



# Pennsylvania Public Water System Compliance Report - 2003

## Table of Contents

	Page
1. Introduction - Pennsylvania's Safe Drinking Water Program	1
• Public Water System - Definitions	1
• Background	2
• Sources of Drinking Water Contamination	3
• Improved Public Health Protection	4
• Source Water Assessment and Protection Program	4
• Financial, Technical, and Educational Assistance	5
• Eliminating Lead Sources	8
• Monitoring/Reporting (M/R) Requirements	8
• Variances and Exemptions	9
• Consumer Confidence Reports	9
• Regulation Development	9
2. PWS Profile and Compliance Summary	11
• General Statistics	11
• PWS Profile - 2003	12
• Figure 1. Number of Systems/Population by Size Category	12
• Figure 2. Number of Systems by Source Type	13
• Figure 3. Population Served by Source Type	14
• Summary of Violations	14
• Definitions	14
• Figure 4. Summary of Violations, MCL and MCL Significant Monitoring/Reporting	18
• Figure 5. Summary of Violations, Treatment Technique (TT) and Significant TT Monitoring/Reporting	21
• Figure 6. Summary of Violations, MCL, Treatment Technique, & Significant Monitoring/Reporting (Total)	22
• Violations Summary by Violation Type and PWS Type and Size	23
• Figure 7. CWS Total Coliform Violations	23
• Figure 8. CWS Chemical & Radiological Violations	23
• Figure 9. CWS Filter Rule Violations	24
• Figure 10. CWS Lead & Copper Violations	24
• Figure 11. CWS Disinfectants/Byproducts Violations	25
• Figure 12. Consumer Confidence Reports Violations	25

- Figure 13. Nontransient Noncommunity Violations 26
- Figure 14. Transient Noncommunity Violations 27

•	Compliance Rates	28
•	Figure 15. CWS Monitoring/Reporting	28
•	Figure 16. CWS Maximum Contaminant Levels	29
•	Figure 17. CWS Treatment Technique	30
•	Figure 18. Nontransient Noncommunity Systems	31
•	Figure 19. Transient Noncommunity Systems	32
•	Figure 20. All Public Water Systems	33
3.	Filter Plant Performance	34
•	Figure 21. Number of Filtered and Unfiltered Surface Water Systems	37
•	Figure 22. Turbidity Monitoring Violations	37
•	Figure 23A. Turbidity Exceeding 0.5 NTU	38
•	Figure 23B. Turbidity Exceeding 2.0 NTU	38
•	Figure 24A. Entry Point Disinfectant Violations	39
•	Figure 24B. Distribution System Chlorine Violations	39
•	Figure 25. Chlorine Monitoring Violations	40
•	Figure 26. Filter Plant Performance - Annual Program Results	40
•	Figure 27. Filter Plant Performance Evaluations -Total to Date	41
•	Figure 28. Pennsylvania Waterborne Disease Outbreaks	42
4.	Discussion and Conclusion	43
•	Where To Go For Additional Information	45
Appendix A:	Public Water Systems with MCL and/or Treatment Technique Violations	A-1



# Pennsylvania Public Water System Compliance Report - 2003

## 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), and consumer confidence report rule (CCR) violations for the calendar year 2003. 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 minus Appendix A, which is a list of public water systems having MCL and or treatment technique violations during 2003 is available on the Department of Environmental Protection (DEP) web site and in hardcopy. 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 Supply and Wastewater Management administers the PWSS program. Under the 1905 Public Water Supply Law, Pennsylvania led the nation in waterborne disease outbreaks, averaging eight to ten per year. Today, DEP regulates over 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 15 years is due in part to Pennsylvania's filtration requirements. In 1989, regulations were established requiring about 275 public water systems with unfiltered surface water sources to be filtered or abandoned. Filtration plants have been constructed for nearly all of the state's unfiltered surface water sources and work on the remaining three sources is scheduled for completion in the near future. To assure that Pennsylvania's 350 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 115 of the state's filter plants. The state holds over 25 percent of the 420 plants enrolled at the national level. In fact, Pennsylvania has more members than any other state in the nation. To date, 43 filter plants have completed detailed self-assessment reports that include action plans to voluntarily correct identified problems and ultimately optimize treatment. Altogether, the 115 filter plants serve over 5 million people, which is a large portion of the 8.3 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. Over 95% of the assessments were completed by September 24, 2003. All contracts and grants for source water assessments of over 14,000 sources serving public water systems were completed by August 31, 2003.

Projects to support development of local, voluntary source water protection are in place and 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 established and, over the last 3 years has awarded grants to 87 public water systems or municipalities to develop and implement local source water protection programs. A guidebook for developing local source water protection has been completed, and is available on CD and on the web.

### **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. Since then, PENNVEST has funded over \$1.2 billion in water supply infrastructure improvement projects benefiting Pennsylvania residents. PENNVEST also serves as the financing agency for drinking water state revolving loan funds (DWSRF) authorized by the 1996 Safe Drinking Water Act Amendments.

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.

The grant programs implemented by the Division of Technical Assistance and Outreach (TAO) to promote regionalization and consolidation have been eliminated. These grant programs funded 49 regionalization studies and eight consolidation construction projects. A total of \$2.6 million was awarded under these grant programs.

TAO continues to provide both classroom training and on-site technical assistance to drinking water systems. Through the use of the Environmental Training Partnership's (ETP) peer trainers, on-going assistance services are provided to public and privately owned drinking water systems. On average, 70 sites receive assistance from these trainers each year.

The regular general classroom training offered through the ETP will end in the summer of 2004. Training modules that reflect the new technology based operator testing will be completed by the end of 2004. These modules will be made available to any approved training provider. Training providers can use these modules to create training courses for delivery to their respective audiences. In 2003, the ETP provided 67 basic water system training courses throughout the state and 16 on-site training courses. These courses cover material provided by the Sacramento Training Courses, Corrosion Control, Water



Math and Pumps and Pumping. ETP training provided training to approximately 881 potential water system operators this year.

The Division completed the fourth year of implementation of its Capability Enhancement Program. The prioritization of every community and nontransient noncommunity water system was reviewed and revised as needed. Training modules to address financial and managerial issues of water systems are under development. Over 95 operators attended the 12 Emergency Response Plan Workshops held in 2003. The demand for Capability Enhancement Services continues to grow. To date, over 45 drinking water systems have participated in the program.

TAO 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. Guidelines to implement an "Interim Program" that met EPA requirements were revised to more accurately reflect program requirements. These revised guidelines were effective January 2004 and have the force of law to implement the program. This past year draft regulations and additional guidelines have been developed for the DEP and the State Board for Certification of Water and Wastewater System Operators. The public participation phase was completed. Draft regulations will be forwarded to the Environmental Quality Board for first consideration by the end of 2004.

The DEP regional training network continues to offer technical and regulatory training to help the regulated community comply with appropriate drinking water laws, rules and regulations. In 2003, regional trainers concentrated their efforts on the implementation of the Disinfectants/Disinfection Byproducts Rule for small public water systems.

Over the past year, DEP made considerable progress on the development of an on-line university, including the storyboards for several training courses. DEP intends to provide training, mainly on regulatory topics, over the Internet, starting in 2004, to help water suppliers to comply with the regulations.

DEP Technical Training Section staff and Pennsylvania State University at Harrisburg staff continue to work together to develop and deliver a series of hands-on training courses using the pilot treatment facility constructed in 2000 and hands-on training stations that have been completed over the past three years.

The Small Drinking Water Systems Engineering Services Program (ESP) continues to provide various engineering services/activities to assist small drinking water systems with special situations occurring within their systems. A joint approach involving representatives of the water system, DEP, and a contracted engineering firm is used to determine an approach to help solve technical issues at small water system's requesting assistance.

An ESP web site containing more detailed information on the program has been developed and can be accessed from the following link:

[http://www.dep.state.pa.us/dep/deputate/watermgmt/wsm/WSM\\_DWM/Technol/default.htm](http://www.dep.state.pa.us/dep/deputate/watermgmt/wsm/WSM_DWM/Technol/default.htm)

Since implementing the program in December 1999 efforts have continued to assist as many small drinking water systems as possible. Assistance is provided to help address various public health and safety concerns, such as recurring water shortages, nitrate contamination, GUDI sources, and other site-specific situations.

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 the project-scoping meeting was held it was determined that seven of the systems did not meet the criteria to participate in the program, or are on hold due to timing or funding issues or have elected not to participate in the program at this time.

There are currently 21 active projects involving three source yield studies, two nitrate assessments, seven GUDI source projects, and nine 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.

In an attempt to save money for additional projects, the Division's geologist has completed "desktop hydrogeologic studies" for several projects. The geologist provided on-going oversight of source site selection and pre-drilling plans at several public water systems supported by the ESP. Desktop hydrogeologic studies have been conducted for each and include a fracture trace analysis, literature search of relevant geologic reports of the area, and an assessment of aquifer characteristics. The results of the study were then incorporated into Alfred Benesch and Company's ESP report for the participating system. The Division's geologist also reviewed and commented on drilling plans and was on-site during several well drilling and aquifer tests.

The nine completed projects to date include the repair and replacement of a deteriorated and severely leaking distribution system; the interconnection of a small mobile home park with a neighboring municipal authority; the replacement of a leaking transmission main that crossed under a high-speed railroad; the development of a groundwater source to eliminate the use of an unfiltered surface source, the interconnection of a small community water system with a larger neighboring Authority, the construction of a geodesic dome to cover a finished water reservoir, the disbanding of a system using an unfiltered surface source, the permitting of a well for a system experiencing source yield deficiencies, and streambank improvements to allow vehicular access to a water treatment facility.

The most noteworthy activities for this reporting period include:

- Completion of geodesic dome construction on a finished water storage facility;
- Completion of a membrane cartridge filtration system pilot study;
- Initiated permitting for an existing well to be placed on-line;
- Completion of several pre-drilling plans;
- Began construction on a distribution system replacement project;

- Began design assessment for the rehabilitation of a spring in order to eliminate surface water intrusion;
- Continued with design and permitting on a package filtration treatment plant;
- Completion of two nitrate studies, and
- Held several project status meetings with participants, as well as project scoping meetings with potential participants.

Some of the work already started and expected to continue during the next reporting period includes:

- Completion of design and permitting assistance with two package filtration plants;
- Upgrading of an existing well to acceptable standards and connection to the system;
- Completion of two distribution system replacement projects;
- Completion of two spring rehabilitation projects;
- Completion of upgrades to a greensand filtration plant;
- Design and permitting of a nitrate treatment system; and
- Development of work plans for the new systems participating in the program.

### **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, 2003](#), PDF file.

### **Monitoring/Reporting (M/R) Requirements**

All PWSs are required to monitor, report and comply with the MCLs for total coliform bacteria and nitrate. In addition, CWSs are subject to M/R requirements for other microbiological contaminants, chemicals and radiological contaminants, and to adhere to

MCL and treatment technique requirements. Because NTNCWSs can contribute significantly to an individual's daily water intake, M/R, MCL, MRDL and TT requirements apply to NTNCWSs as well as CWSs. A PWS is required to monitor and verify that the levels of contaminants present in the water do not exceed the MCLs and treatment technique requirements. There were no MRDL violations in 2003.

In addition to MCL 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.

To further encourage routine monitoring and timely reporting of results, DEP initiated a pilot program in 1999 to offer a financial incentive for CWSs and NTNCWSs serving less than 3,300 people. If a target system performed all required compliance monitoring during the year, they were eligible for reimbursement for some or all of their chemical and radiological monitoring. This program resulted in total reimbursements of over \$395,000 in 2000 among 833 water systems. In 2001 reimbursements totaled \$259,000 for 864 water systems. Reimbursements for 2002 came to \$225,000 for 618 water systems and marked the end of the program.

