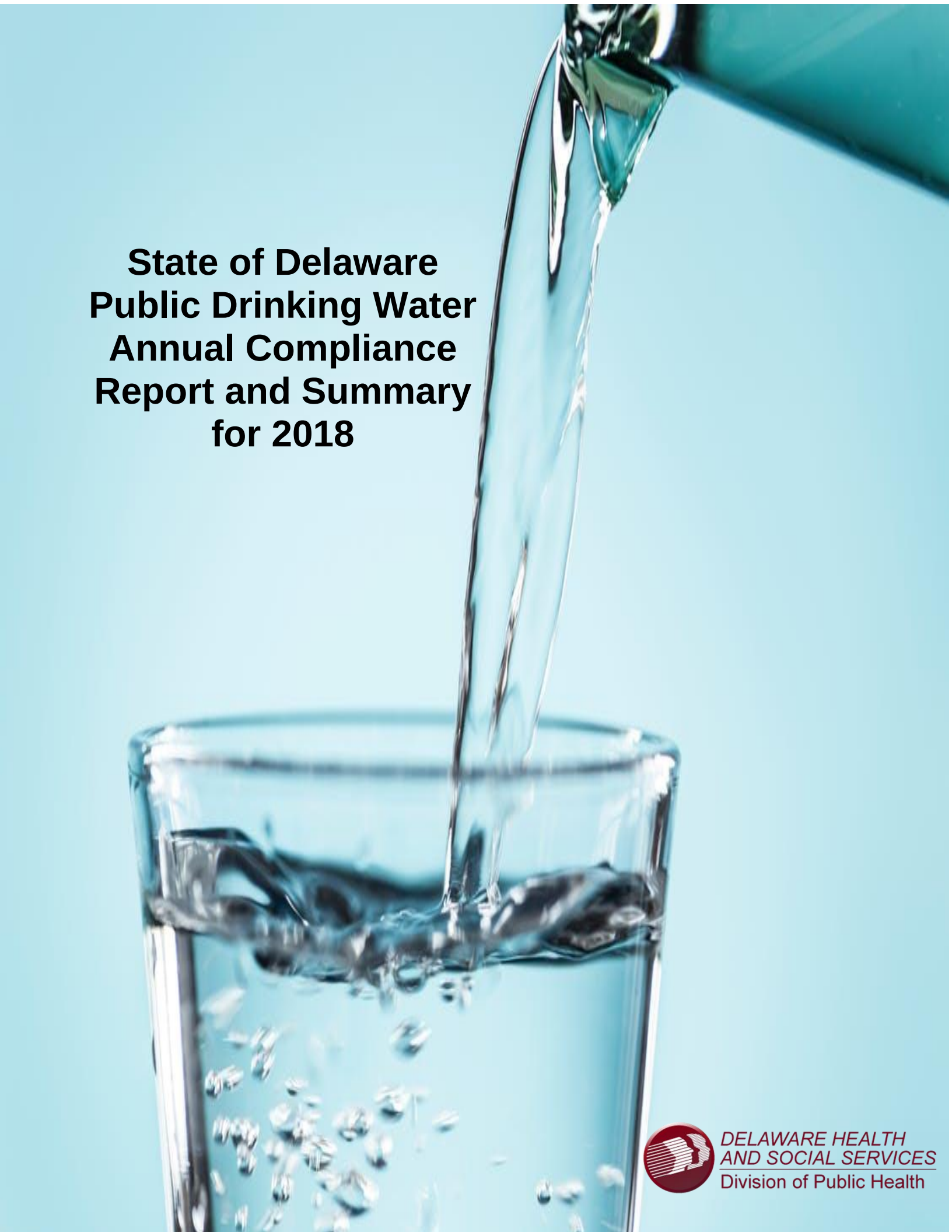

State of Delaware Public Drinking Water Annual Compliance Report and Summary for 2018

DELAWARE HEALTH AND SOCIAL SERVICES
Division of Public Health

Acknowledgements

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This report was prepared by the Delaware Department of Health and Social Services, Division of Public Health, Office of Drinking Water.

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Contents

Executive Summary

The State of Delaware Public Drinking Water Annual Compliance Report and Summary for 2018 covers the period of January 1 to December 31, 2018. It is provided by the Delaware Department of Health and Social Services, Division of Public Health (DPH), Office of Drinking Water (ODW) to the U.S. Environmental Protection Agency (EPA) and the public. Submission of this annual report is a mandatory EPA requirement.

Water systems in Delaware must provide safe drinking water to the public in accordance with the Safe Drinking Water Act (SDWA). *The State of Delaware Public Drinking Water Annual Compliance Report and Summary for 2018* gives the EPA and the public a descriptive overview of all public water systems in Delaware and their compliance status. The public can use this document as a quick reference to determine if the water system serving their household or business is in compliance with, or in violation of, state and federal regulations.

Delaware residents get their drinking water from either groundwater or surface water sources, depending on where they live. About two-thirds of Delaware households are connected to public water systems that use groundwater sources; the remaining one-third obtains water from surface water sources. The major sources of groundwater are the Columbia Aquifer, the Cheswold Aquifer, and the Piney Point Aquifer. All surface water plants for Delaware reside in northern New Castle County. The major sources of surface water are the Brandywine River Basin, Christiana River Basin, Red Clay Creek, and White Clay Creek.

Definitions

Community Water System (CWS): a public water system that serves at least 15 service connections used by year-round residents, or regularly serves at least 25 year-round residents.

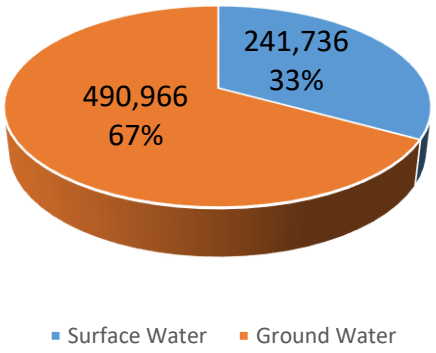
Non-Transient Non-Community Water System (NTNCWS): a public water system other than a community water system that regularly serves at least 25 of the same persons over six months per year.

Transient Non-Community Water System (TNCWS): a public water system with at least 15 service connections or that regularly serves an average of at least 25 individuals daily at least 60 days of the year.

Surface Water: all water that is open to the atmosphere and subject to surface runoff.

