 1 (as Nitrogen) | 2 | 1 | 292 | 255 |
| Selenium | 0.05 | 0 | 0 | 3 | 3 |
| Thallium, Total | 0.002 | 0 | 0 | 3 | 3 |
| **Subtotal** | | **108** | **66** | **841** | **467** |
| | | | | | |
| **RADIONUCLIDE CONTAMINANTS** | | | | | |
| Radium 226 | --------- | 0 | 0 | 63 | 17 |
| Radium 228 | --------- | 0 | 0 | 63 | 17 |
| Combined Radium (-226 & -228) | 5 pCi/l | 0 | 0 | 0 | 0 |
| Combined Uranium | 30 µg/L | 0 | 0 | 37 | 11 |
| Gross Alpha, Excl. Radon & Ura | 15 pCi/l | 0 | 0 | 49 | 16 |
| Gross Beta & Photo Emitters | Mrem/yr | 0 | 0 | 12 | 6 |
| 38-Strontium-90 | 8 pCi/l | 0 | 0 | 1 | 1 |
| Tritium | 20,000 pCi/l | 0 | 0 | 1 | 1 |
| **Subtotal** | | **0** | **0** | **226** | **32** |
| | | | | | |
| **TOTAL CHEMICAL CONTAMINANTS** | | **125** | **72** | **5709** | **662** |
| | | | | | |
| **TOTAL COLIFORM RULE** | | | | | |
| MCL, Acute | Present | 49 | 49 | | |
| MCL, Monthly | Present | 340 | 278 | | |
| Monitoring Routine & Repeat Major | | | | 1,867 | 1,284 |
| **Subtotal** | | **389** | **282** | **1,867** | **1,284** |
| | | | | | |

**Figure 5A.**

**Pennsylvania -- SUMMARY OF VIOLATIONS**
**Surface Water Treatment/IESWTR and Lead and Copper Rules**
**Treatment Techniques (TT) and TT Significant Monitoring/Reporting**
**Annual Compliance Report -- January 1, 2005 to December 31, 2005**

| | | Treatment Technique Violations | | Significant Monitoring/Reporting Violations | |
|---|---|---|---|---|---|
| | | Number of Violations | Number of Systems With Violations | Number of Violations | Number of Systems With Violations |
| **SURFACE WATER TREATMENT RULE/IESWTR** | | | | | |
| **Filtered systems** | | | | | |
| Monitoring, routine/repeat | | | | 1,067 | 167 |
| Treatment techniques | | 45 | 10 | | |
| **Unfiltered systems** | | | | | |
| Monitoring, routine/repeat | | | | 106 | 35 |
| Treatment techniques | | 11 | 4 | | |
| **Subtotal** | | **56** | **14** | **1,173** | **202** |
| | | | | | |
| **LEAD and COPPER RULE** | | | | | |
| Initial lead and copper tap M/R | | | | 29 | 24 |
| Follow-up or routine lead and copper tap M/R | | | | 264 | 262 |
| Treatment installation/technique | | 15 | 15 | | |
| **Subtotal** | | **15** | **15** | **293** | **285** |
| | | | | | |

**Figure 5B.**

**Pennsylvania -- SUMMARY OF VIOLATIONS**
**Disinfectants and Disinfection Byproducts**
**MCL, MRDL, TTand MCL, MRDL, TT Significant Monitoring/Reporting**
**Annual Compliance Report -- January 1, 2005 to December 31, 2005**

| | | Type | MCL, MRDL and TT Violations | | Significant Monitoring/Reporting Violations | |
|---|---|---|---|---|---|---|
| | | | Number of Violations | Number of Systems With Violations | Number of Violations | Number of Systems With Violations |
| **DISINFECTION/BYPRODUCTS CONTAMINANTS** | | | | | | |
| Bromate | 0.01 | MCL | 1 | 1 | 7 | 4 |
| Chlorine | 4.0 | MRDL | 5 | 3 | 2,631 | 892 |
| Chlorine Dioxide | 0.8 | MRDL | 0 | 0 | 8 | 1 |
| Chlorite | 1.0 | MCL | 0 | 0 | 8 | 1 |
| Total Alkalinity | | TT | 0 | 0 | 124 | 38 |
| Total Organic Carbon | | TT | 21 | 11 | 100 | 30 |
| Haloacetic Acids (Five) | 0.06 | MCL | 14 | 7 | 199 | 175 |
| Trihalomethanes | 0.08 | MCL | 35 | 21 | 191 | 172 |
| **Subtotal** | | | **76** | **36** | **3,268** | **1,001** |
| | | | | | | |

**Figure 6.**

**Pennsylvania -- SUMMARY OF VIOLATIONS**
**MCL, MRDL, Treatment Technique, and Significant Monitoring/Reporting**
**Annual Compliance Report -- January 1, 2005 to December 31, 2005**

| | | Number of Violations | Number Of Systems |
|---|---|---|---|
| **GRAND TOTAL** | | **13,734** | **2,880** |

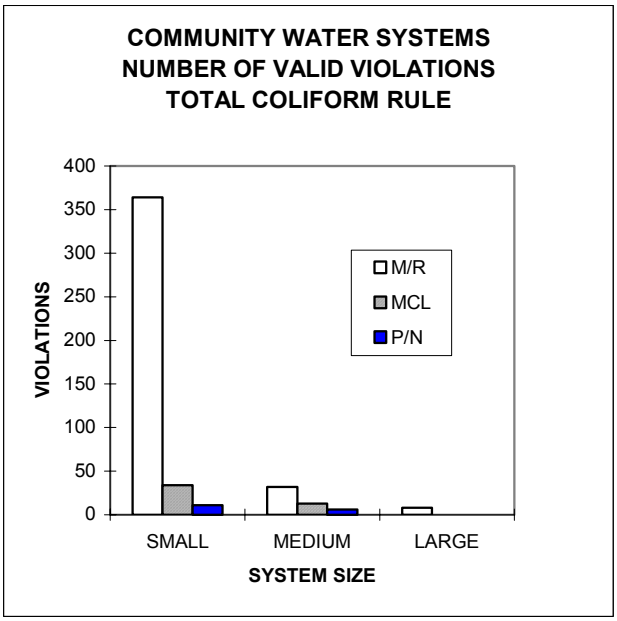
*NOTE:*
*Grand totals include 448 Consumer Confidence reporting violations involving 446 community water systems and 315 Public Notification violations.*

# Violations Summary by Violation Type and PWS Type and Size

## Figure 7.

**COMMUNITY WATER SYSTEMS**
**NUMBER OF VALID VIOLATIONS**
**TOTAL COLIFORM RULE**

| | M/R | MCL | P/N |
|---|---|---|---|
| **SMALL** | 364 | 34 | 11 |
| **MEDIUM** | 32 | 13 | 6 |
| **LARGE** | 8 | 0 | 0 |
| **TOTAL** | 404 | 47 | 17 |




## Figure 8.

**COMMUNITY WATER SYSTEMS**
**NUMBER OF VALID VIOLATIONS**
**CHEMICALS - RADIONUCLIDES**

| | M/R | MCL | P/N |
|---|---|---|---|
| **SMALL** | 2,848 | 25 | 12 |
| **MEDIUM** | 554 | 0 | 0 |
| **LARGE** | 26 | 0 | 0 |
| **TOTAL** | 3,428 | 25 | 12 |

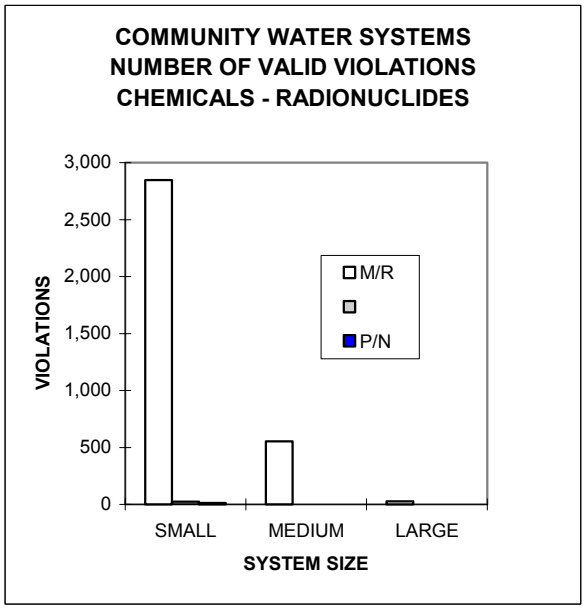


**Figure 9.**

**COMMUNITY WATER SYSTEMS**
**NUMBER OF VALID VIOLATIONS**
**FILTER RULE**

| | M/R | TT | P/N |
|---|---|---|---|
| **SMALL** | 627 | 25 | 2 |
| **MEDIUM** | 340 | 5 | 0 |
| **LARGE** | 64 | 0 | 0 |
| **TOTAL** | 1,031 | 30 | 2 |

