

**DEPARTMENT OF ENVIRONMENTAL PROTECTION**  
**Bureau of Water Standards and Facility Regulation**

**DOCUMENT NUMBER:** 383-2129-005

**TITLE:** Policy for Issuing and Removing Water Supply Warnings

**EFFECTIVE DATE:** October 3, 2009

**AUTHORITY:** Pennsylvania's Safe Drinking Water Act (35 P.S. §721.1 *et seq.*) and regulations at Title 25 Pa. Code Chapter 109.

**POLICY:** The Department of Environmental Protection (DEP) staff and public water suppliers shall follow the guidance and procedures presented in this document to issue and remove water supply warnings under the safe drinking water management program.

**PURPOSE:** The purpose of this document is to establish uniform instructions and protocol for issuing and removing water supply warnings which will promote quality, timely and consistent service to the public and regulated community.

**APPLICABILITY:** This guidance will apply to all public water systems as defined under the Pennsylvania Safe Drinking Water Act.

**DISCLAIMER:** The policies and procedures outlined in this guidance are intended to supplement existing requirements. Nothing in the policies or procedures shall affect regulatory requirements.

The policies and procedures herein are not an adjudication or a regulation. There is no intent on the part of DEP to give the rules in these policies that weight or deference. This document establishes the framework within which DEP will exercise its administrative discretion in the future. DEP reserves the discretion to deviate from this policy statement if circumstances warrant.

**PAGE LENGTH:** 27 pages

**LOCATION:** Volume 22, Tab 17

**DEFINITIONS:** See Title 25 Pa. Code Chapter 109

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## **PURPOSE:**

The purpose of this guidance is to establish a protocol for public water suppliers and Department of Environmental Protection (DEP) staff to follow in the event of a contamination incident or other emergency situation. The procedures outlined in this guidance are intended to assist users in determining when a water supply warning is necessary, what the notice should contain, and when the notice may be lifted. This information is intended to supplement the public notification (PN) requirements found at Title 25 Pa. Code Chapter 109, Subchapter D.

## **BACKGROUND:**

Public water systems serve safe drinking water to over 12 million Pennsylvanians. Serious drinking water contamination incidents are infrequent and are usually of short duration. However, when an emergency occurs, it is essential that public water supplier and DEP staff take quick action. Emergency situations are defined in later sections of this guidance, and include source water contamination, a breakdown in water treatment, and disruptions in the distribution system. When these situations occur, a water supplier may need to issue a water supply warning to protect the public health.

Section 109.408, specifies the requirements for notification to the public for violations and situations with significant potential to have serious effects on human health as a result of short-term exposure. These violations or situations, also called Tier 1 events, have the potential to cause acute health effects within hours or days. Consequently, Tier 1 PN is required as soon as possible, but no later than 24 hours because of the urgency of the situation.

The Tier 1 PN requirements contain mandatory elements. One of the most significant elements relates to actions that consumers should take as a result of the situation. Examples of actions included in a water supply warning are:

- Boiling the water before use,
- Not drinking the water, and
- Not using the water.

The required actions are specific to the Tier 1 violation or situation.

## **TIER 1 VIOLATIONS OR SITUATIONS:**

Tier 1 notices must be issued for the violations or situations listed below and must meet the content, format, and delivery requirements of Chapter 109, Subchapter D.

### **Tier 1 Violations or Situations Requiring Tier 1 PN:**

1. Violation of the maximum contaminant level (MCL) for **total coliforms** when **fecal coliforms** or *E. coli* are present in the water distribution system or when the water supplier fails to test for fecal coliforms or *E. coli* when any check sample tests positive for coliforms.
2. Violation of the MCL for **nitrate, nitrite, or total nitrate and nitrite** or when the water supplier fails to take a confirmation sample within 24 hours of the system's receipt of the first sample showing an exceedance of the nitrate or nitrite MCL.