### **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. There were no variances and exemptions in effect for any Pennsylvania PWSs during the 2003 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 2002 was due by July 1, 2003 and about 72% of the community systems voluntarily met that deadline. Through follow-up compliance efforts, the percentage improved to 94% by the end of 2003. DEP continued to work with the Pennsylvania Rural Water Association (PRWA) to

revise their electronic template as well as provided technical assistance to help suppliers comply.

## **Regulation Development**

The proposed *Microbial and Disinfection Byproducts Corrective Amendments* rulemaking was approved by the Environmental Quality Board on May 21, 2003. The proposed rulemaking was then published in the *Pennsylvania Bulletin* on August 2, 2003. The 30-day public comment period ended on September 2, 2003. No public comments were received. Six minor, clarifying revisions were made to the final rulemaking. The final rulemaking was then reviewed by the Technical Assistance Center Advisory Board (TAC) in December 2003. The TAC approved the final rulemaking with no changes.

The Environmental Quality Board (EQB) approved the final Radionuclides Rule on December 16, 2003. The final radionuclides rule was published in the *Pennsylvania Bulletin* on April 3, 2004 and will be incorporated into Title 25, Pa Code, Chapter 109, Safe Drinking Water Regulations to be printed June 4, 2004. The Water Resources Advisory Committee (WRAC) and the Technical Assistance Center (TAC) Advisory Board were involved in the development of the final radionuclide rule amendments to Chapter 109. TAC reviewed and approved the final radionuclides rule on August 14, 2003 and the WRAC on September 10, 2003.

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

The Environmental Quality Board (EQB) approved the final Filter Backwash Recycling Rule (FBRR) on December 16, 2003. The final FBRR was published in the *Pennsylvania Bulletin* on April 3, 2004 and will be incorporated into Title 25, Pa Code, Chapter 109, Safe Drinking Water Regulations to be printed June 4, 2004. The Water Resources Advisory Committee (WRAC) and the Technical Assistance Center (TAC) Advisory Board were involved in the development of the final FBRR amendments to Chapter 109. TAC reviewed and approved the final FBRR on August 14, 2003 and the WRAC on September 10, 2003.

The FBRR will affect about 67 drinking water filtration plants using surface water or ground water under direct influence of surface water (GUDI) sources and utilizing conventional or direct filtration processes. These plants must recycle their filter backwash water; sludge thickener supernatant and liquids from dewatering processes to the head of the treatment processes or other DEP approved location by June 8, 2004.

## 2.

## PWS Profile and Compliance Summary

The following pages display some fundamental Pennsylvania PWS statistics, a table of the incidence of MCL, significant monitoring, and TT violations, and graphics to illustrate the general picture of PWS compliance in Pennsylvania in 2003.

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 can be found. The SDWIS violation database for the 2003 report was frozen on April 1, 2004. However, Pennsylvania did not receive notice of this until early in June 2004. In the interim, in mid-May, another transmittal of PADWIS data was made to EPA and it is this version of the data that forms the basis for this report.

### General Statistics

- Total Population of Pennsylvania: 12,287,000
- Percent of Population Served by Individual Wells: 12%
- Percent of Population Served by Community Water Systems: 85%
- 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.
- 8% of the population was covered by source protection programs.
- 94% of all CWSs have received a source water infiltration (SWIP) evaluation.
- There were no confirmed water-borne disease outbreak during 2003
- 2,268 On-Site Assessments (Full Inspections) were performed.
- 99% of the population served by CWSs with surface-water sources or ground water under the direct influence of surface water receive filtered water.
- 82% of all surface-water systems have optimized filtration treatment.
- 100 Filter Plant Performance Evaluations were performed.
- 97% of the population served by CWSs are protected by optimized corrosion control .
- 92% of all children at day-care and school facilities which have their own water supply are protected by optimized corrosion control treatment.
- Over 99% of the population served by CWSs are protected from nitrate/nitrite.
- Over 99% of the population of CWSs are protected from carcinogenic contaminants

### Compliance Actions

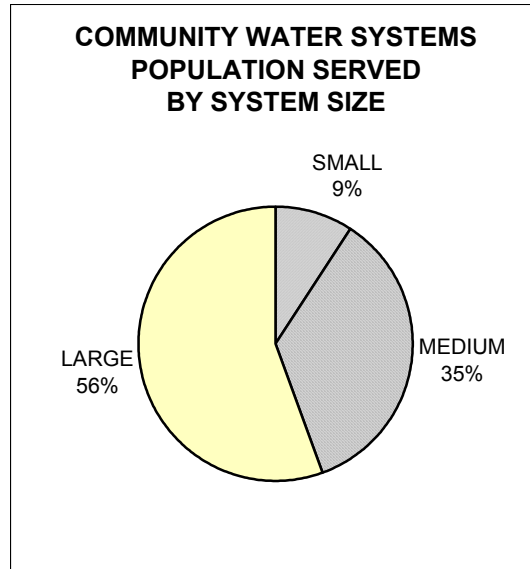
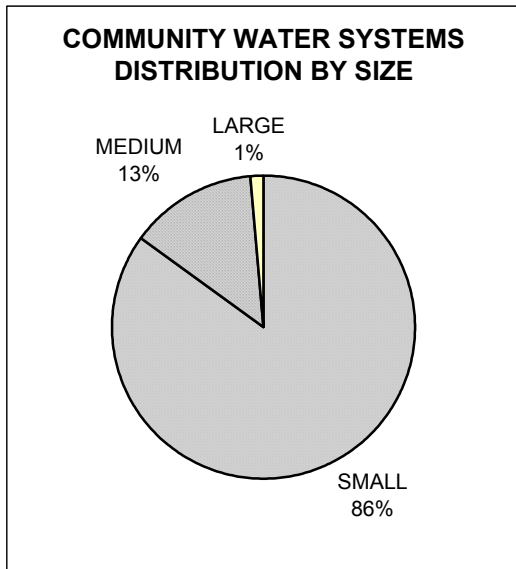
Action	Number
Compliance Letters	3,071
Consent & Administrative Orders	19
Consent Assessments	2
Boil Water Advisories (Community Systems)	58
Boil Water Advisories (Noncommunity Systems)	49
Civil Penalties Collected	\$40,552

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 - 2003

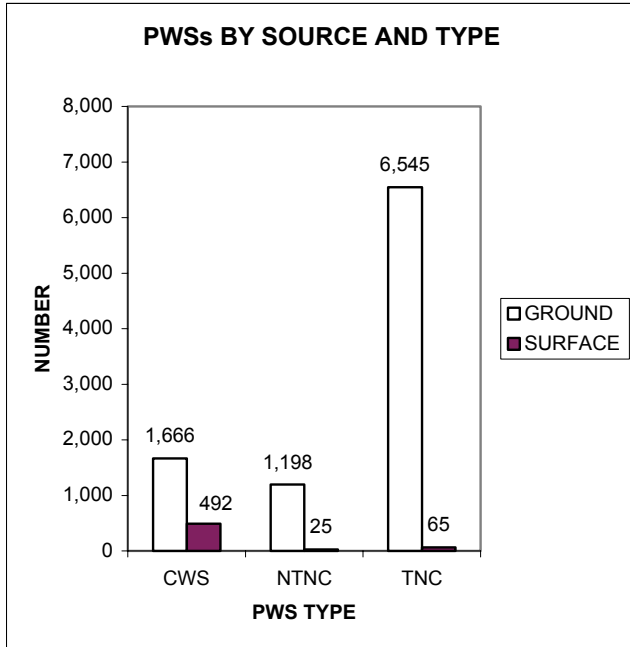
Figure 1. Number of Systems and Population Served by Size Category

	NUMBER OF PWSs			POPULATION SERVED		
	CWS	NTNC	TNC	CWS	NTNC	TNC
<b>SMALL</b>	1,836	1,210	6,603	960,285	445,893	813,994
<b>MEDIUM</b>	291	13	7	3,684,818	94,353	33,450
<b>LARGE</b>	31	0	0	5,811,670	0	0
<b>TOTAL</b>	<b>2,158</b>	<b>1,223</b>	<b>6,610</b>	<b>10,456,773</b>	<b>540,246</b>	<b>847,444</b>



**Figure 2. Number of Systems by Source Type**

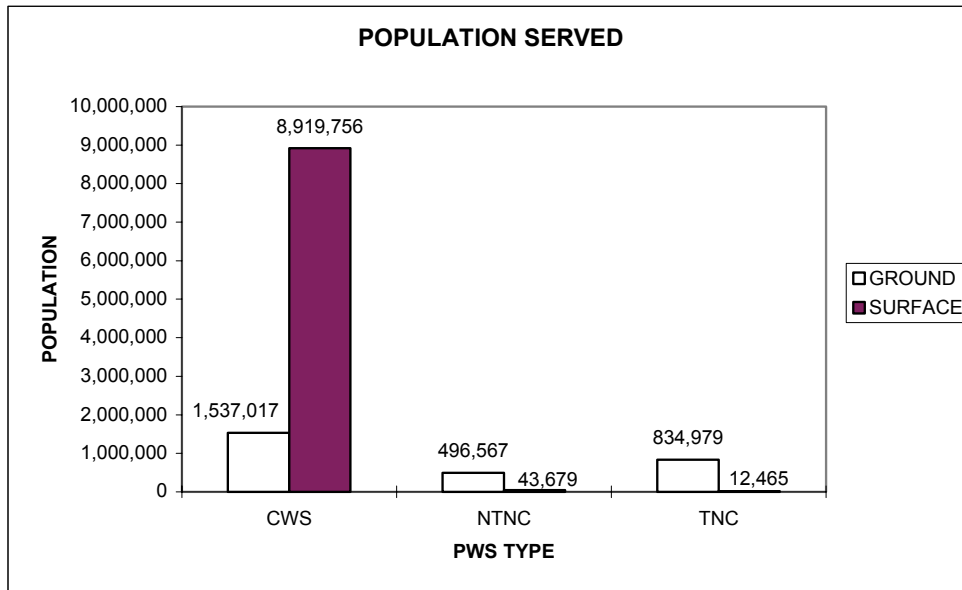
<b>PWSs BY SOURCE AND SYSTEM TYPE</b>								
	<b>CWS</b>		<b>NTNC</b>		<b>TNC</b>		<b>TOTAL</b>	
	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT
<b>GROUND</b>	1,666	77.2%	1,198	98.0%	6,545	99.0%	9,409	94.2%
<b>SURFACE</b>	492	22.8%	25	2.0%	65	1.0%	582	5.8%
<b>TOTAL</b>	2,158	100.0%	1,223	100.0%	6,610	100.0%	9,991	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
<b>GROUND</b>	1,537,017	14.7%	496,567	91.9%	834,979	98.5%	2,868,563	24.2%
<b>SURFACE</b>	8,919,756	85.3%	43,679	8.1%	12,465	1.5%	8,975,900	75.8%
<b>TOTAL</b>	10,456,773	100.0%	540,246	100.0%	847,444	100.0%	11,844,463	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 2002, the Stage 1 Disinfectants and Disinfection Byproducts Rule (DBPR) applies to community water systems and non-transient non-community systems, serving at least 10,000 people, that add a disinfectant to the drinking water during any part of the treatment process. Violations of the DBPR are to be 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.

**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.

**SDWIS Code:** Specific numeric codes from the Safe Drinking Water Information System (SDWIS) have been assigned to each violation type included in this report. The violations to be reported include exceeding contaminant MCLs, failure to comply with treatment requirements, and failure to meet monitoring and reporting requirements. Four-digit SDWIS Contaminant Codes have also been included in the chart for specific MCL contaminants.