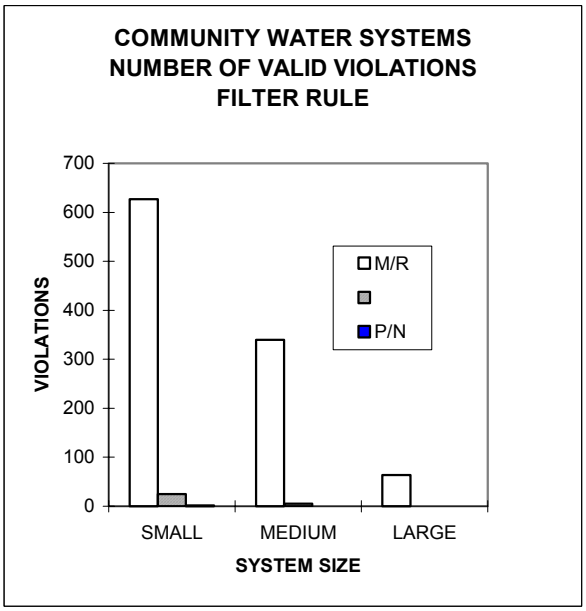



**Figure 10.**

**COMMUNITY WATER SYSTEMS**
**NUMBER OF VALID VIOLATIONS**
**LEAD AND COPPER RULE**

| | M/R | TT |
|---|---|---|
| **SMALL** | 176 | 8 |
| **MEDIUM** | 14 | 1 |
| **LARGE** | 1 | 0 |
| **TOTAL** | 191 | 9 |

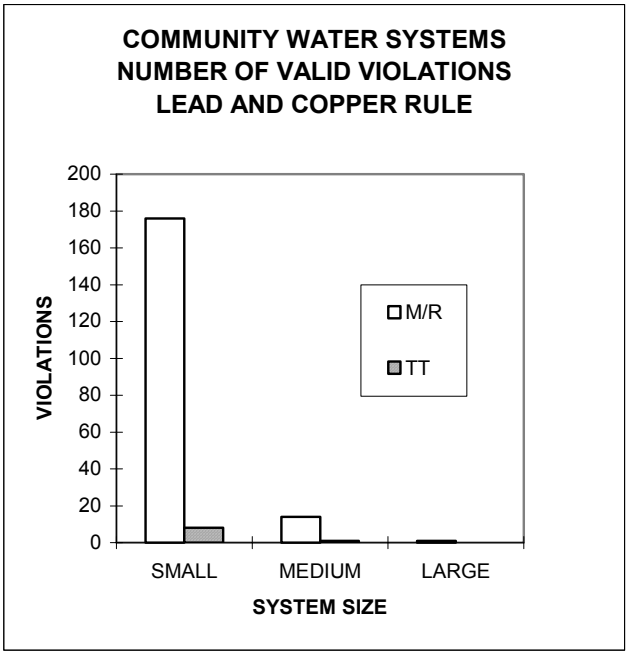


**Figure 11.**

**COMMUNITY WATER SYSTEMS**
**NUMBER OF VALID VIOLATIONS**
**DISINFECTANTS/BYPRODUCTS**

| | M/R | MCL | MRDL | T/T | P/N |
|---|---|---|---|---|---|
| **SMALL** | 2,533 | 30 | 3 | 4 | 29 |
| **MEDIUM** | 280 | 16 | 2 | 9 | 30 |
| **LARGE** | 27 | 0 | 0 | 0 | 0 |
| **TOTAL** | 2,840 | 46 | 5 | 13 | 59 |

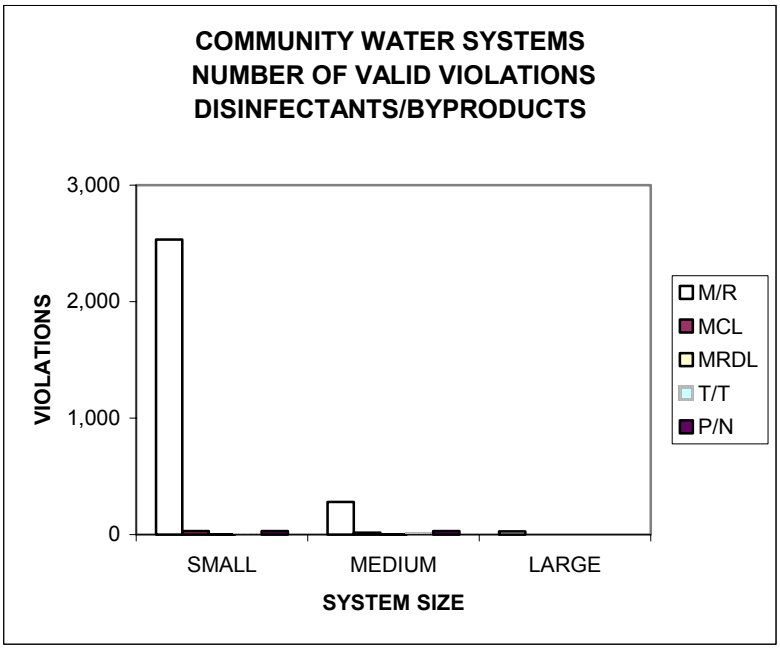


**Figure 12.**

**COMMUNITY WATER SYSTEMS**
**NUMBER OF VALID VIOLATIONS**
**CONSUMER CONFIDENCE REPORTS**

| | M/R |
|---|---|
| **SMALL** | 408 |
| **MEDIUM** | 37 |
| **LARGE** | 3 |
| **TOTAL** | 448 |

**Includes late and missing reports and certifications.**

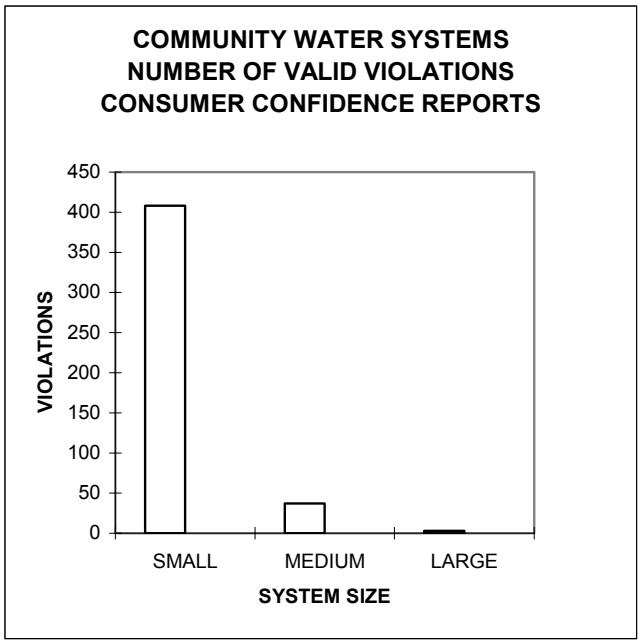


**Figure 13.**

**NONTRANSIENT NONCOMMUNITY WATER SYSTEMS**
**NUMBER OF VALID VIOLATIONS**

| | M/R | MCL | TT | PN |
|---|---|---|---|---|
| **TCR** | 116 | 47 | 0 | 14 |
| **CHEM/RAD** | 1,575 | 24 | 0 | 13 |
| **FILTER** | 35 | 0 | 7 | 1 |
| **LCR** | 100 | 0 | 5 | 1 |
| **DBPR** | 417 | 3 | 8 | 16 |
| **TOTAL** | 2,243 | 74 | 20 | 45 |

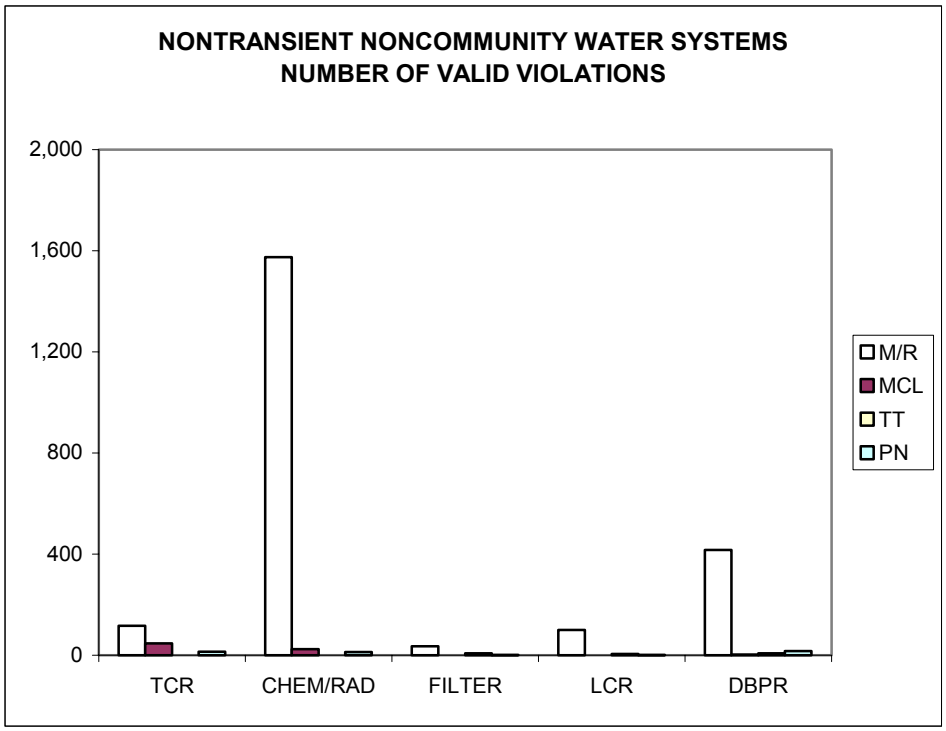
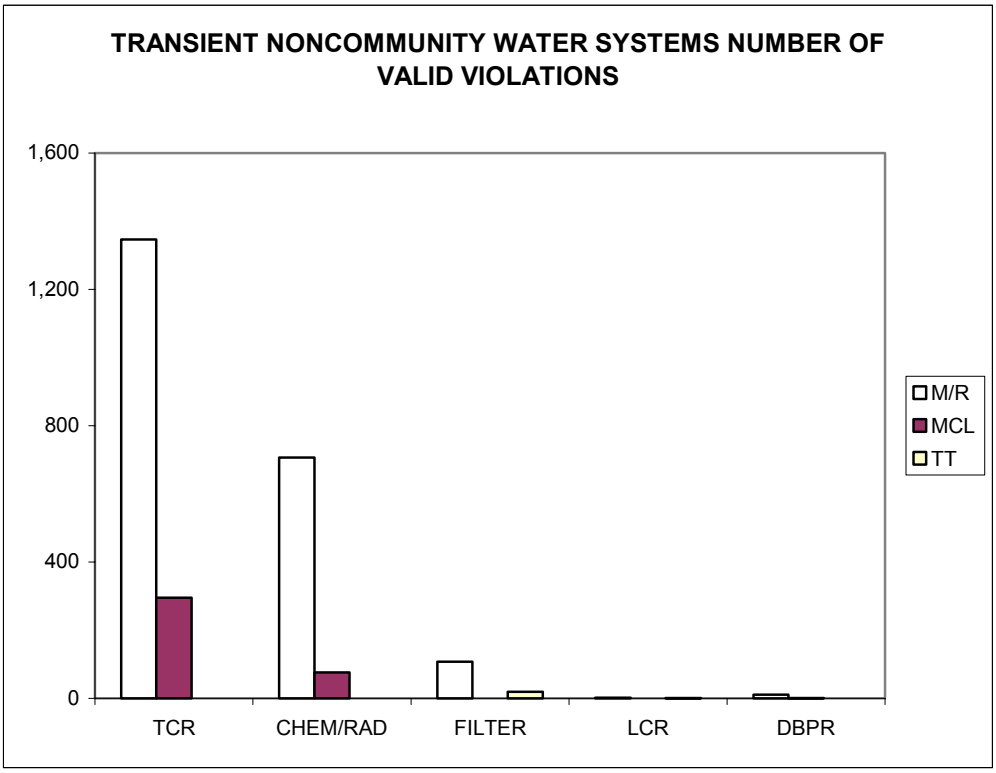