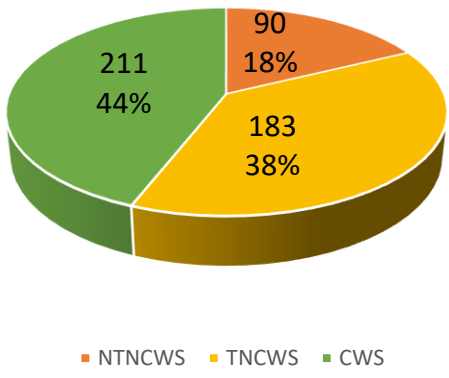
Groundwater: all water held underground in the soil or pores and crevices in rocks.

Figure 1. Population Served by Surface Water and Groundwater Systems, Delaware, 2018



Delaware Department of Health and Social Services, Division of Public Health, Office of Drinking Water, 2018.

Figure 2. Types of Public Water Systems, Delaware, 2018



Delaware Department of Health and Social Services, Division of Public Health, Office of Drinking Water, 2018.

Due to Delaware's small size, ODW traditionally conducts most monitoring for public water systems. A few large water systems conduct their own monitoring and report the results to ODW. Since monitoring requirements increased in recent years, ODW requires community water systems serving more than 1,000 people to collect their own total coliform, nitrate, and monthly fluoride compliance samples. Such community water systems (municipalities and public water utilities districts) must submit those samples to the Delaware Public Health Laboratory (DPHL) or a certified private laboratory for analysis, and then submit results to ODW. Additionally, all community water systems and the non-transient, non-community water systems (schools, daycares, factories, etc.) are required to collect samples for compliance with Lead and Copper Rule standards. The samples are analyzed by a certified laboratory and the results are submitted to ODW. Transient, non-community water systems (restaurants, parks, rest stops, etc.) are not required to conduct lead and copper monitoring.

ODW performs two types of assessments: Level 1 Assessments (a study of the water system after total coliform bacteria have been detected in the water system) and Level 2 Assessments (a detailed study of the water system after an *E. coli* Maximum Contaminant Level violation, and/or multiple occasions when total coliform bacteria have been found in the water system). In 2018, ODW completed 36 Level 1 Assessments and 15 Level 2 Assessments, which is comparable to the number completed in 2017. The similarity in completed assessments is due to consistent enforcement of the Revised Total Coliform Rule.

The total number of monitoring and reporting violations under the Lead and Copper Rule increased from nine in 2017, to 22 in 2018. The increase in violations is due to the increased number of water systems that were required to monitor last year and failed to do so.

There were 10 action level exceedances for lead and copper in 2018, compared to six in 2017. These water systems installed treatment or flushed their system routinely to ensure lower levels of lead or copper.

The U.S. Congress adopted the SDWA in 1974. The EPA established the Public Water System Supervision (PWSS) program under the authority of the SDWA to regulate drinking water

provided by public water systems. Under the SDWA and its 1986 and 1996 amendments, the EPA set national limits on drinking water contaminant levels to ensure that water is safe for human consumption. These limits are known as Maximum Contaminant Levels . The State of Delaware adopted these limits for use in state regulations governing drinking water.

The SDWA allows a state to seek primacy, an EPA approval to administer its own PWSS program. The State of Delaware was granted primacy in April 1978. For Delaware to continue to receive primacy, it must meet certain SDWA requirements, including adopting drinking water regulations that are at least as stringent as the federal regulations. The State must also demonstrate that it can enforce the program requirements. DPH is the entity responsible for monitoring and enforcing drinking water regulations; It does so through the ODW.

ODW staff generated the data in this report. Violation information was obtained from the Safe Drinking Water Information System/State version and the federal operational data system, and includes information reported quarterly to the EPA. This report is also available on ODW's website: http://www.dhss.delaware.gov/dhss/dph/hsp/pubdw.html.

State Public Drinking Water Summary, 2018

This document provides an overview of the state's public drinking water system for 2018. Its contents range from general information to violations by contaminant and by water system. For additional information or clarification, contact the Office of Drinking Water (ODW) at 302-741-8630.

Table 1. Population, Delaware, 2018	
Population of Delaware	954,937
Percentage served by individual wells	23.3%
Percentage served by public water supplies	76.7%
Year primacy granted to state by EPA	1978

Source: Delaware Population Consortium, 2018.

Table 2. Land Usage, Delaware, 2018		
Total land area of Delaware	1,356,186 acres	
Forest/Forested Wetlands	370,430 acres	27%
Agriculture	500,159 acres	37%
Developed	278,804 acres	21%
Wetland/Water/ Waterways	206,793 acres	15%

Source: Delaware Office of State Planning

Table 3. Public Water Systems, Delaware, 2018	
Residents served by public water systems[1]	732,702
Residents served by surface water systems	241,736
Residents served by ground water systems	490,966
Number of Public Water Systems	484
Community Water Systems	211
Non-transient, Non-Community Water Systems	90
Transient Non-Community Water Systems	183
Number using surface water	3
Number using ground water	481

[1] Safe Drinking Water Information System/State Version (SDWIS/State), Delaware Department of Health and Social Services, Division of Public Health, 2018.

Table 4. Drinking Water Sources, Delaware, 2018
Major Sources of Surface Water
Brandywine River Basin
Christina River Basin
Red Clay/White Clay Creeks
Major Sources of Ground Water
Columbia Aquifer
Cheswold Aquifer
Piney Point Aquifer
Number of gallons of public water used in Delaware each day: 101 mgd[2]

[2] Million Gallons per Day: Delaware Department of Natural Resources and Environmental Control, 2018.

Definitions

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

Inorganic Contaminant (IOC): A chemical compound identified in the National Primary Drinking Water Regulations (NPDWR), which may be naturally occurring or a result of human activities and does not contain both carbon and hydrogen. Examples include metals, nitrates, and asbestos. 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 enter the drinking water from household pipes and plumbing fixtures. Lead can pose various health risks when ingested at any level, while copper ingestion can pose health risks at elevated levels. States report violations of the Lead and Copper Rule in the following five categories:

1. *Initial lead and copper tap monitoring/reporting:* A violation in which a system did not meet initial lead and copper testing requirements, or failed to report the results of those tests to the state.

2. *Follow-up or routine lead and copper tap monitoring/reporting:* A violation in which a system did not meet follow-up or routine lead and copper tap testing requirements, or failed to report the results.