**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” 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, 2003 to December 31, 2003**

	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
<b>ORGANIC CONTAMINANTS</b>					
1,1,1-Trichloroethane	0.2	0	0	170	136
1,1,2-Trichloroethane	0.005	0	0	171	137
1,1-Dichloroethylene	0.007	4	2	171	137
1,2-Dichloroethane	0.005	0	0	173	139
1,2-Dichloropropane	0.005	0	0	171	137
1,2 Dibromo-3-Chloropropane (DBCP)	0.0002	0	0	36	23
1,2,4-Trichlorobenzene	0.07	0	0	170	136
2,3,7,8-TCDD (Dioxin)	3X10 <sup>-6</sup>	0	0	0	0
2,4,5-TP (Silvex)	0.05	0	0	0	0
2,4-D	0.07	0	0	44	32
Alachlor (Lasso)	0.002	0	0	44	28
Atrazine	0.003	0	0	67	39
Benzene	0.005	1	1	172	138
Benzo (A) Pyrene	0.0002	0	0	36	25
BHC-gamma (Lindane)	0.0002	0	0	49	29
Carbofuran	0.04	0	0	29	21
Carbon Tetrachloride	0.005	0	0	170	136
Chlordane	0.002	0	0	31	23
cis-1,2-Dichloroethylene	0.07	3	1	170	136
Dalapon	0.2	0	0	0	0
Di(2-Ethylhexyl) Adipate	0.4	0	0	35	24
Di(2-Ethylhexyl) Phthalate	0.006	0	0	37	26
Dichloromethane (Methylene Chloride)	0.005	1	1	171	137
Dinoseb	0.007	0	0	0	0
Diquat	0.02	0	0	0	0
Endothall	0.1	0	0	29	22
Endrin	0.002	0	0	1	1
Ethylbenzene	0.7	0	0	170	137
Ethylene Dibromide (EDB)	0.00005	0	0	40	23
Glyphosate	0.7	0	0	1	1
Heptachlor	0.0004	0	0	0	0
Heptachlor Epoxide	0.0002	0	0	0	0

Pennsylvania Public Water System Compliance Report - 2003

	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
Hexachlorobenzene (HCB)	0.001	0	0	0	0
Hexachlorocyclopentadiene	0.05	0	0	35	25
Methoxychlor	0.04	0	0	44	26
Monochlorobenzene (Chlorobenzene)	0.1	0	0	171	137
o-Dichlorobenzene	0.6	0	0	170	136
Oxamyl (Vydate)	0.2	0	0	31	22
p-Dichlorobenzene	0.075	0	0	170	136
Pentachlorophenol	0.001	0	0	35	25
Picloram	0.5	0	0	29	21
Simazine	0.004	0	0	53	31
Styrene	0.1	0	0	171	137
Tetrachloroethylene	0.005	5	3	172	138
Toluene	1	0	0	170	136
Total Polychlorinated Biphenyls (PCB)	0.0005	0	0	0	0
Toxaphene	0.003	0	0	1	1
trans-1,2-Dichloroethylene	0.1	0	0	170	136
Trichloroethylene	0.005	5	3	171	137
Vinyl Chloride	0.002	1	1	0	0
Xylenes, Total	10	0	0	169	136
<b>Total trihalomethanes</b>	0.10	0	0	1	1
<b>Subtotal</b>		<b>20</b>	<b>8</b>	<b>4,121</b>	<b>177</b>
<b>INORGANIC CONTAMINANTS</b>					
Antimony, Total	0.006	0	0	134	117
Arsenic	0.05	2	2	133	115
Barium	2	3	2	134	115
Beryllium, Total	0.004	0	0	131	114
Cadmium	0.005	1	1	136	119
Chromium	0.1	0	0	130	113
Cyanide	0.2	0	0	129	114
Fluoride	2	2	2	150	129
Mercury	0.002	1	1	129	112
Nickel	0.1	0	0	132	115
Nitrate	10 (as Nitrogen)	135	94	517	422
Nitrite	1 (as Nitrogen)	0	0	353	300
Selenium	0.05	0	0	133	116

Pennsylvania Public Water System Compliance Report - 2003

	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
Thallium, Total	0.002	0	0	132	115
<b>Subtotal</b>		<b>144</b>	<b>101</b>	<b>2,473</b>	<b>619</b>
<b>RADIONUCLIDE CONTAMINANTS</b>	** Note				
Combined Radium (-226 & -228)	5 pCi/l	0	0	0	0
Gross Alpha, Excl. Radon & Ura	15 pCi/l	0	0	0	0
Gross Beta & Photo Emitters	Mrem/yr	0	0	3	3
38-Strontium-90	8 pCi/l	0	0	2	2
Tritium	20,000 pCi/l	0	0	2	2
<b>Subtotal</b>		<b>0</b>	<b>0</b>	<b>7</b>	<b>3</b>
<b>TOTAL CHEMICAL CONTAMINANTS</b>		<b>164</b>	<b>109</b>	<b>6,601</b>	<b>731</b>
<b>TOTAL COLIFORM RULE</b>					
MCL, Acute	Present	85	82		
MCL, Monthly	Present	316	276		
Monitoring Routine & Repeat Major				1,765	1,226
<b>Subtotal</b>		<b>401</b>	<b>284</b>	<b>1,765</b>	<b>1,226</b>

**\*\* Note:**

*Community and noncommunity water systems are on a four-year sampling cycle for gross alpha due in June 2004.*

**Figure 5.**

**Pennsylvania -- SUMMARY OF VIOLATIONS  
Treatment Techniques (TT) and TT Significant Monitoring/Reporting  
Annual Compliance Report -- January 1, 2003 to December 31, 2003**

	Treatment Technique Violations		Significant Monitoring/Reporting Violations	
	Number of Violations	Number of Systems With Violations	Number of Violations	Number of Systems With Violations
<b>SURFACE WATER TREATMENT RULE/IESWTR</b>				
<b>Filtered systems</b>				
Monitoring, routine/repeat			167	71
Treatment techniques	172	6		
<b>Unfiltered systems</b>				
Monitoring, routine/repeat			15	6
Failure to filter	1	1		
<b>Subtotal</b>	<b>173</b>	<b>7</b>	<b>182</b>	<b>77</b>
<b>LEAD and COPPER RULE</b>				
Initial lead and copper tap M/R			23	17
Follow-up or routine lead and copper tap M/R			32	32
Treatment installation/technique	4	4		
<b>Subtotal</b>	<b>4</b>	<b>4</b>	<b>55</b>	<b>49</b>
<b>DISINFECTION/BYPRODUCTS CONTAMINANTS</b>				
Chlorine	66	6	89	52
Chloramine	1	1	0	0
Chlorine Dioxide	0	0	10	1
Chlorite	0	0	10	1
Disinfectant Residual	123	11	323	73
Total Alkalinity	0	0	58	10
Total Organic Carbon	11	4	23	6
Haloacetic Acids (Five) Note	***	1	9	4
Trihalomethanes	0	0	12	6
<b>Subtotal</b>	<b>202</b>	<b>5</b>	<b>534</b>	<b>107</b>

\*\*\* Note: The Haloacetic Acid violation is an MCL violation (mcl=0.06), not treatment technique.



**Figure 6.**

**Pennsylvania -- SUMMARY OF VIOLATIONS  
MCL, Treatment Technique, and Significant Monitoring/Reporting  
Annual Compliance Report -- January 1, 2003 to December 31, 2003**

		<b>Number of Violations</b>	<b>Number Of Systems</b>
<b>GRAND TOTAL</b>		<b>10,782</b>	<b>2,479</b>

*NOTE:*

*Grand totals include 701 Consumer Confidence reporting violations involving 576 community water systems.*

**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
SMALL	455	39
MEDIUM	48	8
LARGE	3	0
<b>TOTAL</b>	<b>506</b>	<b>47</b>

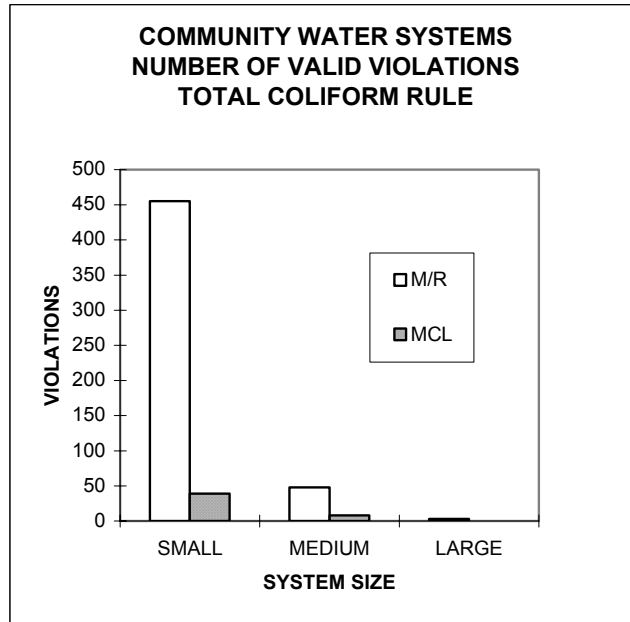
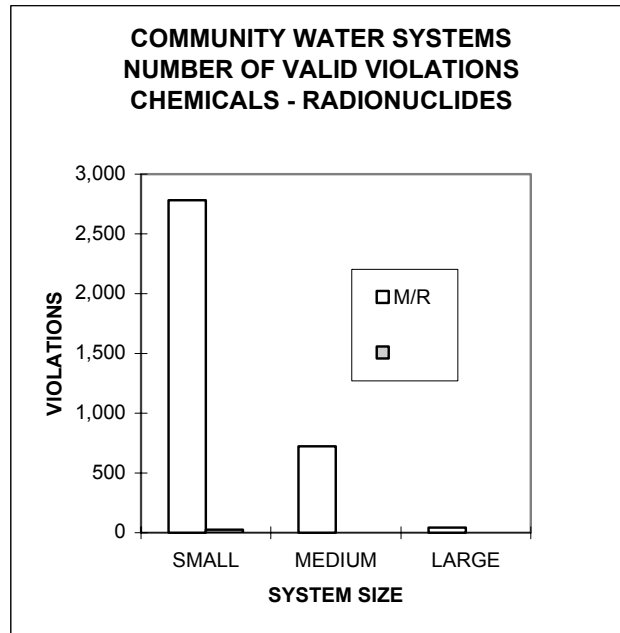


Figure 8.