**Figure 14.**

**TRANSIENT NONCOMMUNITY WATER SYSTEMS**
**NUMBER OF VALID VIOLATIONS**

| | M/R | MCL | TT | PN |
|---|---|---|---|---|
| **TCR** | 1,347 | 295 | 0 | 131 |
| **CHEM/RAD** | 706 | 76 | 0 | 31 |
| **FILTER** | 107 | 0 | 19 | 8 |
| **LCR** | 2 | 0 | 1 | 0 |
| **DBPR** | 11 | 1 | 0 | 10 |
| **TOTAL** | 2,173 | 372 | 20 | 180 |



## Compliance Rates

A public water system is counted as in compliance if there were no violations during the year. A public water system is counted as out of compliance if there was any time period within the year when there was an outstanding violation. Being counted as out of compliance does not imply that the violation spanned the entire year.

**Figure 15.**

**COMMUNITY WATER SYSTEMS**
**PERCENT IN COMPLIANCE FOR**
**MONITORING AND REPORTING**

| | SYSTEMS | POPULATION |
|---|---|---|
| **SMALL** | 41.4% | 41.4% |
| **MEDIUM** | 48.1% | 54.0% |
| **LARGE** | 51.6% | 38.1% |

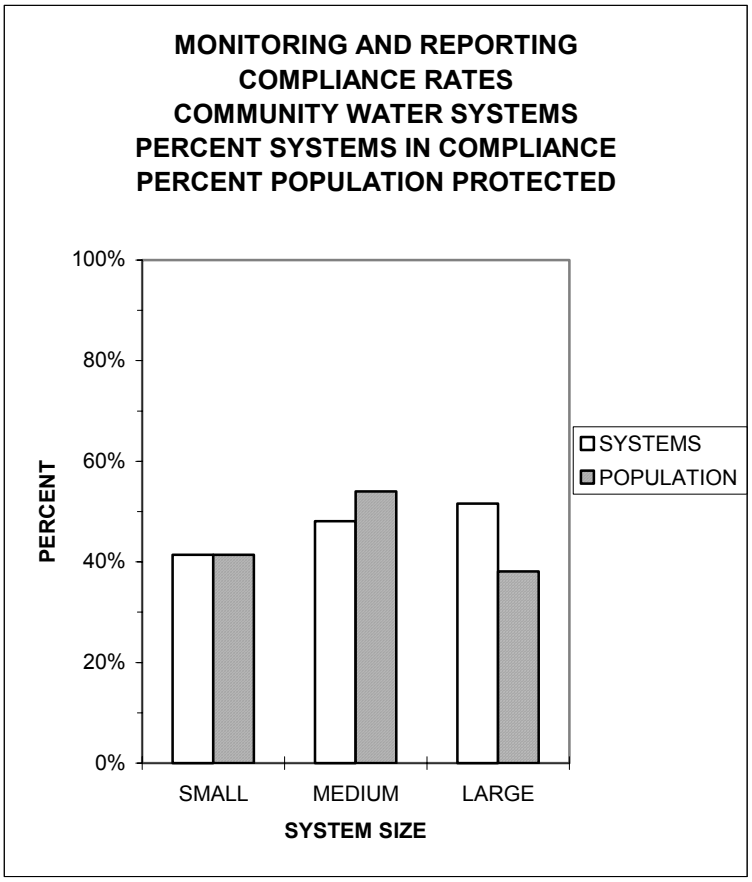


**Figure 16.**

**COMMUNITY WATER SYSTEMS**
**PERCENT IN COMPLIANCE FOR**
**MAXIMUM CONTAMINANT LEVELS**

| | SYSTEMS | POPULATION |
|---|---|---|
| **SMALL** | 96.9% | 95.6% |
| **MEDIUM** | 95.2% | 96.5% |
| **LARGE** | 100.0% | 100.0% |

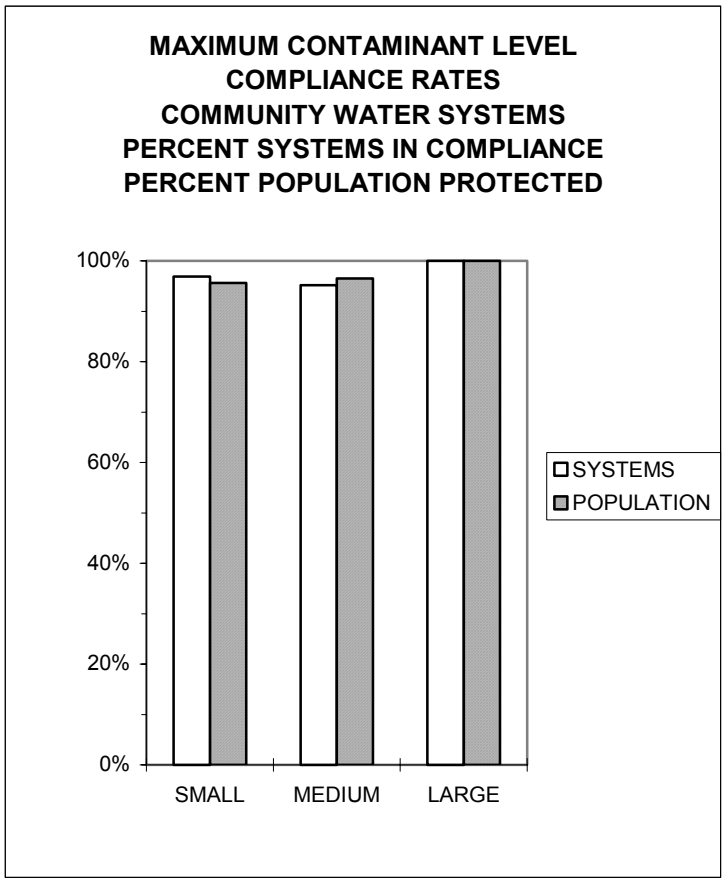


**Figure 17.**

**COMMUNITY WATER SYSTEMS**
**PERCENT IN COMPLIANCE FOR**
**TREATMENT TECHNIQUES**

| | SYSTEMS | POPULATION |
|---|---|---|
| **SMALL** | 99.0% | 98.7% |
| **MEDIUM** | 97.3% | 98.0% |
| **LARGE** | 100.0% | 100.0% |