3. *Treatment installation:* Violations for a failure to install an optimal corrosion control treatment system or source water treatment system that would reduce lead and copper levels in water at the tap.

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

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

Maximum Contaminant Level (MCL): The legal threshold limit on the amount of a substance that is allowed in public water systems under the Safe Drinking Water Act. MCLs ensure that drinking water does not pose either a short-term or long-term health risk. MCLs are defined in milligrams per liter (mg/L; 1 mg/L = 1 part per million) unless otherwise specified.

Monitoring: The EPA specifies which water testing methods public water systems must use and sets schedules for the frequency of testing. A public water system that does not follow the 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 the purposes of this report, significant monitoring violations are major violations that occur when compliance sampling is not conducted or when results are not reported during a compliance period. A major monitoring violation for the surface water treatment rule occurs when at least 90 percent of the required compliance samples are not taken, or the results are not reported, during the compliance

period. Further enforcement actions, including administrative orders and penalties, may be taken for continued non-compliance. (See Enforcement Actions.)

Organic Contaminant: A chemical compound identified in the NPDWR, which contains both carbon and hydrogen and originate from human activities. EPA has established MCLs for 54 organic contaminants [40 CFR 141.61].

Public Notification: When a system issues a public notice and notifies the Division of Public Health that the notice was delivered.

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

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

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

3. *Beta particles and photon emitters:* A violation for beta particle and photon radiation from the decay of natural and man-made deposits of certain radioactive minerals above 4 millirem/year.

4. *Uranium:* A violation for uranium is above 30 micrograms/liter (µg/L; 1 µg/L = 1 part per billion).

Reporting Period: The reporting period for information to be included in this report is from January 1, 2018 through December 31, 2018.

Revised Total Coliform Rule (RTCR): Establishes an MCL for *E. coli* and uses the presence of *E. coli* and total coliform bacteria to initiate a “find and fix” approach to address fecal contamination that could enter the distribution system.

It requires public water systems to perform Assessments to identify sanitary defects and subsequently take action to correct them:

- *Level 1 Assessment:* A Level 1 Assessment is a study of the water system to identify potential problems and determine (if possible) why total coliform bacteria were detected in the water system. For systems collecting fewer than 40 samples per month, more than one positive sample for total coliform triggers an Assessment. For systems collecting 40 or more samples per month, more than 5 percent of the samples positive for total coliform triggers an Assessment.

Definitions *(continued)*

- *Level 2 Assessment:* A Level 2 Assessment is a detailed study of the water system to identify potential problems and determine (if possible) why an *E. coli* MCL violation has occurred and/or why total coliform bacteria were found in the water system on multiple occasions. Level 2 Assessments are conducted when a water system detects *E. coli* in its water, or if the system triggers two Level 1 Assessments in a rolling 12-month period.

Four classifications of violations are issued under the purview of the RTCR:

- *E. coli* MCL Violation: Issued when the presence of *E. coli* is confirmed.

- Treatment Technique (TT) Violation: Issued when a water system fails to conduct a required process intended to reduce the level of a contaminant in drinking water. Non-compliance is based on the failure to take any of the following actions:

    - Failure To conduct a Level 1 or Level 2 Assessment within 30 days of learning of the Assessment trigger

    - Failure to correct sanitary defects from a Level 1 or Level 2 Assessment within 30 days of learning of the Assessment trigger

    - Failure of a seasonal water system to complete the state-approved start-up procedure prior to serving water to the public

- Monitoring Violations: Issued to a system that fails to conduct routine or repeat monitoring, including:

    - Failure to take routine total coliform sample(s)

    - Failure to analyze for *E. coli* following a total coliform positive sample

- Reporting Violations: Issued to a system that fails to report routine or repeat monitoring results, including:

    - Failure to submit a monitoring report

    - Failure to submit a completed Level 1 or Level 2 Assessment form within 30 days of learning of the Assessment trigger

    - Failure to notify ODW by the end of the next business day following an *E. coli*-positive sample or *E. coli* MCL violation

    - Failure for a seasonal water system to submit a certification of completion for ODW-approved seasonal start-up procedure prior to serving water to the public

Definitions *(continued)*

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]. Violations of the Surface Water Treatment Rule are to be reported for the following four categories:

1. *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.

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

3. *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.

4. *Failure to filter (for unfiltered systems):* A violation for a system's failure to properly treat its water. EPA will supply data for this violation code to the states.

Treatment Technique: A water disinfection process that EPA requires instead of setting 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: Surface water systems that do not need to filter their water before disinfecting it because the source is very clean [40 CFR, Subpart H]. There are no unfiltered surface water systems in Delaware.

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

Table 5. Summary of Violations for Regulated Analytes, Delaware, 2018

	MCL (mg/L)[1]	MCLs		Treatment Techniques		Significant Monitoring/ Reporting	
		Violations	Systems with Violations	Violations	Systems with Violations	Violations	Systems with Violations
Organic Contaminants							
1,1,1-Trichloroethane	0.2	0	0	N/A	N/A	0	0
1,1,2-Trichloroethane	0.005	0	0	N/A	N/A	0	0
1,1-Dichloroethylene	0.007	0	0	N/A	N/A	0	0
1,2,4-Trichlorobenzene	0.07	0	0	N/A	N/A	0	0
1,2-Dibromo-3-chloropropane (DBCP)	0.0002	0	0	N/A	N/A	0	0
1,2-Dichloroethane	0.005	0	0	N/A	N/A	0	0
1,2-Dichloropropane	0.005	0	0	N/A	N/A	0	0
2,3,7,8-TCDD (Dioxin)	$3x10^{-8}$	0	0	N/A	N/A	0	0
2,4,5-TP	0.05	0	0	N/A	N/A	0	0
2,4-D	0.07	0	0	N/A	N/A	0	0
Acrylamide	N/A	N/A	N/A	0	0	N/A	N/A
Alachlor	0.002	0	0	N/A	N/A	0	0
Atrazine	0.003	0	0	N/A	N/A	0	0
Benzene	0.005	0	0	N/A	N/A	0	0
Benzo[a]pyrene	0.0002	0	0	N/A	N/A	0	0
Carbofuran	0.04	0	0	N/A	N/A	0	0
Carbon tetrachloride	0.005	0	0	N/A	N/A	0	0
Chlordane	0.002	0	0	N/A	N/A	0	0
cis-1,2-Dichloroethylene	0.07	0	0	N/A	N/A	0	0
Dalapon	0.2	0	0	N/A	N/A	0	0
Di(2-ethylhexyl) adipate	0.4	0	0	N/A	N/A	0	0
Di(2-ethylhexyl)phthalate	0.006	0	0	N/A	N/A	0	0

Source: Delaware Department of Health and Social Services, Division of Public Health, Office of Drinking Water, 2018.