3. Exceedance of the **nitrate** MCL by noncommunity water systems when permitted by the Department in writing to operate under an Alternate Nitrate Level.
4. Violations of the maximum residual disinfectant level (MRDL) for **chlorine dioxide** when one or more of the samples taken in the distribution system the day following an exceedance of the MRDL at the entrance of the distribution system exceed the MRDL or when the water supplier does not take the required samples in the distribution system.
5. Violation of the **turbidity** MCL of 5 NTU based on an average for 2 consecutive days by a public water system using an unfiltered surface water source.
6. Violation of a **treatment technique** requirement for pathogenic bacteria, viruses and protozoan cysts, resulting from a single exceedance of the combined filter effluent (CFE) maximum allowable **turbidity** limit.
7. Occurrence of a **waterborne disease outbreak** or any **other situation** defined under 109.701(a)(3)(iii) that adversely affects the quality or quantity of the finished water.
8. Other **violations or situations with significant potential to have serious adverse effects on human health** as a result of short-term exposure, as determined by the Department on a case-by-case basis.

The first six violations have a defined trigger level (e.g. a drinking water standard) to determine when Tier 1 PN is required. However, the last two situations are case-specific and require more explanation.

The “other situations” mentioned under number seven are further defined in section 109.701(a)(3)(iii) are circumstances that exist which may adversely affect the quality or quantity of drinking water including, but not limited to:

- The occurrence of a waterborne disease outbreak.
- A failure or significant interruption in key water treatment processes.
- A natural disaster that disrupts the water supply or distribution system.
- A chemical spill.
- An unexpected loading of possible pathogens into the source water that significantly increases the potential for drinking water contamination.
- An overfeed of a drinking water treatment chemical that exceeds a published maximum use value, such as National Sanitation Foundation’s maximum use value.
- A situation that causes a loss of positive water pressure in any portion of the distribution system where there is evidence of known contamination or a water supplier suspects a high risk of contamination. (For more information, refer to “Policy for Determining When Loss of Positive Pressure Situations in the Distribution System Require One-Hour Reporting to the Department and Issuing Tier 1 Public Notification” 383-2129-004.)
- A lack of resources that adversely affect operations, such as staff shortages, notification by the power utility of planned lengthy power outages, or imminent depletion of treatment chemical

inventories. Some situations that could adversely affect resources include pandemic flu, labor strikes, and natural or manmade disasters.

Situations under number eight are case-specific, and include other violations or situations with significant potential to have serious adverse effects on human health. One example of this type of situation is an extreme exceedance of an MCL or MRDL. Most MCLs or MRDLs are established for a contaminant assuming a person consumes two liters of water each day for seventy years. The associated health effects are based on long-term consumption (also referred to as **chronic exposure**). For example, the MCL for cadmium is 0.005 mg/L and the standard health effects language is:

*“Some people who drink water containing cadmium in excess of the MCL over many years could experience kidney damage.”*

Generally, when a water supplier exceeds an MCL, the supplier must issue Tier 2 PN within 30 days that includes the chronic health effects language. However, even chronic contaminants can exhibit acute health effects if the levels are high enough. In order to determine at what level a contaminant exhibits **acute** health effects, DEP will use the Environmental Protection Agency’s (EPA) One- and Ten-Day Health Advisory (HA) levels. According to EPA, an HA is an estimate of acceptable drinking water levels for a chemical substance based on health effects information. EPA further defines One- and Ten-Day HAs as follows:

**One-Day HA:** The concentration of a chemical in drinking water that is not expected to cause any adverse effects for up to one day of exposure. The One-Day HA is normally designed to protect a 10-kg child consuming one liter of water per day.

**Ten-Day HA:** The concentration of a chemical in drinking water that is not expected to cause any adverse effects for up to ten days of exposure. The Ten-Day HA is also normally designed to protect a 10-kg child consuming one liter of water per day.

When a water supplier exceeds either a one-day or ten-day HA level, this event becomes a **situation with significant potential to have serious adverse effects on human health** which is a Tier 1 situation. During this Tier 1 situation, a water supplier would be required to issue a Tier 1 public notice that includes acute health effects language listed under Table 1: Drinking Water Standards and Health Advisories.

## **DRINKING WATER STANDARDS AND HEALTH ADVISORIES**

Table 1: Drinking Water Standards and Health Advisories includes the Environmental Protection Agency’s (EPA) One- and Ten-Day Health Advisory (HA) levels, where available, for each of the regulated contaminants. These levels are typically higher than the MCL, and represent short-term or acute exposures with adverse health effects. *Source: EPA’s 2006 Edition of the Drinking Water Standards and Health Advisories (EPA 822-R-06-13), available at the following link:* <http://www.epa.gov/waterscience/criteria/drinking/>.