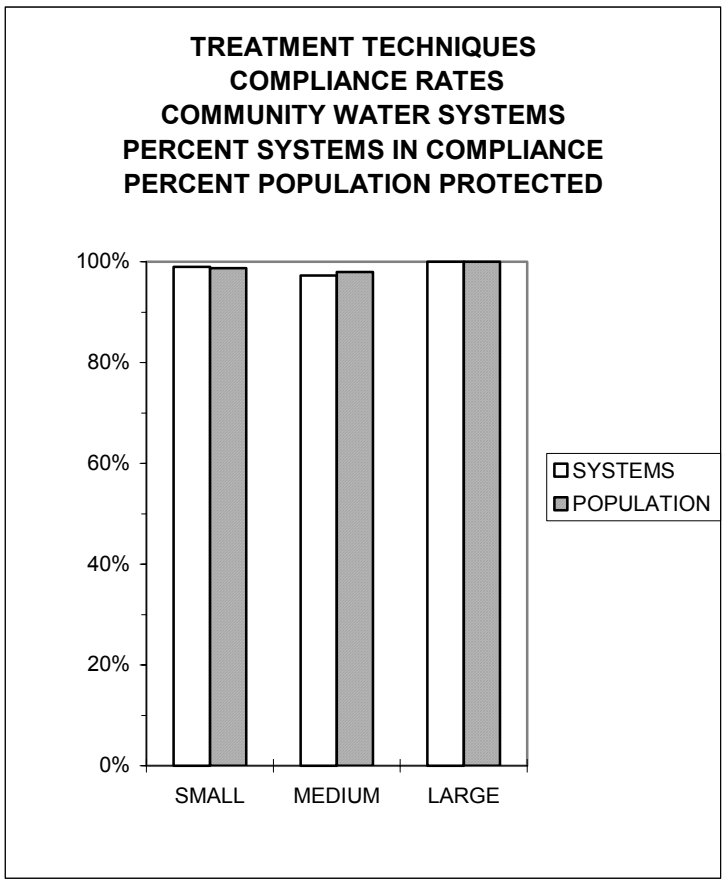


**Figure 18.**

**COMMUNITY WATER SYSTEMS**
**PERCENT IN COMPLIANCE FOR**
**MAXIMUM RESIDUAL DISINFECTANT LEVELS**

| | SYSTEMS | POPULATION |
|---|---|---|
| **SMALL** | 99.9% | 99.9% |
| **MEDIUM** | 99.7% | 99.9% |
| **LARGE** | 100.0% | 100.0% |

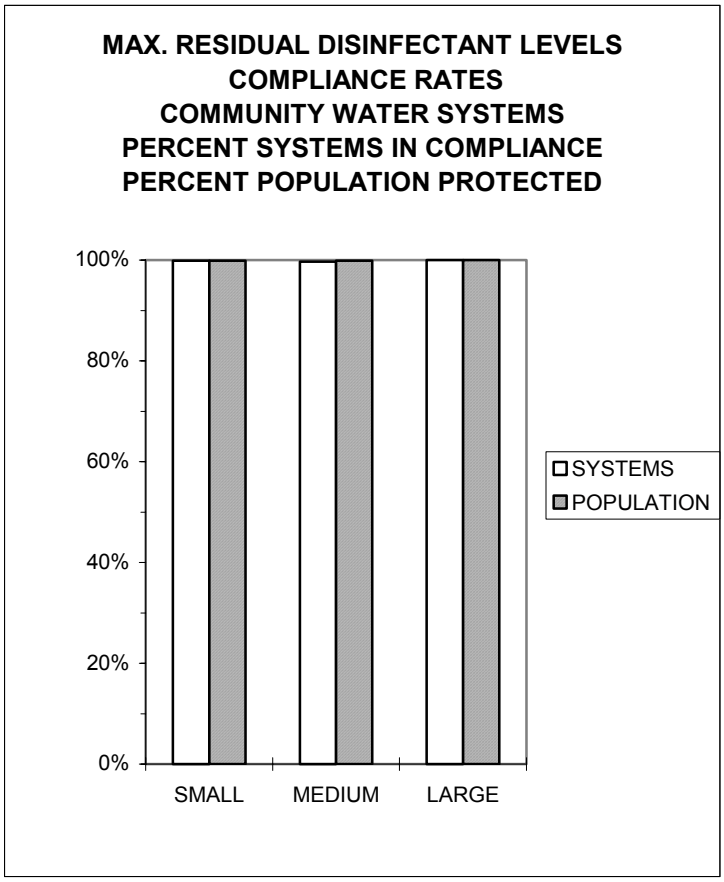


**Figure 19.**

**NONTRANSIENT NONCOMMUNITY WATER SYSTEMS**
**PERCENT IN COMPLIANCE**

| | SYSTEMS | POPULATION |
|---|---|---|
| **M/R** | 69.3% | 68.2% |
| **MCL** | 95.7% | 95.9% |
| **MRDL** | 100.0% | 100.0% |
| **TT** | 99.1% | 97.9% |
| **PN** | 97.5% | 96.1% |

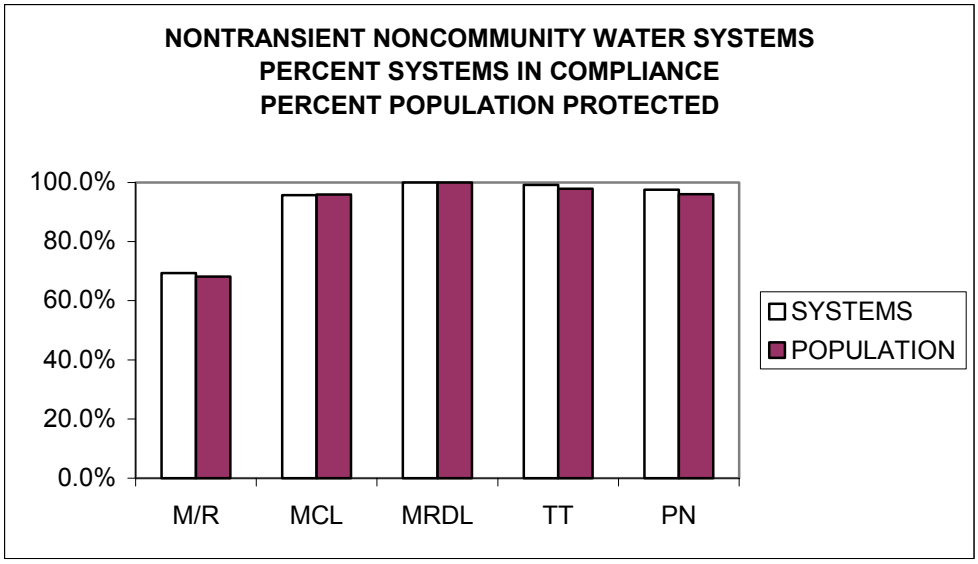


**Figure 20.**

**TRANSIENT NONCOMMUNITY WATER SYSTEMS**
**PERCENT IN COMPLIANCE**

| | SYSTEMS | POPULATION |
|---|---|---|
| **M/R** | 83.2% | 83.7% |
| **MCL** | 96.1% | 95.6% |
| **MRDL** | 100.0% | 100.0% |
| **TT** | 100.0% | 100.0% |
| **PN** | 98.1% | 97.7% |

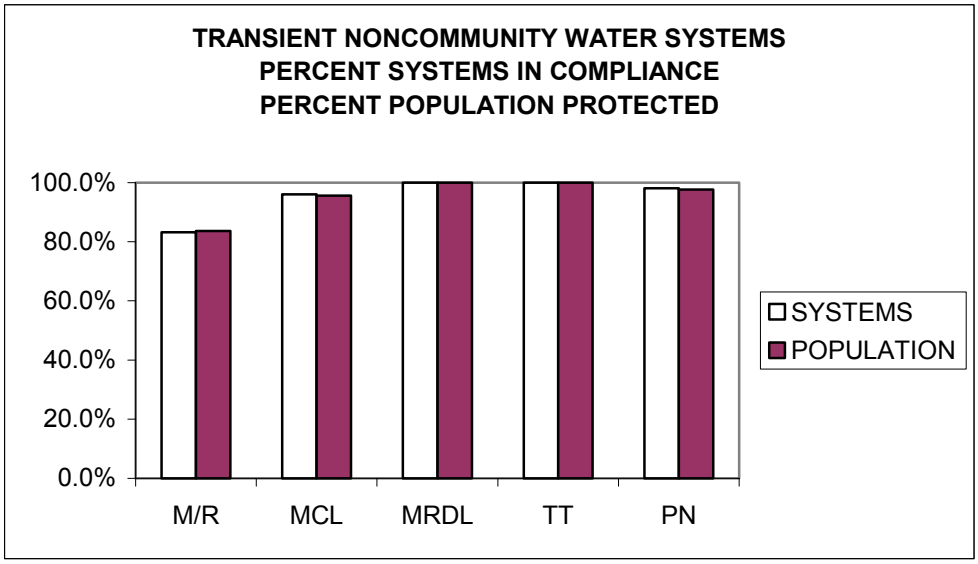
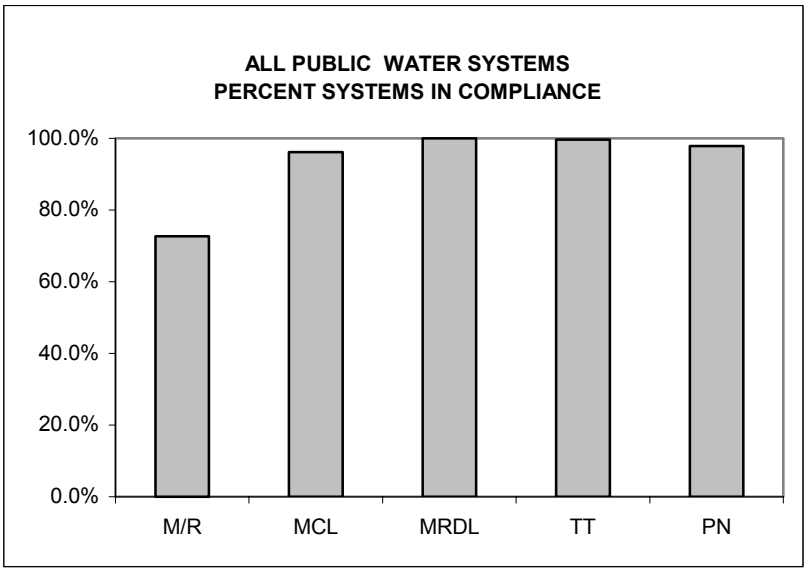


**Figure 21.**

**ALL PUBLIC WATER SYSTEMS**
**PERCENT IN COMPLIANCE**

| | SYSTEMS |
|---|---|
| **M/R** | 72.7% |
| **MCL** | 96.2% |
| **MRDL** | 100.0% |
| **TT** | 99.6% |
| **PN** | 97.9% |



# 3. Filter Plant Performance

The Pennsylvania DEP has the responsibility of assuring that the drinking water industry delivers a safe and reliable supply of water to consumers through efficiently operated facilities. Water systems that derive some or all of their drinking water from surface water sources (including groundwater under the direct influence of surface water) serve over 8.4 million Pennsylvanians as well as millions of visitors to the state. As a result, Pennsylvania has a tremendous interest in the potential for waterborne diseases associated with surface water. Between 1971 and 1980, Pennsylvania reported 20 percent of all waterborne outbreaks in the United States – more than any other state in the nation. Since 1979, eight documented waterborne giardiasis outbreaks and one cryptosporidiosis outbreak have occurred in the Commonwealth. These outbreaks had widespread health implications and cost families, businesses, and local/state governments millions of dollars. While the more significant outbreaks took place among communities that were served unfiltered surface water, the adoption of Pennsylvania's mandatory surface water filtration regulation has shifted the focus to filtration facilities that use surface water.