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

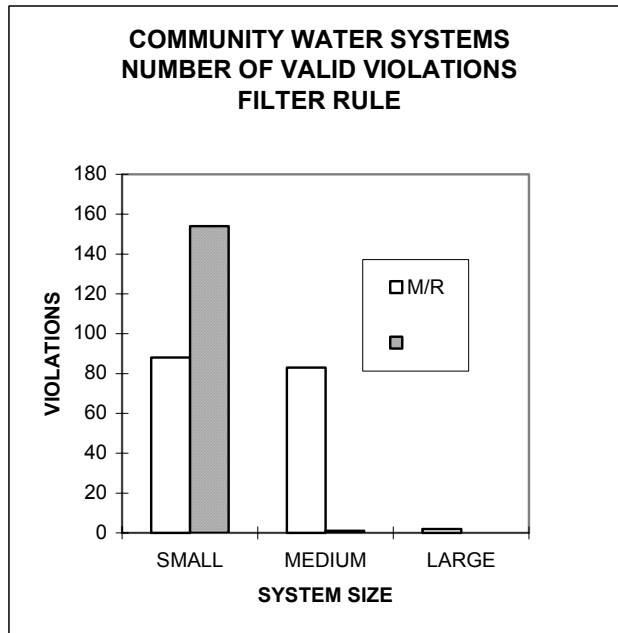
	M/R	MCL
SMALL	2,782	26
MEDIUM	723	1
LARGE	42	0
<b>TOTAL</b>	<b>3,547</b>	<b>27</b>



**Figure 9.**

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

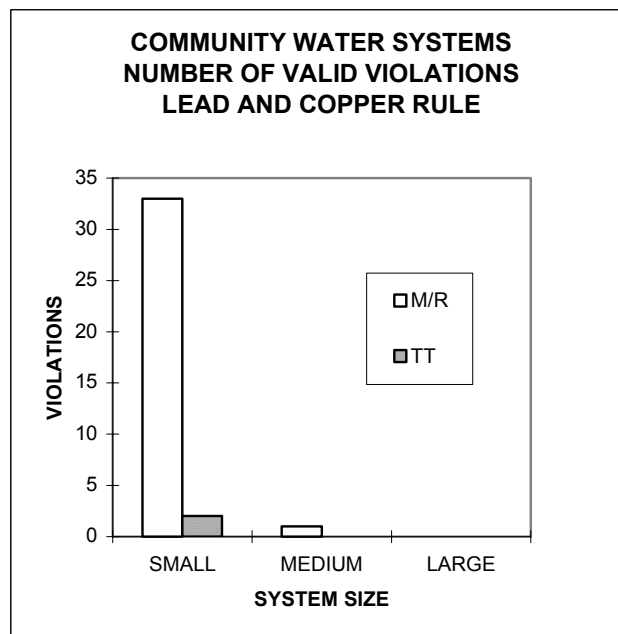
	M/R	TT
<b>SMALL</b>	88	154
<b>MEDIUM</b>	83	1
<b>LARGE</b>	2	0
<b>TOTAL</b>	173	155



**Figure 10.**

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

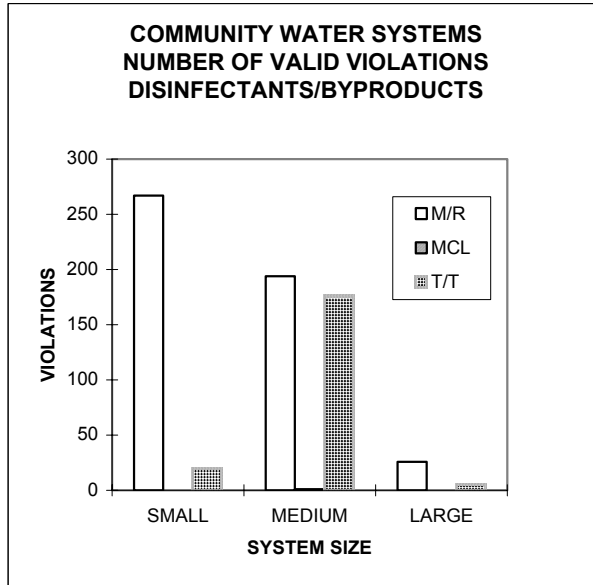
	M/R	TT
<b>SMALL</b>	33	2
<b>MEDIUM</b>	1	0
<b>LARGE</b>	0	0
<b>TOTAL</b>	34	2



**Figure 11.**

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

	M/R	MCL	T/T
<b>SMALL</b>	267	0	20
<b>MEDIUM</b>	194	1	176
<b>LARGE</b>	26	0	5
<b>TOTAL</b>	487	1	201

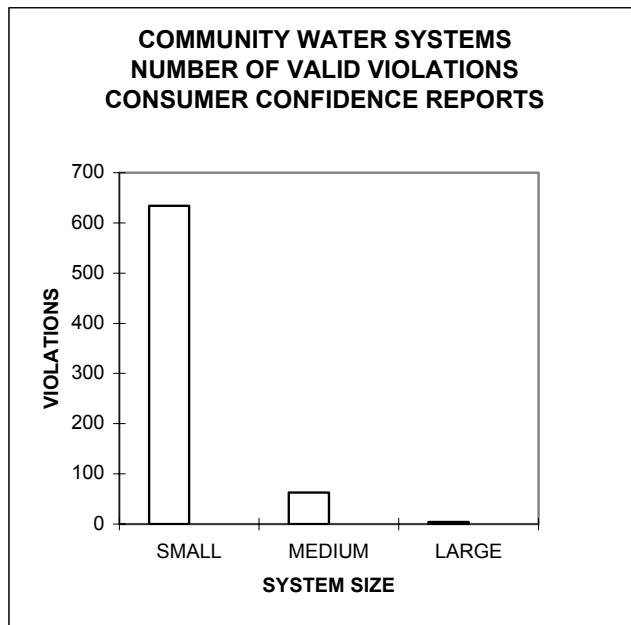


**Figure 12.**

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

	M/R
<b>SMALL</b>	634
<b>MEDIUM</b>	63
<b>LARGE</b>	4
<b>TOTAL</b>	701

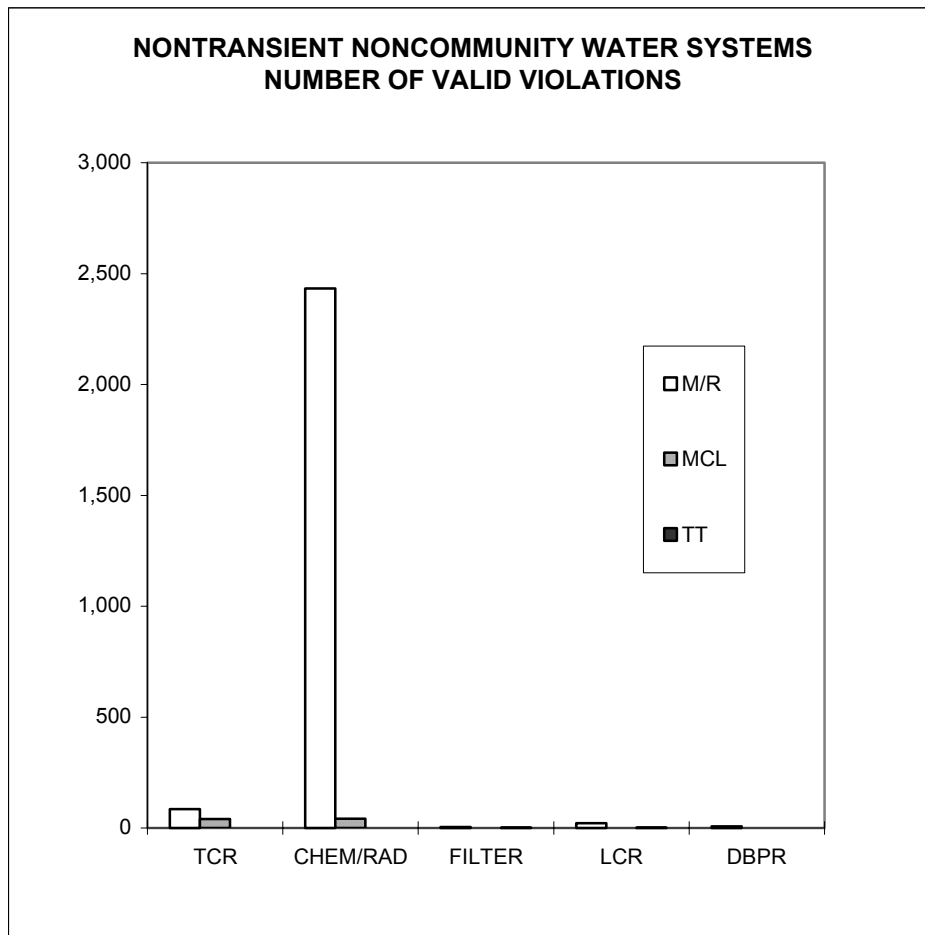
Includes late and missing reports and certifications.



**Figure 13.**

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

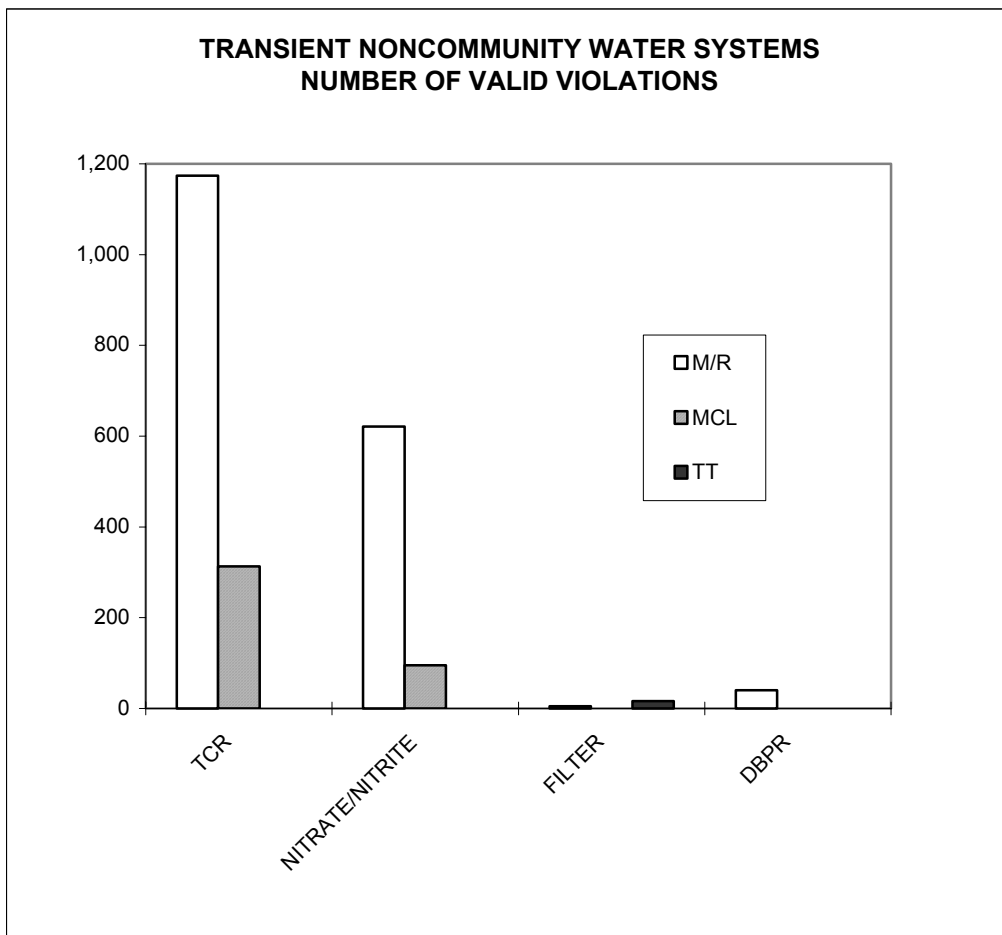
	M/R	MCL	TT
TCR	85	41	0
CHEM/RAD	2,433	42	0
FILTER	4	0	2
LCR	21	0	2
DBPR	7	0	0
<b>TOTAL</b>	<b>2,550</b>	<b>83</b>	<b>4</b>



**Figure 14.**

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

	<b>M/R</b>	<b>MCL</b>	<b>TT</b>
<b>TCR</b>	1,174	313	0
<b>NITRATE/NITRITE</b>	621	95	0
<b>FILTER</b>	5	0	16
<b>DBPR</b>	40	0	0
<b>TOTAL</b>	1,840	408	16

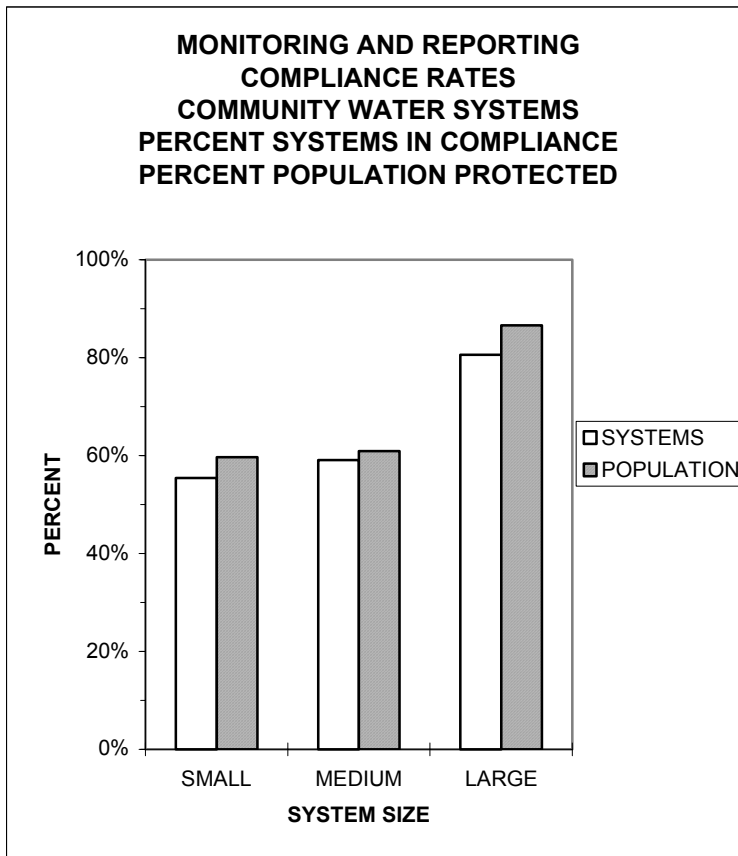


## Compliance Rates

Figure 15.