Table 1 also includes acute health effects language that must be inserted into a Tier 1 public notice when either the one-day or ten-day HA is exceeded. The acute health effects language is taken from EPA’s technical and consumer fact sheets. EPA’s technical and consumer fact sheets may be found at the following link: <http://www.epa.gov/safewater/hfacts.html>. When the acute health effects column contains no information, water suppliers must use the chronic health effects language for that

contaminant (See footnote 3). Where HAs do not exist, water suppliers and DEP staff will need to make decisions about health effects on a case-by-case basis.

**Note:** There are 14 contaminants that have HA levels published on the EPA technical fact sheets that conflict with those published in EPA's *2006 Edition of the Drinking Water Standards and Health Advisories (EPA 822-R-06-13)*.

These contaminants are:

Barium	Dichloroethylene (trans-1,2-)
Mercury	Atrazine
Nickel	Carbofuran
Nitrate + Nitrite	Endrin
Chlorobezene	Oxamyl (Vydate)
p-Dichlorobenzene	Simazine
Dichloroethylene (cis-1,2-)	Toxaphene

For these contaminants, water suppliers and DEP staff should use the HA level published on Table 1 because it represents the latest edition of EPA's document.

**Table 1: Drinking Water Standards and Health Advisories\***

Chemicals	CASRN Number	Standards <sup>1</sup>		Health Advisories 10-kg (22 lb) Child		Tier 1 Acute Health Effects Language <sup>3</sup>
		MCLG <sup>2</sup> (mg/L)	MCL <sup>2</sup> (mg/L)	One-Day (mg/L)	Ten-Day (mg/L)	
<b>Inorganic Chemicals (IOCs):</b>						
Antimony	7440-36-2	0.006	0.006	0.01	0.01	EPA has found antimony to potentially cause the following health effects from acute exposure at levels above the MCL: nausea, vomiting and diarrhea.
Arsenic	7440-38-2	0	0.010	-	-	Acute effects can occur within hours or days of exposure and can include stomach pain; nausea; vomiting; diarrhea; numbness in hands and feet; partial paralysis; thickening and discoloration of the skin; and blindness
Asbestos	1332-21-4	7 million fibers/L	7 million fibers/L	-	-	
Barium	7440-39-3	2	2	-	-	EPA has found barium to potentially cause the following health effects when people are exposed to it at levels above the MCL for relatively short periods of time: gastrointestinal disturbances and muscular weakness.
Beryllium	7440-41-7	0.004	0.004	30	30	Inhalation may cause acute chemical pneumonitis; less toxic via oral exposure
Cadmium	7440-43-9	0.005	0.005	0.04	0.04	EPA has found cadmium to potentially cause a variety of effects from acute exposures, including: nausea, vomiting, diarrhea, muscle cramps, salivation, sensory disturbances, liver injury, convulsions, shock and renal failure.

Chemicals	CASRN Number	Standards <sup>1</sup>		Health Advisories 10-kg (22 lb) Child		Tier 1 Acute Health Effects Language <sup>3</sup>
		MCLG <sup>2</sup> (mg/L)	MCL <sup>2</sup> (mg/L)	One-Day (mg/L)	Ten-Day (mg/L)	
Chromium (total) <u>Note:</u> Standards based on total concentration of the trivalent (Cr <sub>3</sub> ) and hexavalent (Cr <sub>6</sub> ) forms of dissolved chromium.	7440-47-3	0.1	0.1	1	1	EPA has found chromium to potentially cause the following health effects from acute exposures at levels above the MCL: skin irritation or ulceration.
Copper (at tap)	7440-50-8	1.3	TT <sup>4</sup>	-	-	Copper is an essential nutrient, but at high doses it has been shown to cause stomach and intestinal distress, liver and kidney damage and anemia. Persons with Wilson's Disease may be at a higher risk of health effects due to copper than the general public.
Cyanide	143-33-9	0.2	0.2	0.2	0.2	EPA has found cyanide compounds to potentially cause the following health effects from acute exposure at levels above the MCL: rapid breathing, tremors and other neurological effects.
Fluoride	7681-49-4	2	2	-	-	
Lead (at tap)	7439-92-1	0	TT	-	-	Lead can cause a variety of adverse health effects when people are exposed to it at levels above the MCL for relatively short periods of time. These effects may include interference with red blood cell chemistry, delays in normal physical and mental development in babies and young children, slight deficits in the attention span, hearing, and learning abilities of children, and slight blood pressure increases in some adults.