DEP has invested in special programs to protect Pennsylvanians from waterborne diseases and, more recently, disinfection byproducts. These compliance assistance programs are important to Pennsylvanians and the state's filtered surface water suppliers for the following reasons:

- **Population Impact**: Over 8.4 million people as well as millions of tourists receive some or all of their drinking water from the Commonwealth's filter plants.

- **Disease Prevention**: A treatment breakdown at a filter plant presents a widespread acute health threat from a waterborne disease outbreak. A disease outbreak can have a devastating impact on a community. Disease prevention saves millions of dollars in expenses that businesses, homeowners, local government and state government would incur in response to an outbreak.

- **Economy and Essential Services**: Filter plants are a vital part of local infrastructure and our underlying economy. The plants serve drinking water to large metropolitan areas and small rural communities; they represent an essential service to many businesses; and they provide basic fire protection for homeowners and businesses.

- **Compliance Assistance**: Filter plants involve some of the most complex regulations and treatment processes. DEP's programs help suppliers in overcoming numerous on-going compliance challenges.

- **Infrastructure Improvements**: The programs have been a long-standing part of the ranking process for Pennsylvania's low-interest loan program called PENNVEST.

## Filter Plant Performance Evaluation (FPPE)

DEP uses a detailed assessment called Filter Plant Performance Evaluation (FPPE) to help prevent waterborne disease outbreaks at public water supplies using surface water. The FPPE program involves a method of determining the effectiveness of a water treatment plant in removing disease-causing organisms from the incoming raw water. Of particular concern is the removal of microscopic particles down to the three-micron size. This level of filtration reliability is needed to ensure removal of pathogenic protozoa including *Giardia* and *Cryptosporidium*. Both of these pathogens provide a measure for a filter plant's capability of protecting consumers from waterborne diseases, since they are some of the more difficult pathogens to remove and inactivate.

During the evaluation process, DEP staff conduct an on-site survey of plant operations and general physical conditions and sample the facility's raw and filtered water for subsequent microscopic evaluation in the laboratory. Up until 2003, DEP rated the plants as "Acceptable" or "Unacceptable" for their ability to remove *Giardia* cysts and *Cryptosporidium* oocysts. In 2003, the rating system changed to "Commendable," "Satisfactory," or "Needs Improvement." Each rating is based on an operational and equipment survey, water quality data, and the microscopic analysis. The purpose of this performance evaluation and rating system is to determine adherence to sound operational practices and proper functioning of the facility, and to also provide oral and written technical assistance for improving the plant's performance. The program also helps to ensure that water systems are correctly monitoring water quality information as well as helping to reduce violations. Pennsylvania is one of only a handful of states conducting these types of extensive filter plant evaluations.

In light of new research indicating that a higher level of plant performance is necessary to remove pathogens, and in anticipation of more stringent federal regulations, DEP's on-site FPPE reviews continue to become more rigorous in order to encourage systems to produce finished water quality that is better than current regulatory standards. Since the program's inception in 1988, this philosophy has positioned Pennsylvania's filter plants for compliance with future regulations and the prevention of waterborne diseases. In fact, the program has been so successful that DEP provided expert training in 1999 to ten additional field staff who are now taking the lead on FPPEs and providing more localized assistance to water systems.

The following graphs represent the yearly performance of Pennsylvania's surface water treatment plants.

**Figure 22.** *The number of water systems using unfiltered surface water sources has dramatically declined, while the number of filtered surface sources has increased from 204 to 353. Pennsylvanian's benefit from the improved public health protection provided by these filtration plants.*

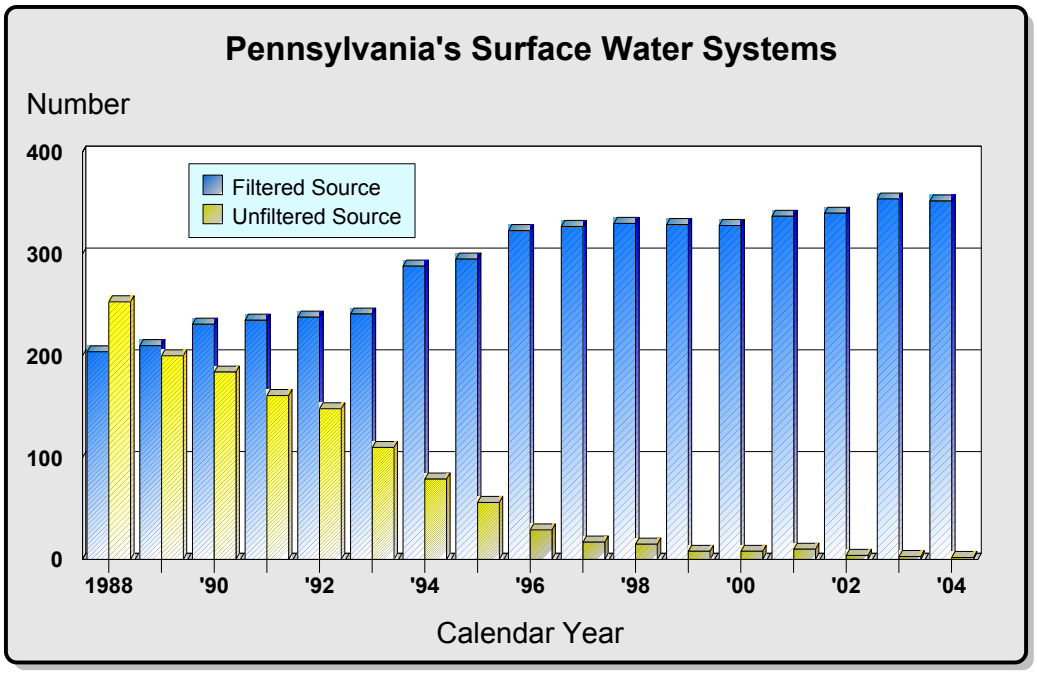
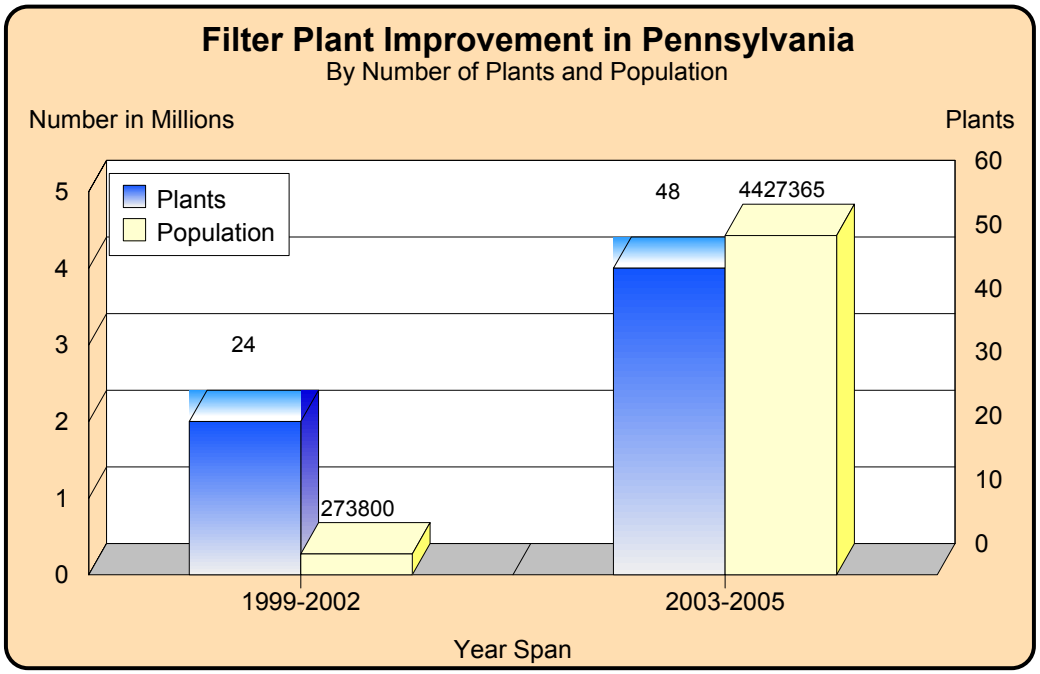