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

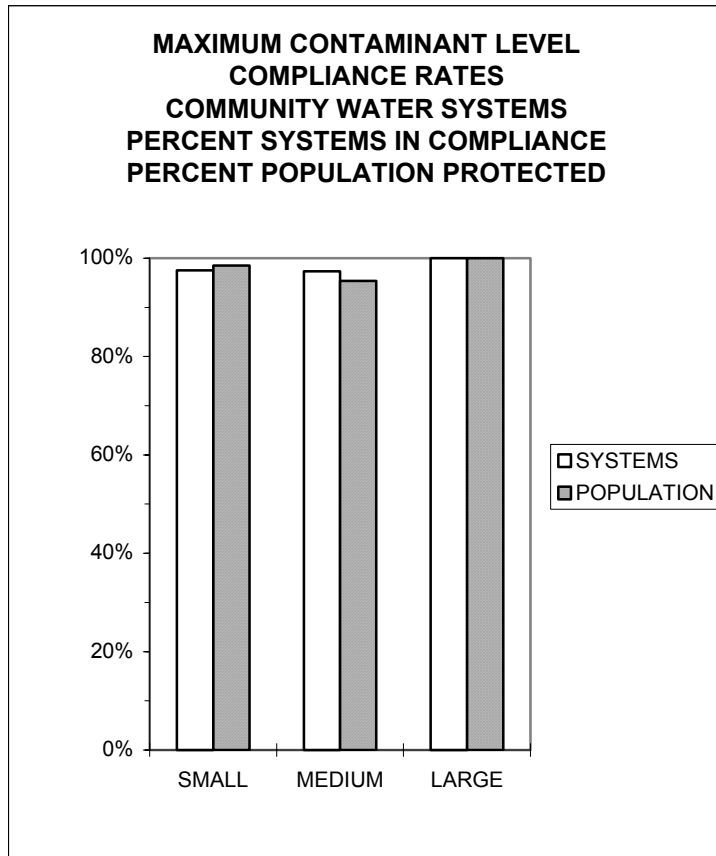
	<b>SYSTEMS POPULATION</b>	
<b>SMALL</b>	55.4%	59.7%
<b>MEDIUM</b>	59.1%	60.9%
<b>LARGE</b>	80.6%	86.6%



**Figure 16.**

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

	<b>SYSTEMS POPULATION</b>	
<b>SMALL</b>	97.5%	98.5%
<b>MEDIUM</b>	97.3%	95.4%
<b>LARGE</b>	100.0%	100.0%

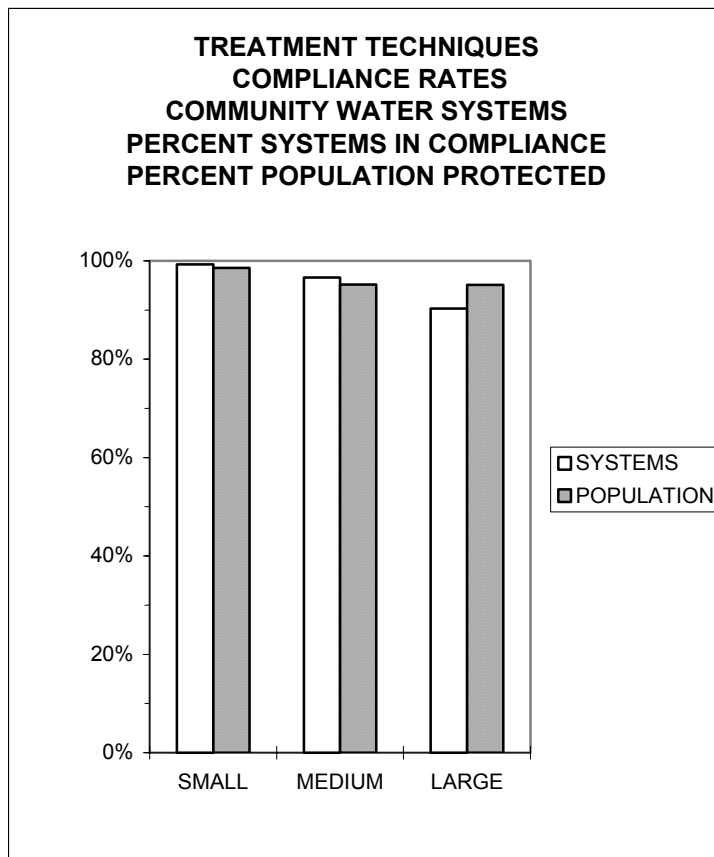




**Figure 17.**

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

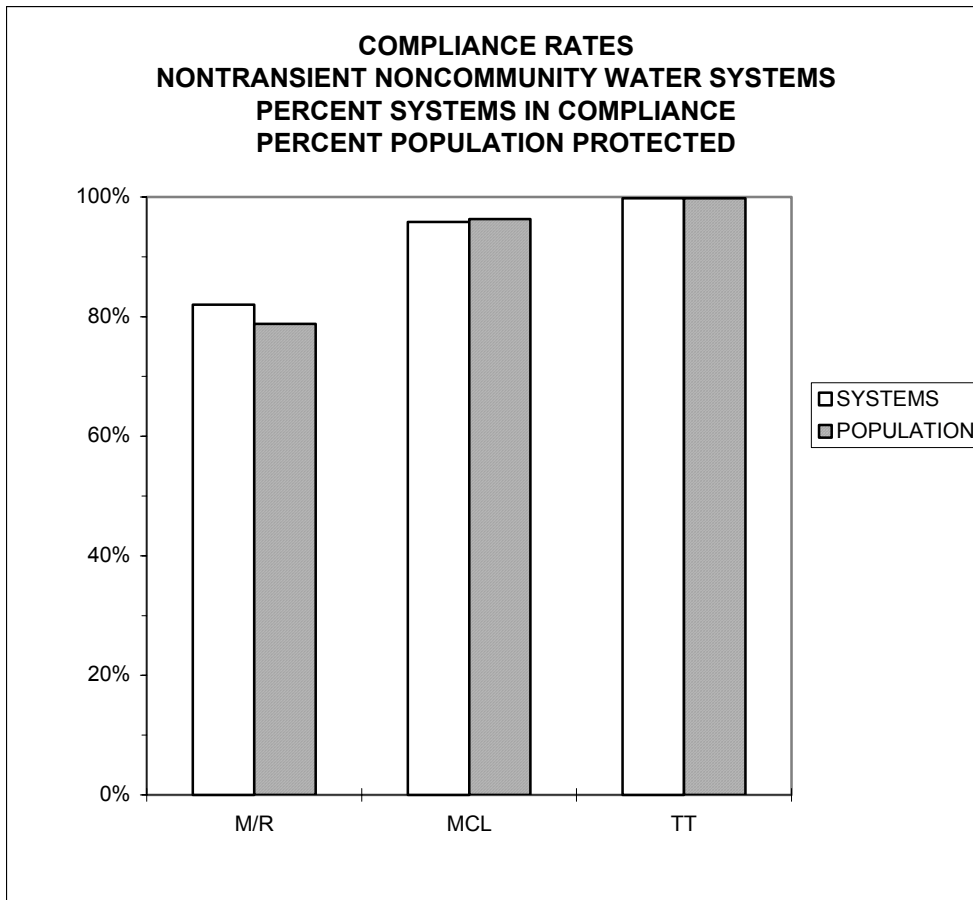
	<b>SYSTEMS POPULATION</b>	
<b>SMALL</b>	99.3%	98.6%
<b>MEDIUM</b>	96.6%	95.2%
<b>LARGE</b>	90.3%	95.1%



**Figure 18.**

**NONTRANSIENT NONCOMMUNITY WATER SYSTEMS  
PERCENT IN COMPLIANCE**

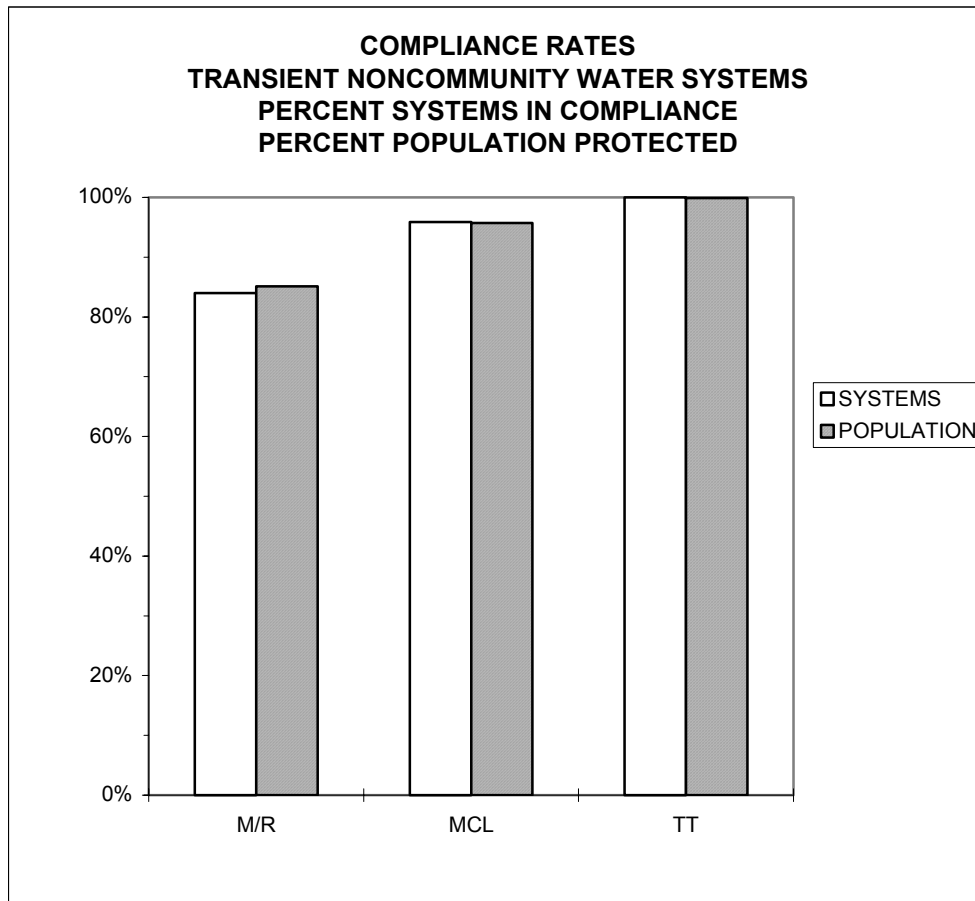
	SYSTEMS POPULATION	
<b>M/R</b>	82.0%	78.8%
<b>MCL</b>	95.8%	96.3%
<b>TT</b>	99.8%	99.8%