[1] Values are in milligrams per liter (mg/L), unless otherwise specified.

Source: Delaware Health and Social Services, Division of Public Health, Office of Drinking Water, 2016.

Table 5. Summary of Violations for Regulated Analytes, Delaware, 2018
(continued)

	MCL (mg/L)[1]	MCLs		Treatment Techniques		Significant Monitoring/ Reporting	
		Violations	Systems with Violations	Violations	Systems with Violations	Violations	Systems with Violations
Organic Contaminants							
Dichloromethane	0.005	0	0	N/A	N/A	0	0
Dinoseb	0.007	0	0	N/A	N/A	0	0
Diquat	0.02	0	0	N/A	N/A	0	0
Endothall	0.1	0	0	N/A	N/A	0	0
Endrin	0.002	0	0	N/A	N/A	0	0
Epichlorohydrin	N/A	N/A	N/A	0	0	N/A	N/A
Ethylbenzene	0.7	0	0	N/A	N/A	0	0
Ethylene dibromide	0.00005	0	0	N/A	N/A	0	0
Glyphosate	0.7	0	0	N/A	N/A	0	0
Heptachlor	0.0004	0	0	N/A	N/A	0	0
Heptachlor epoxide	0.0002	0	0	N/A	N/A	0	0
Hexachlorobenzene	0.001	0	0	N/A	N/A	0	0
Hexachlorocyclopentadiene	0.05	0	0	N/A	N/A	0	0
Lindane	0.0002	0	0	N/A	N/A	0	0
Methoxychlor	0.04	0	0	N/A	N/A	0	0
Methyl tert-Butyl Ether (MTBE)	0.01	0	0	N/A	N/A	0	0
Monochlorobenzene	0.1	0	0	N/A	N/A	0	0
o-Dichlorobenzene	0.6	0	0	N/A	N/A	0	0
Oxamyl (Vydate)	0.2	0	0	N/A	N/A	0	0
para-Dichlorobenzene	0.075	0	0	N/A	N/A	0	0
Pentachlorophenol	0.001	0	0	N/A	N/A	0	0
Picloram	0.5	0	0	N/A	N/A	0	0
Simazine	0.004	0	0	N/A	N/A	0	0
Styrene	0.1	0	0	N/A	N/A	0	0
Tetrachloroethylene	0.005	0	0	N/A	N/A	0	0
Toluene	1	0	0	N/A	N/A	0	0
Total polychlorinated biphenyls (PCBs)	0.0005	0	0	N/A	N/A	0	0

Source: Delaware Department of Health and Social Services, Division of Public Health, Office of Drinking Water, 2018.
[1] Values are in milligrams per liter (mg/L), unless otherwise specified.

Table 5. Summary of Violations for Regulated Analytes, Delaware, 2018
(continued)

	MCL (mg/L)[1]	MCLs		Treatment Techniques		Significant Monitoring/ Reporting	
		Violations	Systems with Violations	Violations	Systems with Violations	Violations	Systems with Violations
Organic Contaminants							
Toxaphene	0.003	0	0	N/A	N/A	0	0
trans-1,2-Dichloroethylene	0.1	0	0	N/A	N/A	0	0
Trichloroethylene	0.005	0	0	N/A	N/A	0	0
Vinyl chloride	0.002	0	0	N/A	N/A	0	0
Xylenes (total)	10	0	0	N/A	N/A	0	0
Subtotal		**0**	**0**	**N/A**	**N/A**	**0**	**0**
Disinfection Byproducts							
Total trihalomethanes	0.08	0	0	N/A	N/A	0	0
Haloacetic Acid 5	0.06	0	0	N/A	N/A	0	0
Maximum Residual Disinfection Level	4.0	0	0	N/A	N/A	0	0
Subtotal		**0**	**0**	**N/A**	**N/A**	**0**	**0**
Inorganic Contaminants							
Antimony	0.006	0	0	N/A	N/A	0	0
Arsenic	0.05	0	0	N/A	N/A	0	0
Asbestos	7 million fibers/L, with fiber length >10 microns	0	0	N/A	N/A	0	0
Barium	2	0	0	N/A	N/A	0	0
Beryllium	0.004	0	0	N/A	N/A	0	0
Cadmium	0.005	0	0	N/A	N/A	0	0
Chromium	0.1	0	0	N/A	N/A	0	0
Cyanide (as free cyanide)	0.2	0	0	N/A	N/A	0	0

Source: Delaware Department of Health and Social Services, Division of Public Health, Office of Drinking Water, 2018.
[1] Values are in milligrams per liter (mg/L), unless otherwise specified.

Table 5. Summary of Violations for Regulated Analytes, Delaware, 2018
(continued)

	MCL (mg/L)[1]	MCLs		Treatment Techniques		Significant Monitoring/Reporting	
		Violations	Systems with Violations	Violations	Systems with Violations	Violations	Systems with Violations
Inorganic MCLs							
Fluoride	2.0	0	0	N/A	N/A	0	0
Mercury	0.002	0	0	N/A	N/A	0	0
Nitrate	10 (as Nitrogen)	10	10	N/A	N/A	0	0
Nitrite	1 (as Nitrogen)	0	0	N/A	N/A	0	0
Selenium	0.05	0	0	N/A	N/A	0	0
Thallium	0.002	0	0	N/A	N/A	0	0
Total nitrate and nitrite	10 (as Nitrogen)	0	0	N/A	N/A	0	0
Subtotal		**10**	**10**	**N/A**	**N/A**	**0**	**0**
Radionuclide MCLs							
Gross alpha	15 pCi/l	0	0	N/A	N/A	0	0
Radium-226 and radium-228	5 pCi/l	1	1	N/A	N/A	0	0
Gross beta	4 mrem/yr	0	0	N/A	N/A	0	0
Subtotal		**0**	**0**	**N/A**	**N/A**	**0**	**0**
Revised Total Coliform Rule							
Acute MCL violation	Presence with *E. coli*	3	3	N/A	N/A	0	0
Level 1 Assessment	Presence	36	36	N/A	N/A	0	0
Level 2 Assessment	Presence w/ *E. coli*	14	14	N/A	N/A	0	0
Sanitary survey	N/A	N/A	N/A	N/A	N/A	0	0
Subtotal		**53**	**53**	**N/A**	**N/A**	**0**	**0**

Source: Delaware Department of Health and Social Services, Division of Public Health, Office of Drinking Water, 2018.
[1] Values are in milligrams per liter (mg/L), unless otherwise specified.