**Figure 23.** *One way to look at the public health impact of the FPPE program is to evaluate the number of plants that have shown improvement and the corresponding population served by those facilities. During the period 1999-2002, 24 filter plants serving almost 275,000 people showed significant improvement and received an upgraded overall performance rating. In comparison, from 2003-2005, 48 filter plants serving approximately 4.4 million citizens showed improvement. This demonstrates both the impact of the program on water suppliers and the technical capability gained by treatment plant operators and Department field staff.*



**Figures 24.** *The annual percentage of Commendable or Satisfactory ratings during filter plant performance evaluations in Pennsylvania has more than doubled to the current level of 79 percent. Over the past few years, the number of plants in the state with these ratings has decreased slightly. In correlation to more stringent regulations, the evaluations continue to become more rigorous to encourage systems to produce finished water quality that is better than current regulatory standards.*

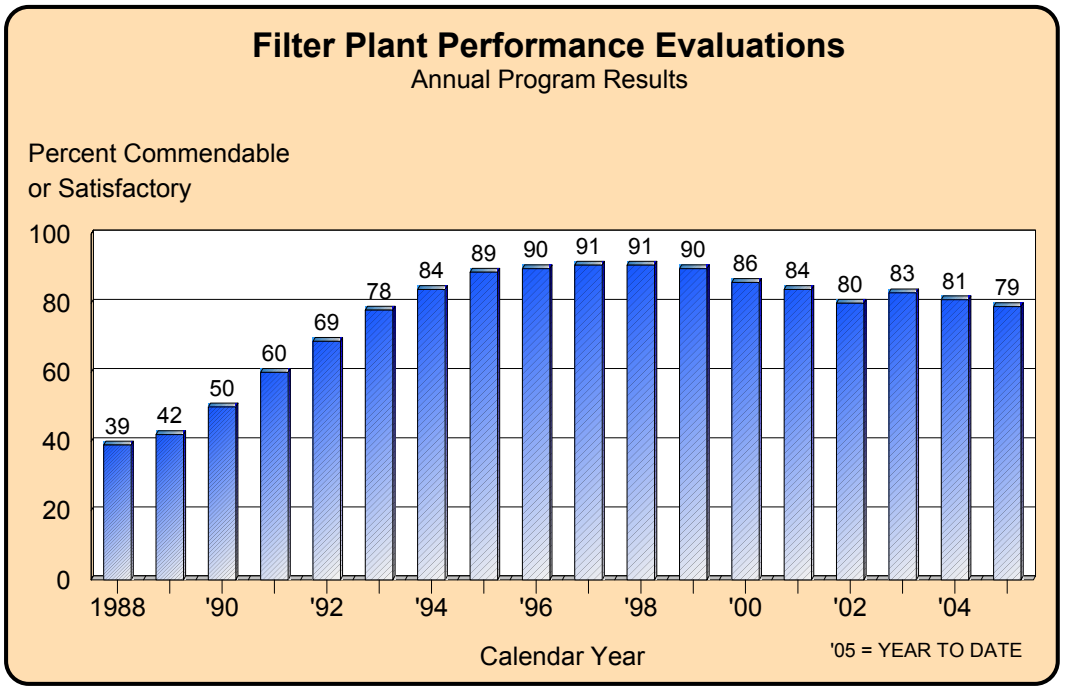
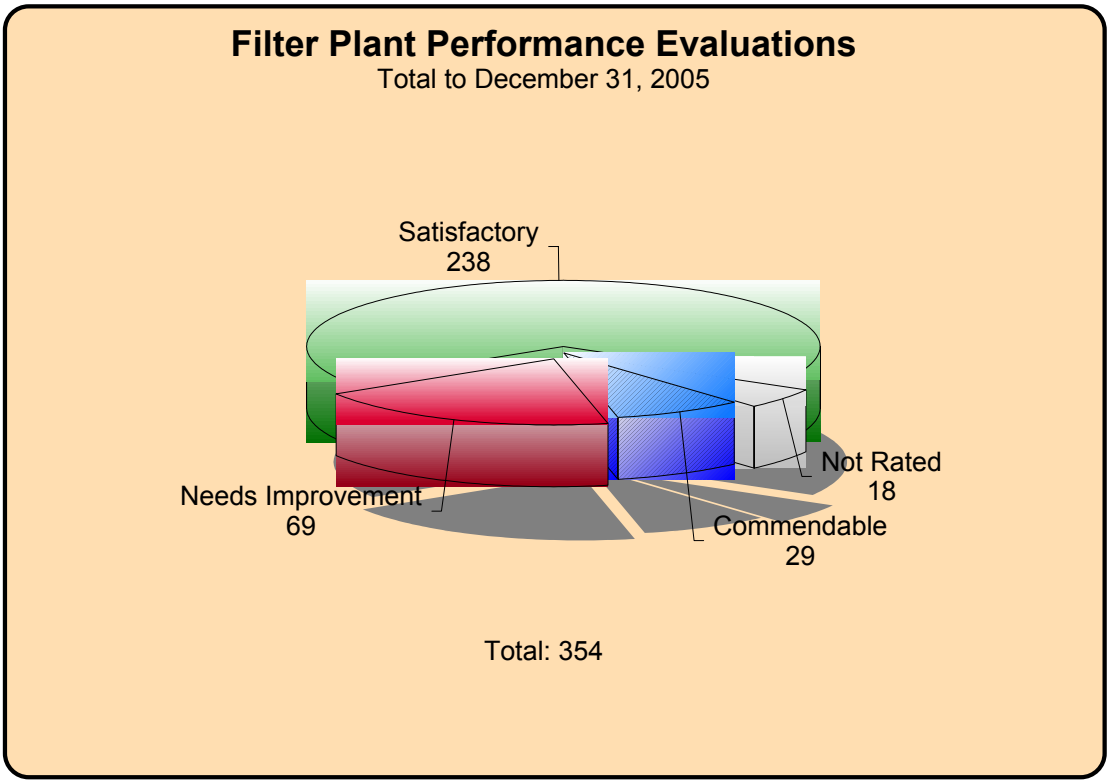


**Figure 25.** *The pie graph below provides the current status of ratings in the filter plant performance evaluation program.*




## Partnership for Safe Water

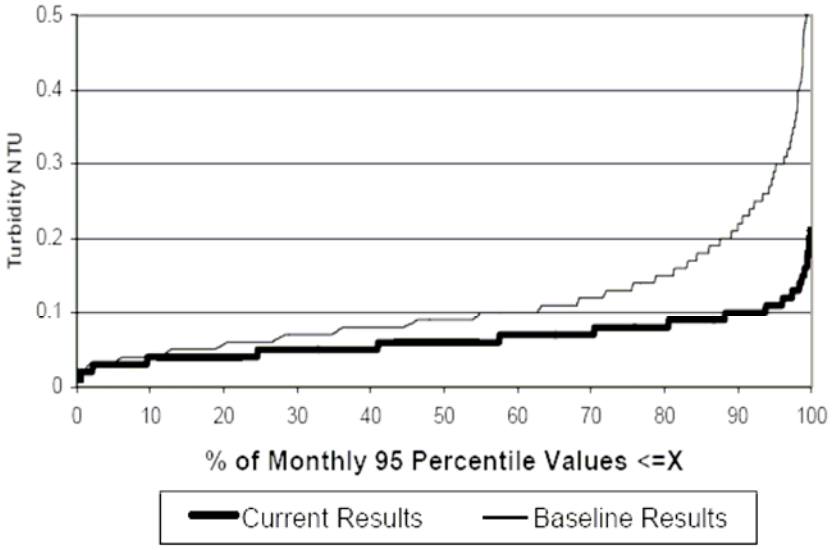
DEP's participation in the Partnership for Safe Water is a complimentary effort to the FPPE program in helping to prevent waterborne diseases. In addition to DEP's evaluation efforts, water systems may voluntarily self-assess and optimize their surface water treatment plants using Partnership tools. DEP's contract with the Pennsylvania Section of the American Water Works Association to encourage filtered water systems to enroll in the program has resulted in membership for 108 of the state's filter plants. Impressively, Pennsylvania has more members than any other state in the nation. Altogether, these filter plants serve about 5.2 million people, which is a large portion of the 8.4 million people served by surface water systems in Pennsylvania.

Partnership for Safe Water Annual Report Demonstrates Outcome of Improved Drinking Water Quality

The Partnership program is a key part of PADEP's compliance assurance efforts and has demonstrated real outcomes for Partnership members and their customers. The most important outcome realized by successfully achieving Phase III of the Partnership is a significant improvement in water quality. A recent report from National AWWA contained the below graph which was created using (2004-2005) turbidity data submitted by Partnership plants from throughout the country. It compares the 95$^{th}$ percentile finished water turbidity values from the baseline year (plant joined Partnership) verses

after completion of the Phase III self-assessment process. Overall performance results from Phase III plants indicates this process has resulted in more than a 50% improvement in finished water quality!