**Figure 19.**

**TRANSIENT NONCOMMUNITY WATER SYSTEMS  
PERCENT IN COMPLIANCE**

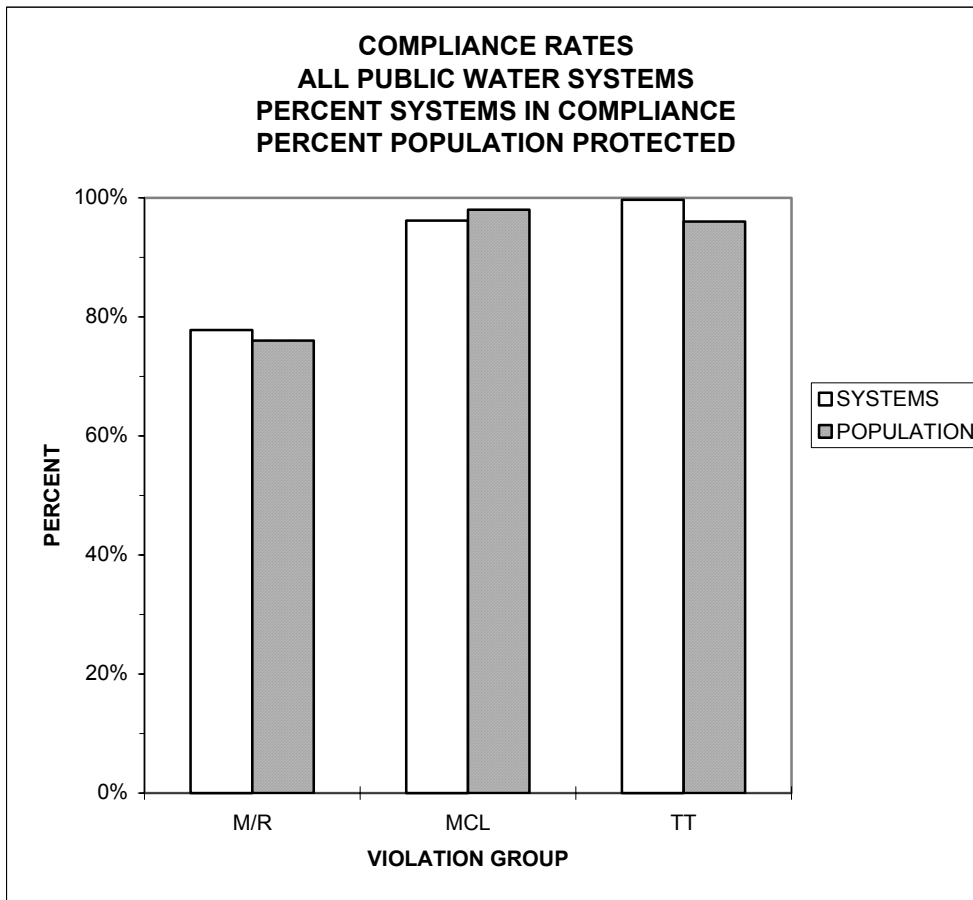
	<b>SYSTEMS POPULATION</b>	
<b>M/R</b>	84.0%	85.1%
<b>MCL</b>	95.9%	95.7%
<b>TT</b>	100.0%	99.9%



**Figure 20.**

**ALL PUBLIC WATER SYSTEMS  
PERCENT IN COMPLIANCE**

	<b>SYSTEMS POPULATION</b>	
<b>M/R</b>	77.8%	76.0%
<b>MCL</b>	96.2%	98.0%
<b>TT</b>	99.7%	96.0%



# 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 8.3 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 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 and numerous 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 serve drinking water to large metropolitan areas and small rural communities and thus are a vital part of local infrastructure; they represent an essential service to many businesses; and they provide basic fire protection for homeowners and businesses.
- **Technical Assistance:** Filter plants involve some of the most complex regulations and treatment processes. The assistance programs help suppliers in overcoming numerous on-going compliance challenges.

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

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 last year, 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.

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 114 of the state's filter plants. Impressively, Pennsylvania has more members than any other state in the nation. Altogether, these filter plants serve over 5 million people, which is a large portion of the 8.3 million people served by surface water systems in Pennsylvania.

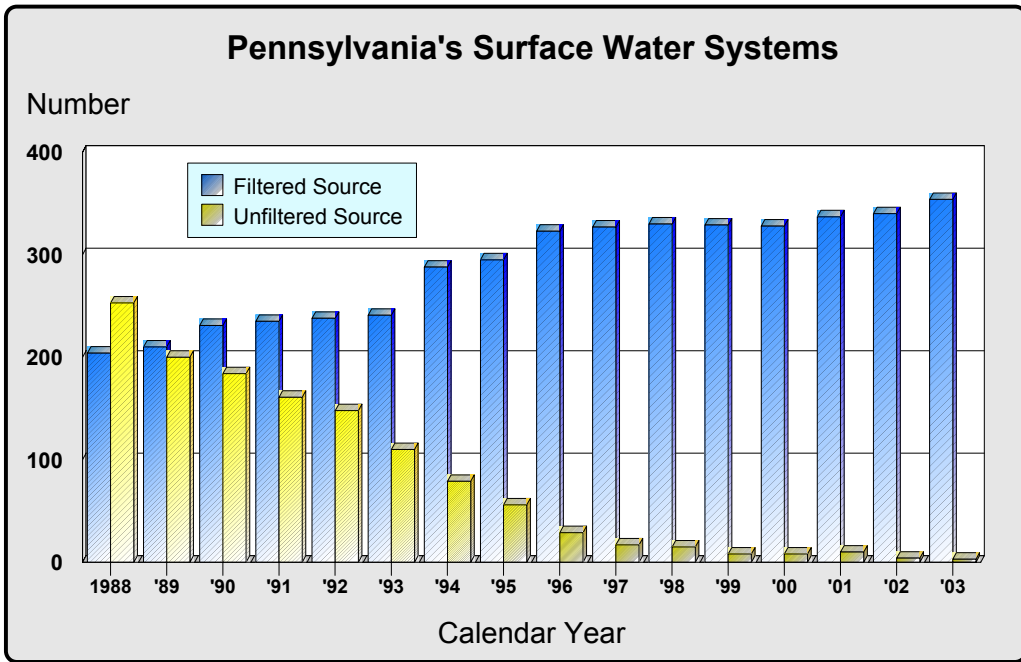
For Pennsylvanians, the bottom line to these and other efforts is that waterborne diseases are on a steep decline. In fact, waterborne disease outbreaks associated with public drinking water are at an all-time low in Pennsylvania. The US Centers for Disease Control and Prevention (CDC) and the US Environmental Protection Agency released disease information in a summary titled, "Surveillance for Waterborne-Disease Outbreaks" published in a November 2002 *Morbidity and Mortality Weekly Report* (CDC Surveillance Summaries, November 22, 2002 / Vol. 51 / No. SS-8). The summary showed no Pennsylvania waterborne disease outbreaks for 1999 and 2000, which follows previous reports that revealed no outbreaks for 1996 through 1998.

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 reported one outbreak in 2001. An outbreak of gastrointestinal illness occurred at a private church camp classified as a transient water system. Nineteen people became ill from a suspected Norwalk-like virus after a storm damaged disinfection facilities at the system's three groundwater wells. No one sought medical care, no one was hospitalized, and there were no deaths. All of the individuals recovered with no lasting ill effects.

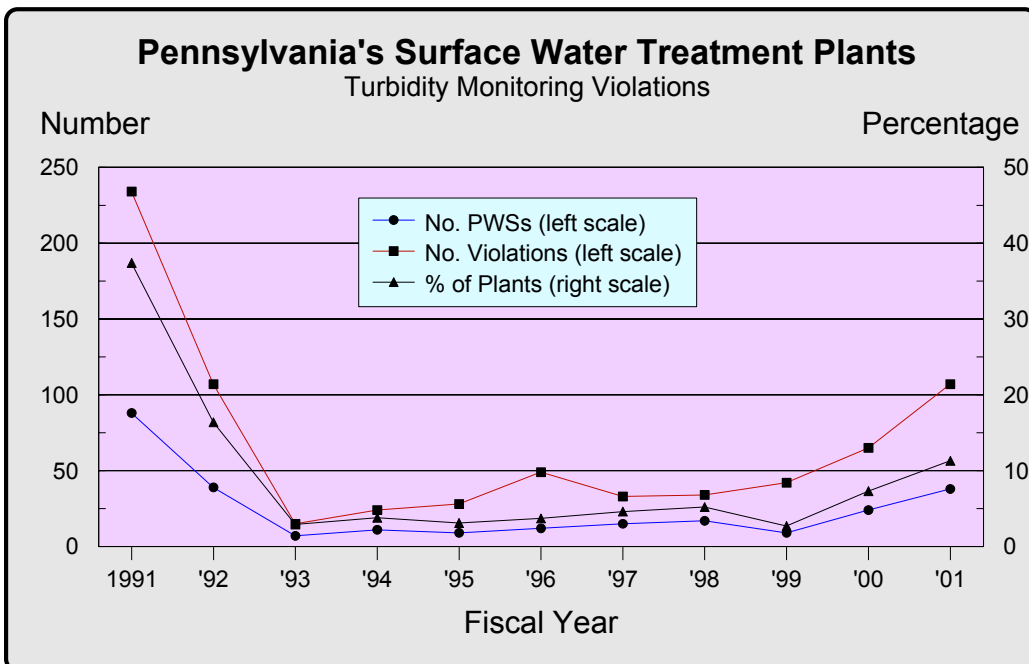
Not all outbreaks are recognized, investigated, and then reported to federal agencies. The sensitivity of the disease surveillance system is affected by the following factors: the size of the outbreak; severity of disease caused by the outbreak; public awareness of the outbreak; routine laboratory testing 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.

The following graphs represent the yearly performance of Pennsylvania's surface water treatment plants. Pending a major transition in new federal turbidity standards, set to take effect between 2002 and 2005, some of the graphs only contain data through 2001.