Chemicals	CASRN Number	Standards <sup>1</sup>		Health Advisories 10-kg (22 lb) Child		Tier 1 Acute Health Effects Language <sup>3</sup>
		MCLG <sup>2</sup> (mg/L)	MCL <sup>2</sup> (mg/L)	One-Day (mg/L)	Ten-Day (mg/L)	
Mercury (inorganic)	7487-94-7	0.002	0.002	0.002	0.002	EPA has found mercury to potentially cause the following health effects when people are exposed to it at levels above the MCL for relatively short periods of time: kidney damage.
Nickel	7440-02-0	-	-	1	1	
Nitrate (as N)	14797-55-8	10	10	10 <sup>5</sup>	10 <sup>5</sup>	Excessive levels of nitrate in drinking water have caused serious illness and sometimes death. The serious illness in infants is due to the conversion of nitrate to nitrite by the body, which can interfere with the oxygen-carrying capacity of the child's blood. This can be an acute condition in which health deteriorates rapidly over a period of days. Symptoms include shortness of breath and blueness of the skin.
Nitrite (as N)	14797-65-0	1	1	1 <sup>5</sup>	1 <sup>5</sup>	
Nitrate + Nitrite (both as N)		10	10	-	-	
Selenium	7782-49-2	0.05	0.05	-	-	Selenium is an essential nutrient at low levels. However, EPA has found it to potentially cause the following health effects from acute exposures at levels above the MCL: hair and fingernail changes; damage to the peripheral nervous system; fatigue and irritability.
Thallium	7440-28-0 (metal)	0.0005	0.002	0.007	0.007	EPA has found thallium to potentially cause the following health effects from acute exposure at levels above the MCL: gastrointestinal irritation; peripheral neuropathy.

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<b>Volatile Organic Compounds (VOCs):</b>						
Benzene	71-43-2	0	0.005	0.2	0.2	Acute exposure to high levels of benzene produces central nervous system effects and death. At lower levels, above the MCL, mild central nervous system effects appear to be concentration dependent and rapidly reversible. Other effects include immune system depression and bone marrow toxicity leading to aplastic anemia.
Carbon Tetrachloride	56-23-5	0	0.005	4	0.2	EPA has found carbon tetrachloride to potentially cause liver, kidney and lung damage when people are exposed to it in drinking water at levels above the MCL for relatively short periods of time.
Chlorobenzene (Note: also known as monochlorobenzene)	108-90-7	0.1	0.1	4	4	EPA has found chlorobenzene to potentially cause anesthetic effects and impaired liver and kidney function from short-term exposure at levels above the MCL.
o-Dichlorobenzene	95-50-1	0.6	0.6	9	9	
p-Dichlorobenzene	106-46-7	0.075	0.075	11	11	EPA has found p-DCB to potentially cause the following health effects when people are exposed to it at levels above the MCL for relatively short periods of time: nausea, vomiting, headaches, and irritation of the eyes and respiratory tract.
1,2-Dichloroethane	107-06-2	0	0.005	0.7	0.7	EPA has found 1,2-dichloroethane to potentially cause the following health effects when people are exposed to it at levels above the MCL for relatively short periods of time: central nervous system disorders, and adverse lung, kidney, liver circulatory and gastrointestinal effects.

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1,1-Dichloroethylene	75-35-4	0.007	0.007	2	1	EPA has found 1,1-DCE to potentially cause the following health effects when people are exposed to it at levels above the MCL for relatively short periods of time: liver damage.
Dichloroethylene (cis-1,2-)	156-59-2	0.07	0.07	4	1	EPA has found cis- and trans-1,2-DCE to potentially cause the following health effects when people are exposed to it at levels above the MCL for relatively short periods of time: central nervous system depression.
Dichloroethylene (trans-1,2-)	156-60-5	0.1	0.1	20	1	
Dichloromethane	75-09-2	0	0.005	10	2	EPA has found dichloromethane to potentially cause the following health effects when people are exposed to it at levels above the MCL for relatively short periods of time: Damage to the nervous system and to blood.
1,2-Dichloropropane	78-87-5	0	0.005	-	0.09	EPA has found 1,2-DCP to potentially cause the following health effects when people are exposed to it at levels above the MCL for relatively short periods of time: damage to the liver, kidneys, adrenal glands, bladder, and the gastrointestinal and respiratory tracts.
Ethylbenzene	100-41-4	0.7	0.7	30	3	EPA has found ethylbenzene to potentially cause the following health effects when people are exposed at levels above the MCL for relatively short periods of time: drowsiness, fatigue, headache, and mild eye & respiratory irritation.
Styrene	100-42-5	0.1	0.1	20	2	EPA has found styrene to potentially cause the following health effects when people are exposed to it at levels above the MCL for relatively short periods of time: nervous system effects such as depression, loss of concentration, weakness, fatigue and nausea.