**Figure 26.** Frequency Distribution of Monthly 95th Percentile Finished Water Turbidity Values From Partnership Plants

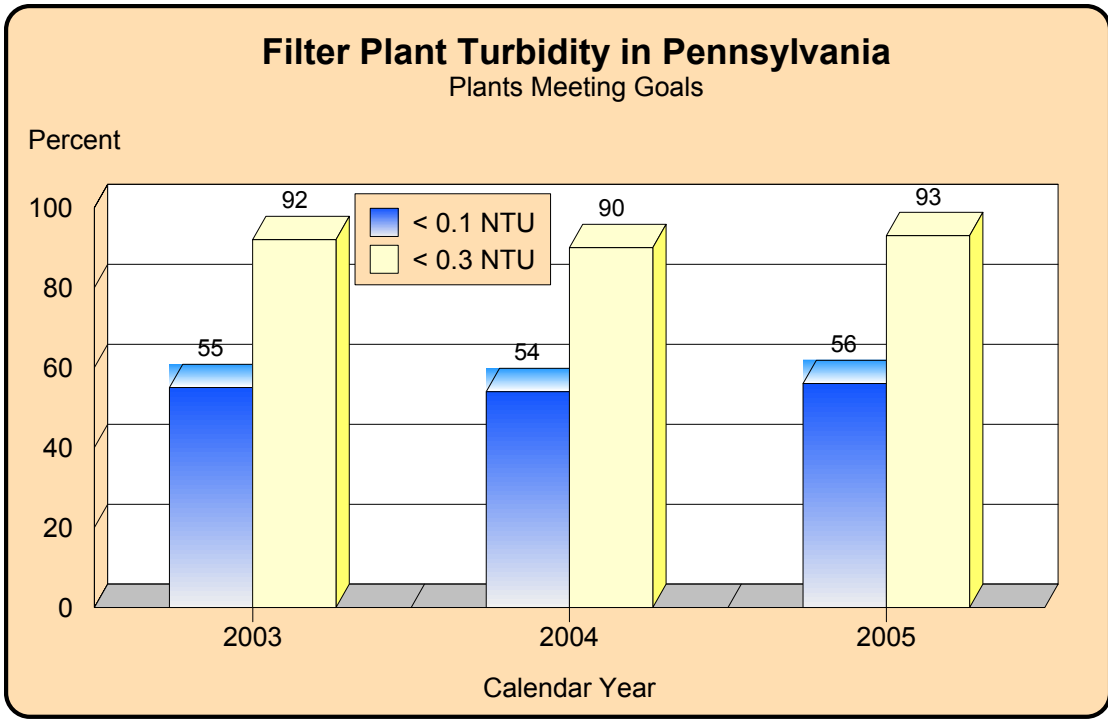



In reviewing the above graph, consider that the regulatory requirement for safe drinking water is 0.3 NTU. 44 surface water filtration plants that together serve almost 3.6 million Pennsylvanians have completed the Phase III self-assessment process and are working to meet the 0.1 NTU goal.

## Area Wide Optimization Program (AWOP)

Pennsylvania participates in the Area Wide Optimization Program. This program provides the opportunity to discuss optimization approaches utilized by other state regulators. One special initiative that has resulted from the AWOP program is the voluntary submittal of data using AWOP's Optimization Assessment Software (OAS). As a result of this initiative, plants receive a customized report providing a yearly trend graph. This data shows that filter plants are striving to meet the 0.1 NTU turbidity goal and produce water well below the regulatory requirement.

**Figures 27.** The below graph shows the percentages of filtered water systems meeting the regulatory 0.3 NTU turbidity requirement verses the 0.1 NTU optimization goal.




## Waterborne Disease Outbreaks

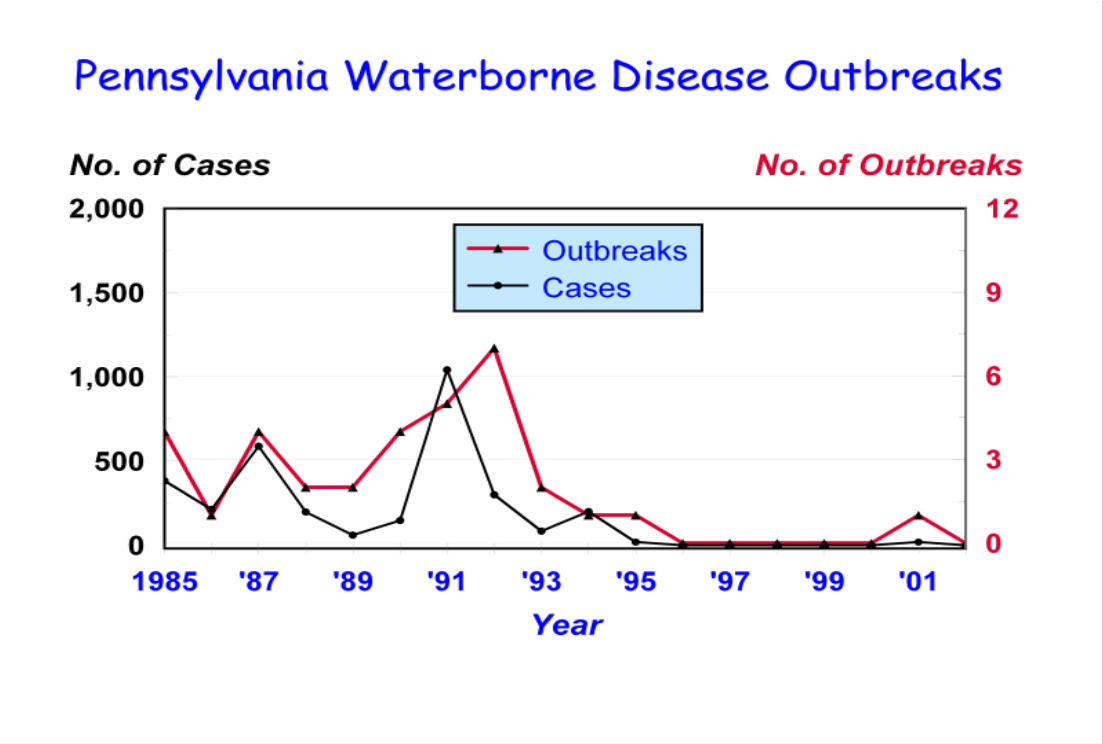
For Pennsylvanians, the bottom line to these and other efforts is that waterborne diseases are on a steep decline. In fact, waterborne disease outbreaks associated with public drinking water are at an all-time low in Pennsylvania. The US Centers for Disease Control and Prevention (CDC) and the US Environmental Protection Agency released disease information in a summary titled, "Surveillance for Waterborne-Disease Outbreaks" published in an October 22, 2004, *Morbidity and Mortality Weekly Report* (CDC Surveillance Summaries, October 22, 2004 / Vol. 53 / No. SS-8). The summary showed one outbreak affecting 19 people at a Pennsylvania church camp in 2001. Regulations classify a camp as a "noncommunity" water system, which differs from the "community" systems that serve most cities, townships and boroughs in the Commonwealth. In previous reports, Pennsylvania waterborne disease outbreaks were zero for the period 1996 through 2000.

CDC's reports typically lag a few years while the agency compiles and analyzes national outbreak data from all fifty states. The Pennsylvania Department of Health provides DEP with more current information on waterborne disease outbreaks. The health department and DEP jointly investigated one outbreak in 2004. An outbreak of gastrointestinal illness occurred at a summer camp classified as a transient water system. The camp physician estimated that between 375 and 475 persons (40 to 50 percent of the camp, including both campers and staff) had developed gastrointestinal symptoms. Primary symptoms involved abdominal pain and loose stools, which were not bloody;

some persons experienced vomiting. The camp staff were suspicious that the outbreak originated in the drinking water because two days prior to the onset of the illnesses, a chlorination pump failed on the potable water system. High coliform levels suggested that a shallow well (30-40 feet deep) effectively withdrew surface water into the potable system. The cause of this outbreak remains unknown. Likely possibilities include enteric viruses or enterotoxigenic E. coli ("ETEC"), which is different than hemorrhagic E. coli such as O157:H7. It is also possible that various disease-causing organisms caused diverse illnesses in different persons. DEP issued a field order to develop an existing well and abandon the problem well.

Not all outbreaks are recognized, investigated, and then reported to federal agencies. The sensitivity of the disease surveillance system is affected by the following factors: the size of the outbreak; severity of disease caused by the outbreak; public awareness of the outbreak; routine laboratory testing for organisms; requirements for reporting cases of diseases; and resources available to the local health departments for surveillance and investigation of probable outbreaks. Thus, the surveillance system probably underreports the true number of outbreaks because of these factors. With the help of local public health agencies, DEP and the Pennsylvania Department of Health are continuing to even further improve the state's disease detection, investigation and reporting system.

**Figure 28.** *The US Centers for Disease Control and Prevention and the US Environmental Protection Agency periodically release disease information. The reports typically lag a few years while the agencies compile and analyze national outbreak data from all fifty states. The following graph shows the occurrence of waterborne diseases in Pennsylvania that were caused by viruses, bacteria and protozoa—the three main culprits in disease outbreaks. The graph reveals a declining trend in the number of people (cases) affected by waterborne disease outbreaks.*



# 4. Discussion and Conclusion

Since 1996, the Safe Drinking Water Act and regulations have undergone a rapid evolution, with 12 new regulations in the last eight years and another five regulations expected in the near future. As a result, public health standards have become more protective. However, the cumulative affect of the new regulations has led to a steep learning curve and a severe shortfall in resources, and many water suppliers and state agencies are struggling to keep pace.

In 2005, a large majority of Pennsylvanians received water from PWSs which reported no violations of health-based standards. The trend in compliance rates over the last 5 years indicates a consistently high compliance rate for health-based standards. However, the compliance rate for meeting all monitoring and reporting requirements continues to be low, at nearly 73% for all PWSs. The tsunami of new regulations is a contributing factor.