**Figure 21.** *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 350.*

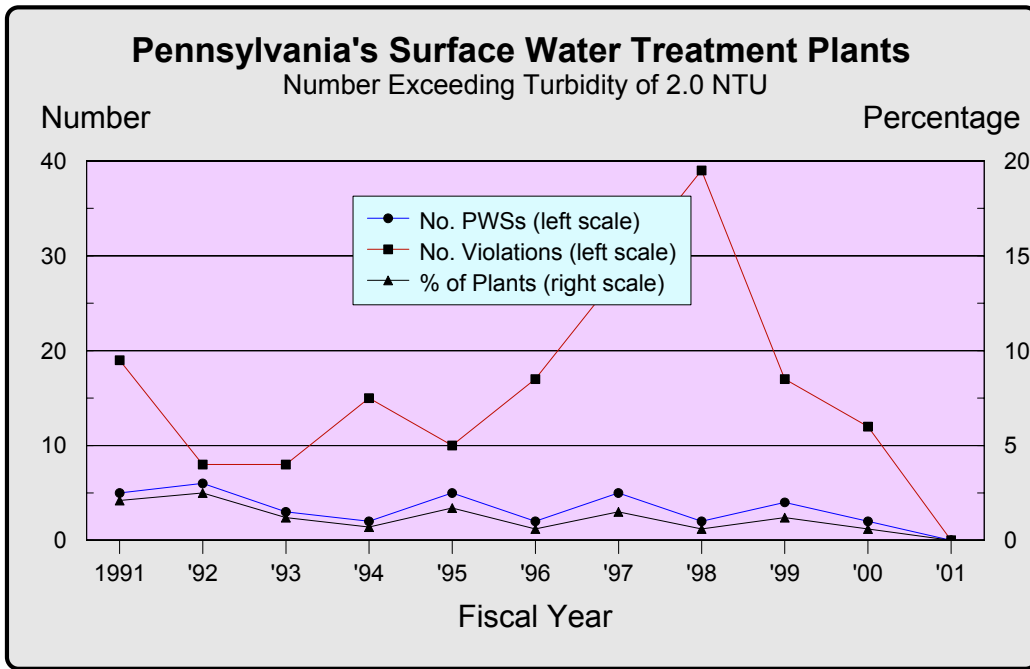
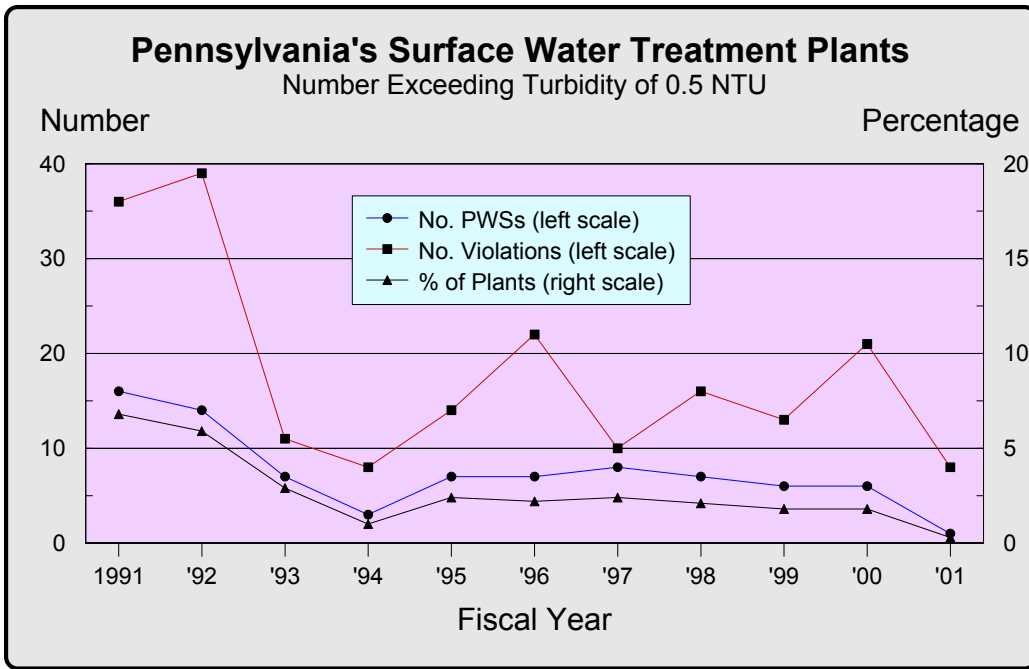


**Figure 22.** *The percentage of filtered water systems violating turbidity monitoring requirements has decreased dramatically since 1991. However, this type of violation has experienced an increase in the last three years. In 2001, the monitoring violations increased slightly from 7 to 11% over the previous year.*

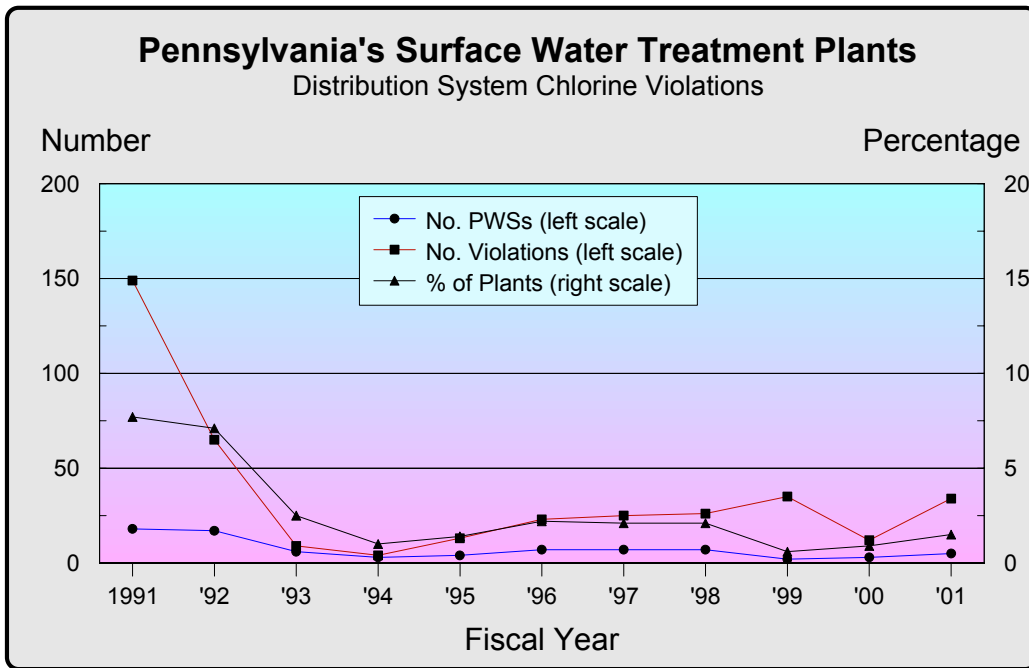
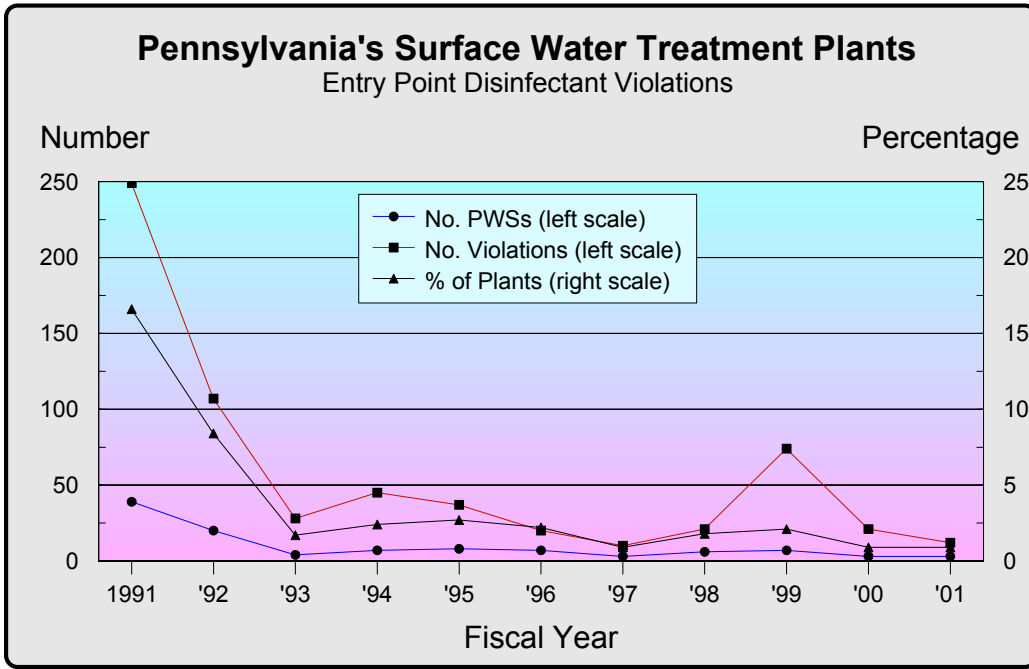




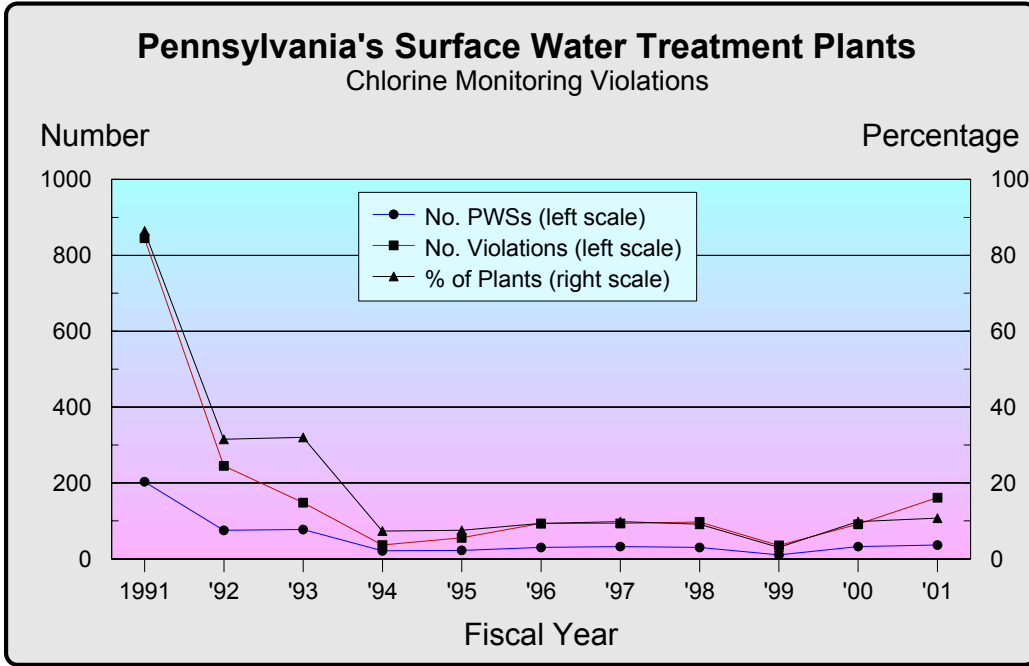
**Figures 23A, 23B.** *The percentages of filtered water systems violating the 0.5-NTU and 2.0-NTU turbidity level requirements have decreased to less than 1 percent.*



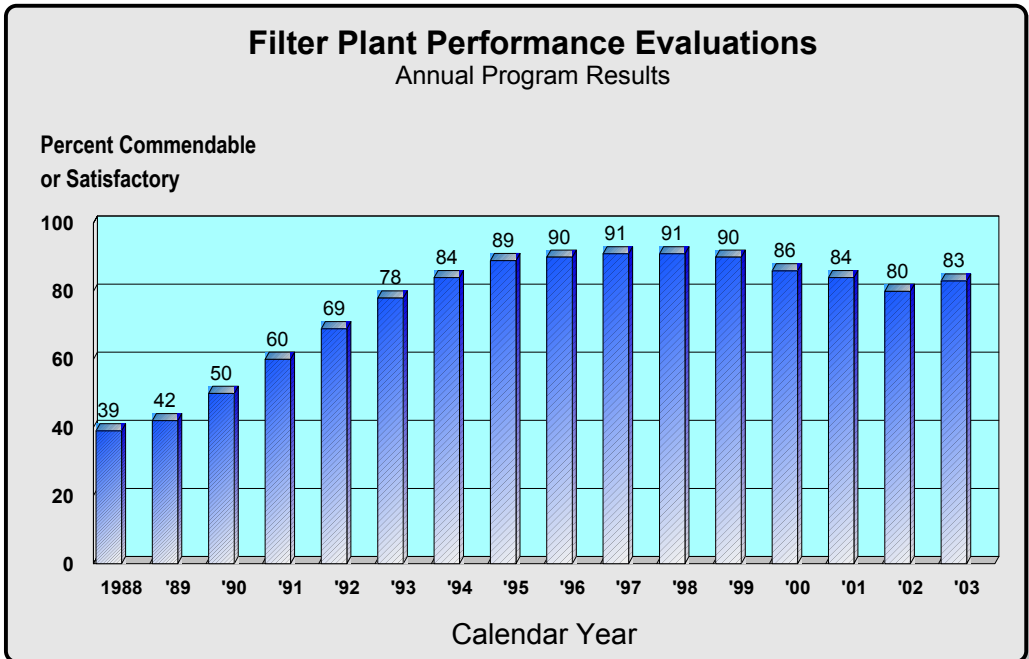
**Figures 24A, 24B.** *The percentage of filtered water systems violating entry point disinfectant levels has decreased. Despite the dramatic growth in the number of filter plants over the years, the percentage of plants in violation now stands at about 1 percent.*