Table 5. Summary of Violations for Regulated Analytes, Delaware, 2018
(continued)

	MCL (mg/L) [1]	MCLs		Treatment Techniques		Significant Monitoring/Reporting	
		Violations	Systems with Violations	Violations	Systems with Violations	Violations	Systems with Violations
Surface Water Treatment Rule							
Filtered systems	N/A	N/A	N/A	0	0	N/A	N/A
Monitoring, routine/repeat	N/A	N/A	N/A	N/A	N/A	0	0
Treatment techniques	N/A	N/A	N/A	0	0	N/A	N/A
Turbidity	N/A	N/A	N/A	N/A	N/A	0	0
Monitoring, routine/repeat	N/A	N/A	N/A	N/A	N/A	0	0
Failure to filter	N/A	N/A	N/A	0	0	N/A	N/A
Subtotal	**N/A**	**N/A**	**N/A**	**0**	**0**	**0**	**0**
Lead and Copper Rule	Action Level (mg/L)	Exceedance	Systems with Exceedance	Violations	Systems with violations	Violations	Systems with Violations
Initial lead and copper tap M/R	N/A	0	0	N/A	N/A	22	22
Follow-up or routine lead and copper tap M/R	N/A	11	10	N/A	N/A	0	0
Treatment installation	N/A	0	0	0	0	N/A	N/A
Public education	N/A	N/A	N/A	0	0	N/A	N/A
Subtotal	**N/A**	**11**	**10**	**0**	**0**	**22**	**22**
Public Notification		**Violations**		**N/A**		**Systems with Violations**	
Consumer Confidence Reports Violations		13		N/A		13	
Public Notification		0		N/A		0	
Ground Water Rule		0		N/A		0	
Subtotal		**13**		**N/A**		**13**	

Source: Delaware Department of Health and Social Services, Division of Public Health, Office of Drinking Water, 2018.
[1] Values are in milligrams per liter (mg/L), unless otherwise specified.

2018 Enforcement Actions

ODW takes enforcement actions when a public water system violates a MCL or treatment technique (TT), as specified in *State of Delaware Regulations Governing Public Drinking Water Systems*; or if a system fails to properly monitor and/or report a particular contaminant.

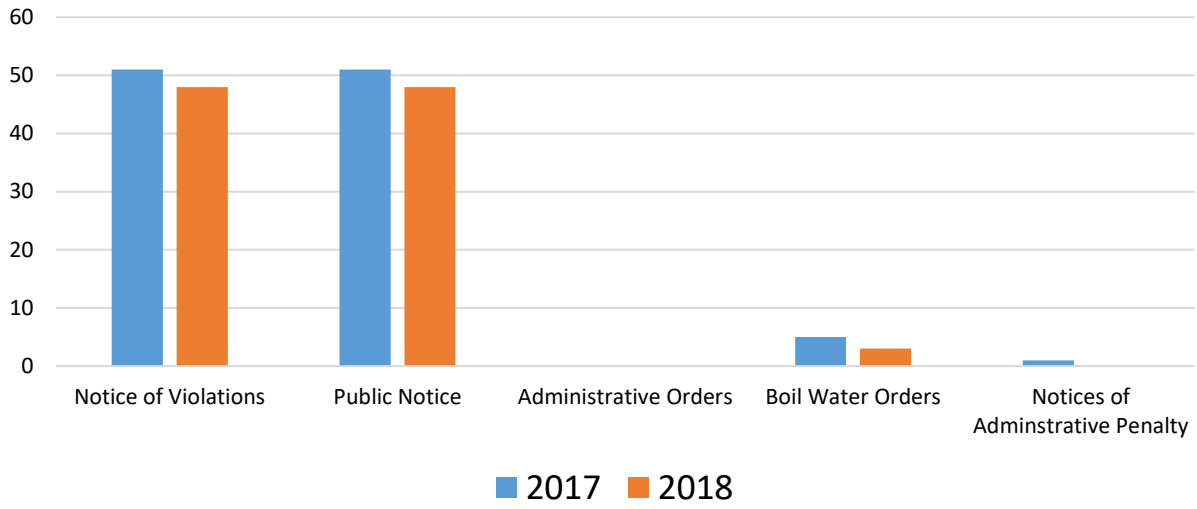
Issuing a Notice of Violation (NOV) is the first action taken. This notifies the owner/operator of a public water system that there was a violation. The next action is for the owner/operator to issue a public notice (PN). The owner/operator is required to mail, hand deliver, or post the PN in a conspicuous place. The PN informs consumers of the water that there was a violation, what the violation was, possible related health effects, and preventive measures the consumer can take until the violation is corrected. A water system issues a boil water notice when ever they violate the *E. coli* MCL. This requires immediate notice (within 24 hours of being notified of the violation) to all consumers and includes instructions for what actions to take to make their water safe for consumption, or if they should use an alternate source such as bottled water.

The Revised Total Coliform Rule requires Level 1 or Level 2 Assessments to be performed on public water systems with the presence of Total Coliform or *E. coli*. The purpose of a Level 1 Assessment is to determine a likely cause of contamination. A Level 2 Assessment is performed whenever *E. coli* is detected, or when the system has had two Level 1 Assessments in a rolling 12-month period. A Level 2 Assessment is an in-depth inspection of the water system to determine the likely source of contamination.

Additional enforcement actions can be used when a water system repeatedly violates an MCL or when a history of violations is present. The issuance of an Administrative Order (AO) can mandate the installation of treatment or the abandonment of a well for persistent violations. A bilateral compliance agreement (BCA) can also be issued. A BCA is a written contract between the system and ODW in which the violations, corrective steps, and the deadline for completing the work are established in writing and are enforceable.

If a public water system fails to correct a violation or continues to be unresponsive to DPH requirements, an AO with or without penalty may be issued. The penalty can range from $100 per day to $10,000 per day, per violation.