**Figure 29. Compliance Trends – Percent of All Public Water Systems In Compliance**

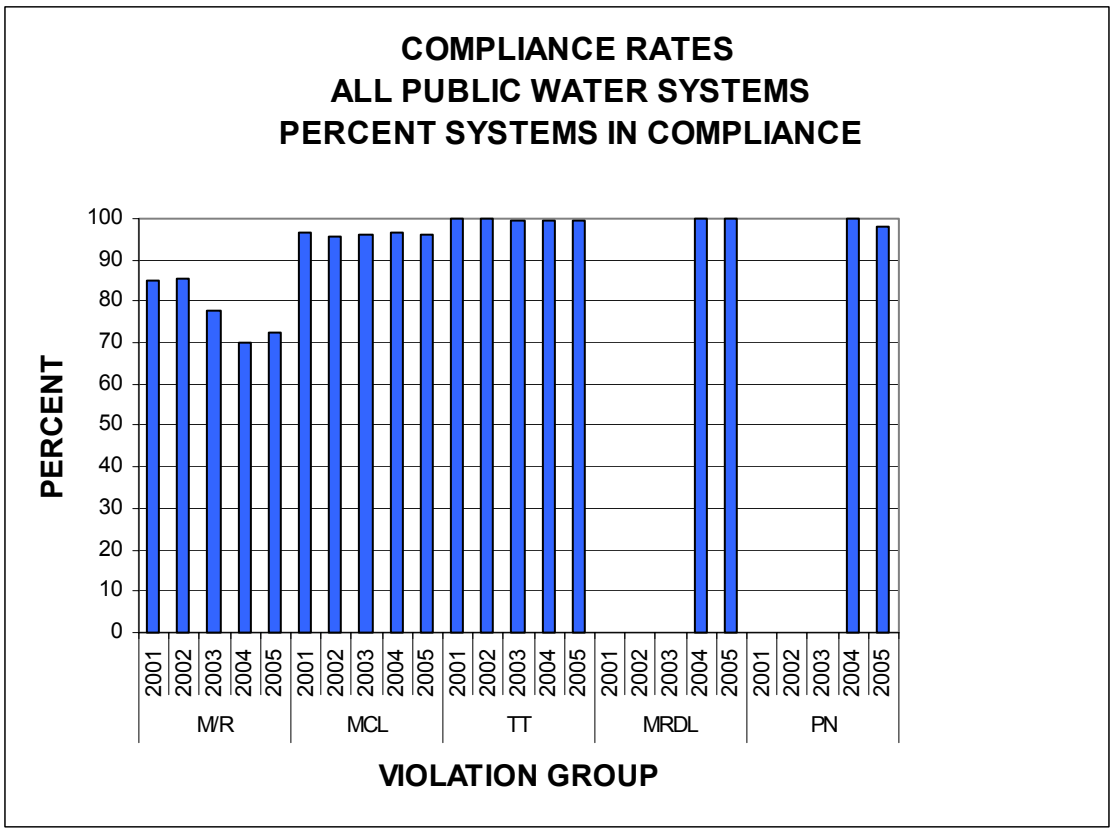
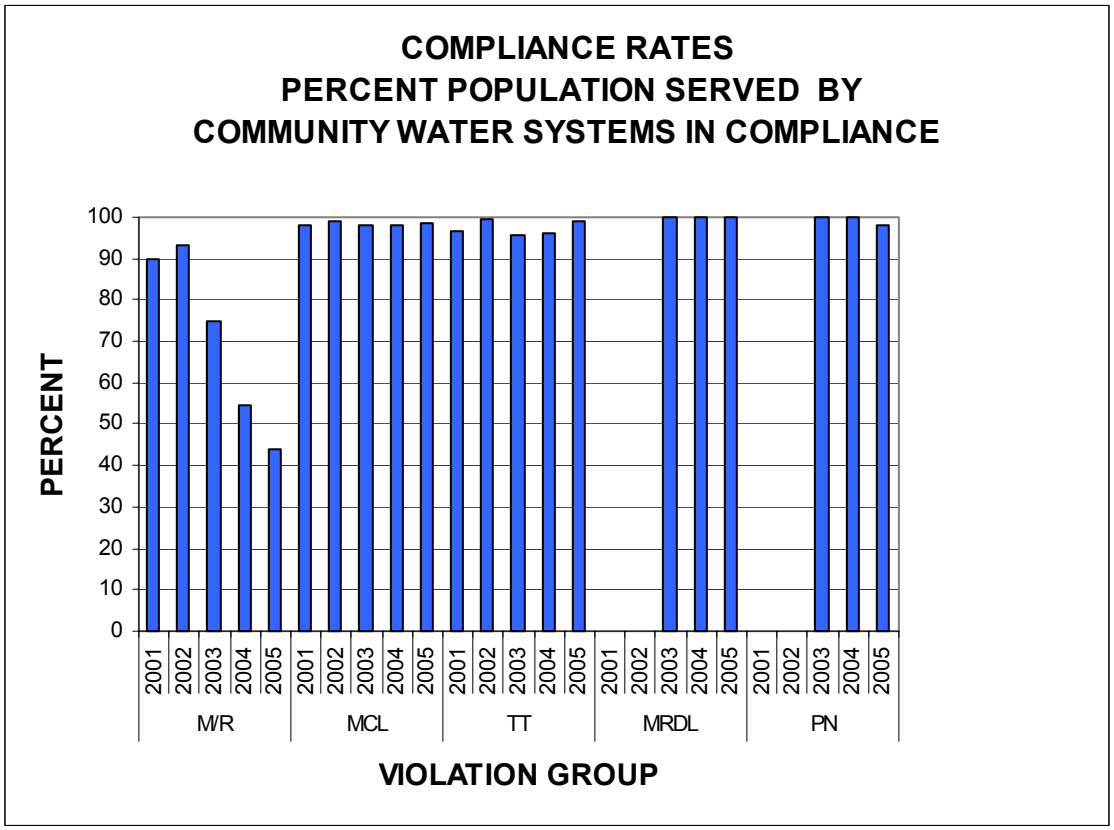


**Figure 30. Compliance Trends – Percent of Population Served By Community Water Systems in Compliance**




***New Regulations.*** Public water systems continued to meet the challenges from several recently enacted regulations.

- Interim Enhanced Surface Water Treatment Rule
- Long Term 1 Surface Water Treatment Rule (SWTR)
- Stage 1 Disinfectants and Disinfection Byproducts Rule (DBPR)
- Minor Revisions to the Lead and Copper Rule
- Major Revisions to the Public Notification Rule
- Filter Backwash Recycling Rule
- Radiological Rule
- Arsenic Rule

These rules are just the leading edge of a collection of new regulatory initiatives that are being implemented as a result of the 1996 Federal Safe Drinking Water Act (SDWA) Amendments. Systems should expect to see at least 3 new regulations in 2006, including the Long Term 2 SWTR, Stage 2 DBPR, and the Groundwater Rule.

***Water System Protection.*** Systems continued efforts to assess the potential threats to and protect their infrastructure from acts of terrorism. DEP implemented several initiatives to help water suppliers prevent attacks against their systems as well as provide rapid notice in the event of planned or actual attacks against water systems. DEP created a security display for use at conferences and meetings.

In 2005, PA DEP staff remained active in numerous areas such as source water protection; training and technical assistance; security; compliance monitoring; surveillance and outreach. Other efforts, such as filter plant performance evaluations and the Partnership for Safe Water, were used to optimize the operation of filter plants to consistently and reliably remove disease-causing organisms.

In addition to traditional surveillance and compliance efforts, field staff continued to work toward addressing water system needs before they result in violations. In anticipation of the new lower Arsenic MCL, DEP conducted mailings and provided technical assistance to systems with historical arsenic results greater than the new MCL. Funding for treatment and infrastructure improvements, wellhead and source water protection, optimization of treatment and regionalization are all tools being used to improve the long-term ability of PWSs in Pennsylvania to comply with current and future requirements.

DEP continued to build on tools added during 2000 in an effort to address water system needs. Under the Source Water Assessment and Protection Program, DEP continued work to access all 14,000 permanent sources of drinking water to identify their susceptibility to potential sources of contamination. The Capability Enhancement Program continued to be in demand with more than 50 systems participating in the program to date. These efforts have resulted in many visible improvements. They also serve to prevent many violations of both current and future regulations that would adversely impact the quality and quantity of the drinking water being produced in Pennsylvania.

As compliance is a long-term effort, DEP staff continue to work with each and every violator to address violations as they occur. In most instances, these efforts result in a voluntary return to compliance. However, when those efforts fail, progressive levels of compliance and enforcement are used.

PA DEP will continue to develop programs to assist water suppliers in protecting and managing their sources of supply; building technical, managerial, and financial capability; and training and certifying personnel responsible for the day-to-day operations of their drinking water systems. The US Congress enacted sweeping amendments to the federal SDWA that will lend considerable support to DEP's efforts. In addition to establishing a state revolving loan fund for water system improvements, Congress established technical and financial assistance programs to states and suppliers for source water protection, capacity development, and training and outreach activities.

These tools will enable DEP to assist Pennsylvania's public water systems in delivering a safe and adequate supply of drinking water to their consumers.

## Where To Go For Additional Information

For copies of this report, or the Appendix listing the public water systems having MCL, MRDL or treatment technique violations during 2005, or for additional information about the Pennsylvania Safe Drinking Water Program contact:

Department of Environmental Protection
Bureau of Water Standards and Facility Regulation
P.O. Box 8467, 11th Floor RCSOB
Harrisburg, PA 17105-8467

Phone: 717-787-5017
Web Site: http://www.dep.state.pa.us
Keyword : drinking water