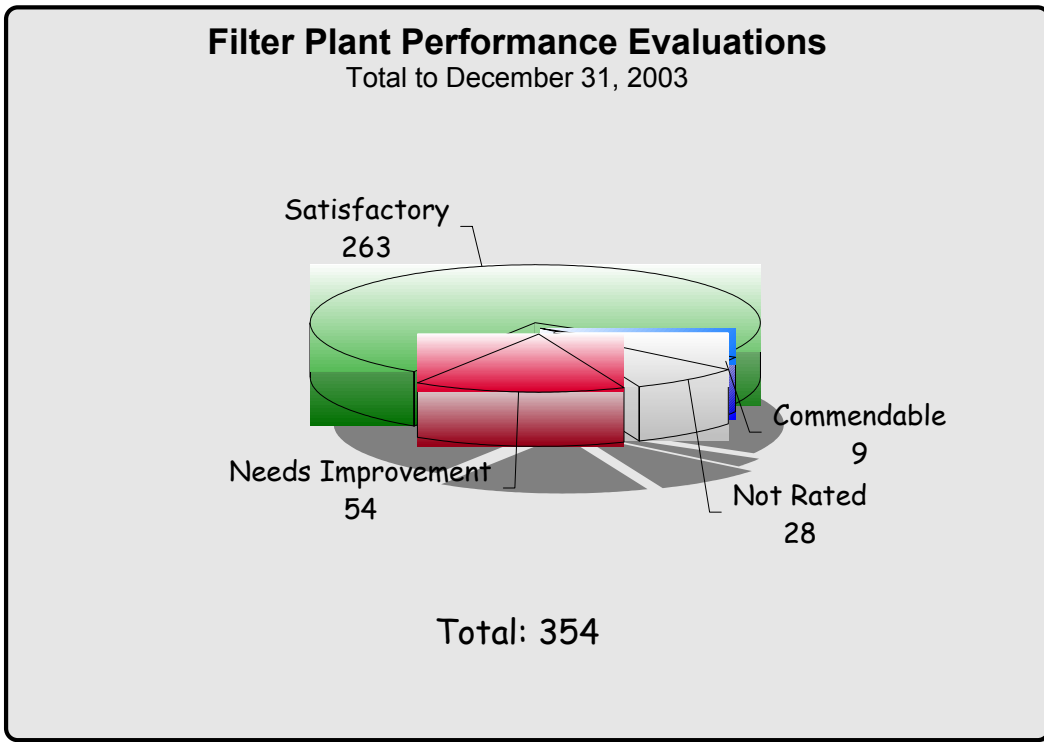
**Figure 25.** The percentage of filtered water systems violating chlorine monitoring requirements has decreased dramatically since 1991. In 2001, distribution disinfectant violations increased slightly from 10 to 11 percent compared to the previous year.



**Figure 26.** The annual percentage of commendable or satisfactory ratings during filter plant performance evaluations in Pennsylvania has more than doubled to the current level of 83 percent. Over the past few years, the number of plants in the state with these ratings has decreased slightly. In anticipation of 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.

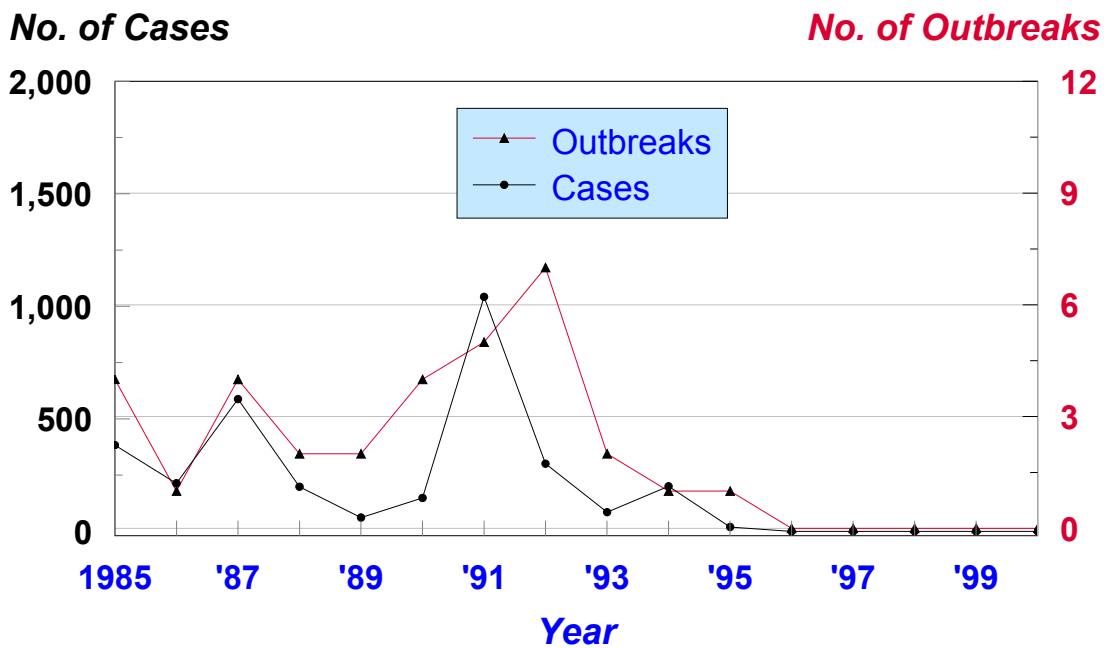


**Figure 27.** *The current status of ratings in the filter plant performance evaluation program.*



**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. It is especially noteworthy that Pennsylvania's graph flattened out to zero over the last five years of available data.

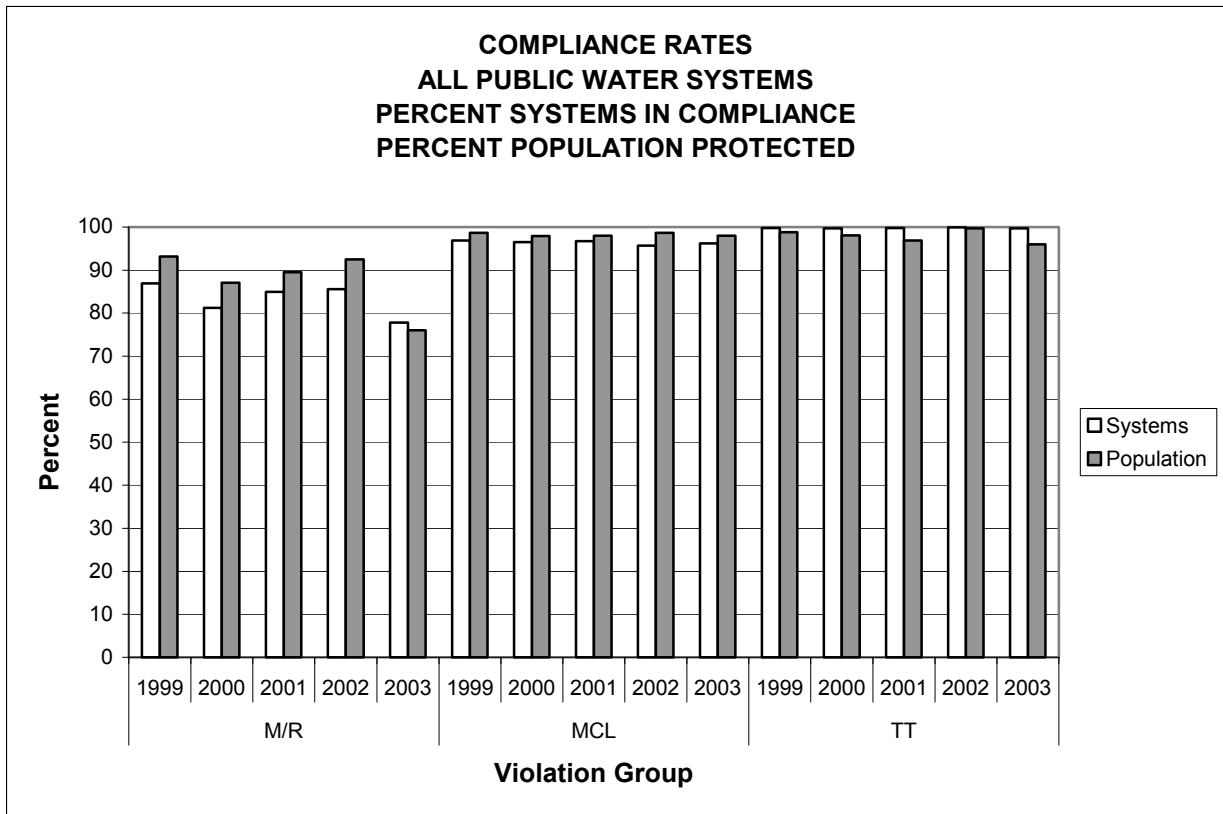
## Pennsylvania Waterborne Disease Outbreaks



# 4.

## Discussion and Conclusion

As evidenced by the facts and figures presented in this report, a large majority of Pennsylvanians received water from public water systems which reported no violations of health-based standards, and for which DEP reported no significant violations of monitoring and reporting requirements in 2003. The trend in compliance rates over the last 5 years indicates a consistently high compliance rate for health-based standards. Compliance with monitoring and reporting requirements fell slightly in 2003 due to the large number of water systems that were required conduct triennial monitoring during the year.



Public water systems maintained a high rate of compliance while facing many challenges.

***Tsunami of New Regulations.*** Public water systems continued to comply with several regulations that were recently enacted (2002).

- Interim Enhanced Surface Water Treatment Rule
- Disinfectants and Disinfection Byproducts Rule
- Minor Revisions to the Lead and Copper Rule
- Major Revisions to the Public Notification Rule

These rules are just the leading edge of a tsunami of new regulatory initiatives that are being implemented as a result of the 1996 Safe Drinking Water Act (SDWA) Amendments. Systems should expect to see at least a dozen new regulations over the next five years.

***Water System Protection.*** In the aftermath of September 11<sup>th</sup>, 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.

In 2003, PA DEP staff remained active in numerous areas such as source water protection; training and technical assistance; security; compliance monitoring; surveillance; and outreach. DEP staff used a number of creative compliance tools, such as monitoring calendars and supplier roundtables, to reach the largest possible number of systems. 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. 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 45 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 list of public water systems having MCL violations during 2003 or for additional information about the Pennsylvania Safe Drinking Water Program contact:

Department of Environmental Protection  
Bureau of Water Supply and Wastewater Management  
P.O. Box 8467, 11th Floor RCSOB  
Harrisburg, PA 17105-8467

Phone: 717-787-5017

Web Site: <http://www.dep.state.pa.us>