Figure 3. Office of Drinking Water Enforcement Actions, Delaware, 2017 and 2018



Source: Delaware Department of Health and Social Services, Division of Public Health, Office of Drinking Water, 2018.

Program Operation

ODW uses an Oracle®-based system to inventory water supplies, record sampling results, and track compliance with monitoring and MCL requirements. The Safe Drinking Water Information System/State (SDWIS/State) includes information about water supply facilities, water sources, treatment used, and sampling results. It also includes information reported quarterly to the EPA.

ODW provides many services to consumers and public water systems. Funding comes from both state and federal monies allotted to Delaware's public drinking water program. ODW and the Delaware Public Health Laboratory (DPHL) use these funds to provide services for the drinking water program, including sample collection and analysis, technical assistance, and operator certification.

Table 6. Budget Information (Public Water System Supervision Grant), Delaware Office of Drinking Water, 2018	
Total Budget	$1,025,738
Federal Budget	$549,000
State Budget	$476,738
Number of Staff Authorized	15.75

Source: Delaware Department of Health and Social Services, Division of Public Health, Office of Drinking Water, 2018

To ensure that Delaware's drinking water meets or exceeds Safe Drinking Water Act (SDWA) requirements, ODW reviews and approves plans for new or existing water treatment systems and/or new or upgraded distribution systems. ODW staff also inspects water systems, provides technical assistance, responds to emergencies, makes compliance determinations based on

monitoring results, and takes enforcement actions when necessary. The DPHL performs water analyses for water quality parameters as outlined in the SDWA. ODW also contracts with private laboratories to analyze some regulated parameters.

Table 7. Operations of the Delaware Office of Drinking Water, 2018	
Inspections	97
Plan Reviews	224

Source: Delaware Department of Health and Social Services, Division of Public Health, Office of Drinking Water, 2018

ODW provides training to water system operators and owners regarding system operation and compliance with rules and regulations. Additionally, ODW contracts with the Environmental Training Center at Delaware Technical Community College (DTCC) and the Delaware Rural Water Association to provide training and additional technical assistance to water system operators.

Table 8. Water Operator Certification, Delaware, 2018	
Number of Certified Operators	426
Number of Approved Sampler/Testers	466

Source: Delaware Department of Health and Social Services, Division of Public Health, Office of Drinking Water, 2018

DPH requires individuals collecting compliance samples or conducting daily monitoring of a public water system to be a licensed operator or certified as an approved sampler/tester. This requirement helps to ensure the integrity of the sampling.

Table 9. Compliance Highlights, Public Water Systems, Delaware, 2017 and 2018

Compliance Area	Samples Collected	Systems In Compliance	Percentage of Population Served by Compliant Systems	Percentage of Water Systems Served by Compliant Systems	Systems not in Compliance	
					2017	2018
Bacteriological	9,921	484	100%	100%	0	0
Bacteriological, Acute (*E. coli*)	9,921	481	99.7%	99.3%	5	3
Surface Water Treatment Rule[1]	N/A	3	100%	100%	0	0
Nitrates	2,052	474	99.6%	97.9%	5	10
Fluoride	2,422	484	100%	100%	0	0
Inorganic (IOC) Excluding Nitrate and Fluoride	1,969	484	100%	100%	0	0
Volatile Organic Chemicals (VOC)	229	484	100%	100%	0	0
Synthetic Organic Chemicals (SOC)	738	484	100%	100%	0	0
Lead and Copper	1,501	474[1]	99.1%	97.9%	6	10
Lead and Copper/ M&R Violations	N/A	462	99.7%	95.5%	9	22
Consumer Confidence Rule – Failure to Report	N/A	471	99.2%	94.1%	29	13
Consumer Confidence Rule – Inadequate Report	N/A	481	100%	100%	4	3
Disinfection Byproducts (DBPs)	926	484	100%	100%	0	0
Radiological	61	483	99.9%	99.8%	0	1
Ground Water Rule	N/A	484	100%	100%	0	0

Source: Delaware Department of Health and Social Services, Division of Public Health, Office of Drinking Water, 2018.

[1] Systems with no action level exceedance.

Systems Out of Compliance

Table 10. Level 1 Assessments, Non-Compliant Public Drinking Water Systems, Delaware, 2018	
System Name	**Population Served**
Bethany Club Tennis	60
Big Oak Family Camping	300
Bridgeville Commercial Park	24
Broadkiln Beach Water Company	480
Brumbley's Family Park	48
Camden Wyoming Moose	70
Central Delaware Christian Academy	110
Country View	84
Evans Farms/Frozen Farmers LLC	25
Fieldstone Golf Club	44
Harrington Moose Lodge 534	25
Holly Lake Campsites System 2	1,375
Indian River Yacht Club	60
Killens Pond State Park System #1	180
Lewes Center	200
Lewes Senior Citizens Center	50
Little People Child Development Center	82
Long Neck Village	345
Lynch's Mobile Home Park	54
Nanticoke Business Park	50
Papen Farms Inc.	55
Peddlers Village Shopping Center	65
Rainbow Day Care	45
Shinning Time Day Care Center	30
Shore Stop #227 Townsend	800
Shore Stop #236 Canterbury	600
Shore Stop #270 Milton	25
Smith Landing System 2	114
Sports at the Beach System 5	25
Trap Pond State Park System 3 - Camping	1,000
Treasure Beach Campground System 2	771
Tuckahoe Acres system #1	750
Warrens Station Restaurant	200
White Clay Creek State Park (System 1)	100
Willis Auto Mall	65
Woodbridge High School	650
Level 1 Assessment Totals	
Number of Assessments	36
Number of Systems Affected	36
Number of Repeat Violators	0
Total Population at Risk	8,961

Source: Delaware Department of Health and Social Services, Division of Public Health, Office of Drinking Water, 2018.

Table 11. Level 2 Assessments, Non-Compliant Public Drinking Water Systems, Delaware, 2018	
System Name	**Population Served**
Anyo Properties	44
Broadkiln Beach Water Company	480
Brumbley's Family Park	48
Camden Wyoming Moose	70
Country Center Girl Scout Camp	100
Discovery Cover Learning Center	55
Holly Lake Campsite System 2	1,375
Indian River Yacht Club	60
Little People Child Development Center	82
Maranatha Court	54
Milton Cheer Inc.	63
Peddlers Village Shopping Center	65
Rehoboth Bay Community	554
Shore Stop #236 Canterbury	600
Summit Center	25
Level 2 Assessment Totals	
Number of Assessments	15
Number of Systems Affected	15
Number of Repeat Violators	0
Total Population at Risk	3,765

Source: Delaware Department of Health and Social Services, Division of Public Health, Office of Drinking Water, 2018.

Table 12. Nitrate Violations, Non-Compliant Public Drinking Water Systems, Delaware, 2018		
System Name	**Population Served**	**Return to Compliance Date**
Angola Crest II	159	05/21/2019
Carey Estates	312	10/29/2018
Country Club Village	72	07/19/2018
De-Lux Dairy Market	916	04/30/2018
Fish Hook Mobile	72	03/08/2018
Holly Lake Campsites System 1	405	N/A
Nothing Better	25	10/29/2018
Shore Stop #237	100	12/11/2018
Shore Stop #256 Milford	150	05/07/2018
Tuckahoe Acres System 1	750	08/20/2018
Nitrate Violation Totals		
Number of Violations	10	
Number of Systems Affected	10	
Number of Repeat Violators	0	
Total Population at Risk	2,961	

Source: Delaware Department of Health and Social Services, Division of Public Health, Office of Drinking Water, 2018.

Table 13. Radiological Compounds Violations, Non-Compliant Public Drinking Water Systems, Delaware, 2018				
System Name	**Population Served**	**Contaminant**	**MCL[1] in pCi/L[2]**	**Level Found in pCi/L**
Sussex Manor Mobile Home Park	49	Combined Radium	5	5.55
Radiological Compounds Violation Totals				
Number of Violations	1			
Number of Systems Affected	1			
Number of Repeat Violators	0			
Total Population at Risk	49			

Source: Delaware Department of Health and Social Services, Division of Public Health, Office of Drinking Water, 2018.
[1] MCL means Maximum Contaminant Level
[2] pCi/L means picocuries per liter

Table 14. Inorganic/Volatile/Synthetic Organic Compound Rule (IOC/VOC/SOC) Violations, Non-Compliant Public Drinking Water Systems, Delaware, 2018				
System Name	**Population Served**	**Contaminant**	**MCL[1] in mg/L[2]**	**Level Found in mg/L**
None	N/A	N/A	N/A	N/A
IOC/VOC/SOC Rule Violation Totals				
Number of Violations	0			
Number of Systems Affected	0			
Number of Repeat Violators (Systems)	0			
Total Population at Risk	0			

Source: Delaware Department of Health and Social Services, Division of Public Health, Office of Drinking Water, 2018.
[1] MCL means Maximum Contaminant Level
[2] mg/L means milligrams per liter

Table 15. Disinfection Byproducts Rule (DPB) Violations, Non-Compliant Public Drinking Water Systems, Delaware, 2018				
System Name	**Population Served**	**Contaminant**	**MCL[1] in mg/L[2]**	**Level Found in mg/L**
None	N/A	N/A	N/A	N/A
Disinfection Byproducts Rule Violation Totals				
Number of Violations	0			
Number of Systems Affected	0			
Number of Repeat Violators	0			
Total Population at Risk	0			

Source: Delaware Department of Health and Social Services, Division of Public Health, Office of Drinking Water, 2018.
[1]MCL means Maximum Contaminant Level
[2]mg/L means milligrams per liter

Table 16. Maximum Residual Disinfection Level (MRDL) Violations, Non-Compliant Public Drinking Water Systems, Delaware, 2018				
System Name	**Population Served**	**Contaminant**	**MRDL[1] in mg/L[2]**	**Level Found in mg/L**
None	N/A	N/A	N/A	N/A
Maximum Residual Disinfection Level Violation Totals				
Number of Violations			0	
Number of Systems Affected			0	
Number of Repeat Violators			0	
Total Population at Risk			0	

Source: Delaware Department of Health and Social Services, Division of Public Health, Office of Drinking Water, 2018.
[1]MRDL means Maximum Residual Disinfectant Level
[2]mg/L means milligrams per liter

Table 17. Ground Water Rule Violations, Non-Compliant Public Drinking Water Systems, Delaware, 2018		
System Name	**Population**	**Return to Compliance Date**
None	N/A	N/A
Ground Water Rule Violation Totals		
Number of Violations		0
Number of Systems Affected		0
Number of Repeat Violators		0
Total Population Affected		0

Source: Delaware Department of Health and Social Services, Division of Public Health, Office of Drinking Water, 2018.

Table 18. Surface Water Treatment Rule (Turbidity Violation), Non-Compliant Public Drinking Water Systems, Delaware, 2018	
System Name	**Population Served**
None	N/A
Surface Water Treatment Rule Violation Totals	
Number of Violations	0
Number of System Affected	0
Number of Repeat Violators	0
Total Population Affected	0

Source: Delaware Department of Health and Social Services, Division of Public Health, Office of Drinking Water, 2018.

Table 19. Lead and Copper Rule (LCR) Monitoring Violations, Non-Compliant Public Drinking Water Systems, Delaware, 2018

Systems that failed to collect the required number of samples including tap samples and/or water quality parameters during any monitoring period in 2018

System Name	Population	Return to Compliance Date
Barkers Landing	498	N/A
Bethany Crest LLC	60	N/A
Central Christian School	100	N/A
Countryside Hamlet	66	N/A
Crystal Steel Fabricators	40	N/A
Fox Pointe Subdivision	500	N/A
Happy Place Childcare of Middletown	32	N/A
Hartly Elementary School	375	N/A
Hilltop Trailer Park	65	N/A
Hockers Super Center	75	N/A
Holiday Estates	75	N/A
Holiday Pines	60	N/A
Law MHP	50	N/A
Lighthouse Point and Community Center	36	N/A
Lotus Blossom Learning Center	30	N/A
Mid-Atlantic Family Practice	25	N/A
Northside Professional Center	30	N/A
Ollies Imagination Station	60	N/A
Sand Hill MHP	90	N/A
Shells Learning Center III	83	N/A
Sussex Manor MHP	49	N/A
Village Square Academy	50	N/A
LCR Monitoring Violation Totals		
Number of Violations	22	
Number of Systems Affected	22	
Number of Repeat Violators	0	
Total Population at Risk	2,449	

Source: Delaware Department of Health and Social Services, Division of Public Health, Office of Drinking Water, 2018.

Table 20. Lead and Cooper Rule (LCR) 90th Percentile Action Level (AL) Exceedances, Delaware, 2018				
System Name	**Population Served**	**Contaminant**	**AL in mg/L[1]**	**90th percentile in mg/L**
Allen Harim Foods Inc.	750	Copper	1.3 mg/L	2.26 mg/L
Bethany Crest	60	Lead	0.015 mg/L	0.020 mg/L
Centerville Layton School	47	Copper	1.3 mg/L	1.93 mg/L
Delaware State Fair	452	Lead	0.015 mg/L	0.016 mg/L
Enchanted Acres	75	Lead	0.015 mg/L	.020 mg/L
Enchanted Acres	75	Copper	1.3 mg/L	1.45 mg/L
Hanover Foods	67	Lead	0.015 mg/L	0.016 mg/L
Layton's Riviera	35	Copper	1.3 mg/L	1.70 mg/L
Lewes Board of Public Works	3,000	Lead	0.015 mg/L	0.027 mg/L
Perdue Foods LLC	1,500	Copper	1.3 mg/L	3.91 mg/L
Woodbridge High School	650	Copper	1.3 mg/L	5.22 mg/L
LCR 90th Percentile Action Level Exceedance Totals				
Number of Exceedances			11	
Number of Systems Affected			10	
Number of Repeat Violators			0	
Total Population At Risk			6,711	

Source: Delaware Department of Health and Social Services, Division of Public Health, Office of Drinking Water, 2018.
[1]mg/L means milligrams per liter

Table 21. Failure to have Licensed Operator Violations, Non-Compliant Public Drinking Water Systems, Delaware, 2018	
System Name	**Population Served**
Barkers Landing	498
Hilltop Trailer Park	65
Holiday Estates	75
Holiday Pines	60
Nanticoke Business Park	50
Shells Learning Center III	83
Failure to have Licensed Operator Violation Totals	
Number of Violations	6
Number of Systems Affected	6
Number of Repeat Violators	0
Total Population Affected	831

Source: Delaware Department of Health and Social Services, Division of Public Health, Office of Drinking Water, 2018.

Table 22. Monitoring Violations, Non-Compliant Public Drinking Water Systems, Delaware 2018[1]

Systems that failed to collect the required number of samples during any monitoring period

System Name	Population	Rule
None	N/A	N/A
Monitoring Violation Totals		
Total Number of Violations		0
Number of Systems Affected		0
Number of Repeat Violators		0
Total Population Affected		0

Source: Delaware Department of Health and Social Services, Division of Public Health, Office of Drinking Water, 2018.

[1] Excluding lead and copper

Table 23. Consumer Confidence Report (CCR) Rule Inadequate Reporting, Non-Compliant Public Drinking Water Systems, Delaware, 2018

System Name	Population served	Return to Compliance Date
Barkers Landing	498	8/9/2018
Country House	425	N/A
Southwood Acres	534	N/A
CCR Violation Inadequate Reporting Totals		
Number of Violations		3
Number of Systems Affected		3
Number of Repeat Violators		0
Total Population Affected		1,457

Source: Delaware Department of Health and Social Services, Division of Public Health, Office of Drinking Water, 2018.

Table 24. Consumer Confidence Report (CCR) Rule, Failure to Report, Non-Compliant Public Drinking Water Systems, Delaware, 2018

System Name	Population served	Return to Compliance Date
Bethany Crest	60	N/A
Camden Wyoming Sewer and Water Authority	3,500	7/2/2018
Countryside Estates	50	N/A
Countryside Hamlet	66	N/A
Forest Park	46	7/16/2018
Fox Pointe Subdivision	500	7/2/2018
Frankford Water Dept.	1,014	7/9/2018
Hilltop Trailer Park	65	N/A
Holiday Estates	75	N/A
Holiday Pines	210	N/A
Maranatha Court	54	N/A
Pinnacle Rehabilitation	256	N/A
Sussex Manor MHP	49	N/A
CCR Violation Failure to Report Violation Totals		
Number of Violations		13
Number of Systems Affected		13
Number of Repeat Violators		0
Total Population Affected		5,945

Source: Delaware Department of Health and Social Services, Division of Public Health, Office of Drinking Water, 2018.

Conclusion

ODW, the EPA, other state agencies, and non-governmental organizations are working with Delaware's public drinking water systems to ensure compliance with all applicable state and federal drinking water regulations. Together, they ensure that violations are corrected in a timely manner and provide technical assistance as needed. This cooperative action ensures that all Delaware residents and visitors receive safe and potable sources of drinking water.

The quality of drinking water supplied by public water systems in Delaware met the requirements of the SDWA in calendar year 2018. Of the state's 732,702 residents, 3,020 (0.4 percent) were exposed to contaminants such as total coliforms (including *E. coli)* and nitrates. Of the 484 public water systems, 13 (2.7 percent) had a violation for health-based contaminants. Twenty-two additional water systems (4.5 percent) reported monitoring and reporting violations, and 22 different systems violated the Lead and Copper Rule.

Additionally, 13 water systems received violations for failing to submit their Consumer Confidence Reports (CCR) and delivery certification to ODW by July 1, 2018, a decrease compared to 2017. However, they were not the same 13 systems as in 2017; only a few were repeat violators. Three water systems returned to compliance within one week and one was in compliance by July 31, 2018. The remaining nine water systems had not returned to compliance by December 31, 2018. ODW issued violations to those systems.

The consistent issue of public water systems failing to have a licensed water operator is improving; ODW cited six public water systems in 2018 compared to 14 in 2017. Four of the six systems without a licensed water operator are small community water systems. ODW provided them with a list of water operators they can hire. The remaining two water systems are non-transient non-community water systems. ODW is encouraging them to designate an employee to take the Limited License water operator course, offered by DTCC, so they can be certified to run only their water system. Since the majority of the non-transient non-community water systems are daycare businesses, ODW is working with the Office of Childcare Licensing, within the Department of Services for Children, Youth and Their Families, to enforce this state regulation.

For detailed information about Delaware's public water systems, visit EPA's Envirofacts webpage at www.epa.gov/enviro/html/sdwis/sdwis_query.html. Additional information can be found on ODW's website: www.dhss.delaware.gov/dhss/dph/hsp/odw.html. To view water system test results and other Delaware public water system data, visit the Drinking Water Watch website at https://drinkingwater.dhss.delaware.gov/. More information is available at this water quality website maintained by the Governor's Office: http://www.delaware.gov/topics/waterquality/index.shtml.