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Tetrachloroethylene (PCE)	127-18-4	0	0.005	2	2	EPA has found tetrachloroethylene to potentially cause the following health effects from acute exposures above MCL levels: detrimental effects to liver, kidney, and central nervous system.
Toluene	108-88-3	1	1	20	2	EPA has found toluene to potentially cause the following health effects when people are exposed to it at levels above the MCL for relatively short periods of time: minor nervous system disorders such as fatigue, nausea, weakness, confusion.
Trichlorobenzene (1,2,4-)	120-82-1	0.07	0.07	0.1	0.1	EPA has found 1,2,4-trichlorobenzene to potentially cause the following health effects when people are exposed to it at levels above the MCL for relatively short periods of time: changes in liver, kidneys and adrenal glands
Trichloroethane (1,1,1-)	71-55-6	0.2	0.2	100	40	EPA has found 1,1,1-TCA to potentially cause the following health effects when people are exposed to it at levels above the MCL for relatively short periods of time: damage to the liver, nervous system and circulatory system.
Trichloroethane (1,1,2-)	79-00-5	0.003	0.005	0.6	0.4	EPA has found 1,1,2-TCE to potentially cause the following health effects when people are exposed at levels above the MCL for relatively short periods of time: irritation of gastrointestinal tract; red or hemorrhaged lungs; pale liver.
Trichloroethylene	79-01-6	0	0.005	-	-	EPA has found trichloroethylene to potentially cause vomiting and abdominal pain from acute exposure at levels above the MCL.

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		MCLG <sup>2</sup> (mg/L)	MCL <sup>2</sup> (mg/L)	One-Day (mg/L)	Ten-Day (mg/L)	
Vinyl Chloride	75-01-4	0	0.002	3	3	EPA has found vinyl chloride to potentially cause the following health effects when people are exposed to it at high inhalation levels (40 - 900 mg/L) for relatively short periods of time: damage to the nervous system.
Xylenes	1330-20-7	10	10	40	40	EPA has found xylenes to potentially cause the following health effects when people are exposed to it at levels above the MCL for relatively short periods of time: disturbances of cognitive ability, balance, and coordination.
<b>Synthetic Organic Chemicals (SOCs):</b>						
Alachlor	15972-60-8	0	0.002	0.1	0.1	EPA has found alachlor to potentially cause the following health effects when people are exposed to it at levels above the MCL for relatively short periods of time: slight skin and eye irritation.
Atrazine	1912-24-9	0.003	0.003	-	-	EPA has found atrazine to potentially cause a variety of acute health effects from acute exposures at levels above the MCL. These effects include: congestion of heart, lungs and kidneys; hypotension; antidiuresis; muscle spasms; weight loss; adrenal degeneration.
Benzo(a)pyrene <i>Polycyclic Aromatic Hydrocarbons (PAHs)</i>	50-32-8	0	0.0002	-	-	EPA has found benzo(a)pyrene to potentially cause the following health effects when people are exposed to it at levels above the MCL for relatively short periods of time: red blood cell damage, leading to anemia; suppressed immune system.

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Carbofuran	1563-66-2	0.04	0.04	-	-	EPA has found carbofuran to potentially cause the following health effects when people are exposed to it at levels above the MCL for relatively short periods of time: headache, sweating, nausea, diarrhea, chest pains, blurred vision, anxiety and general muscular weakness. These effects are reversible.
Chlordane	57-74-9	0	0.002	0.06	0.06	EPA has found chlordane to potentially cause the following health effects in people exposed to it at levels above the MCL for relatively short periods of time: central nervous system effects - including irritability, excess salivation, labored breathing, tremors, convulsions, deep depression - and blood system effects such as anemia and certain types of leukemia.
2,4-D (2,4-dichlorophenoxyacetic acid)	94-75-7	0.07	0.07	1	0.3	EPA has found 2,4-D to potentially cause the following health effects when people are exposed to it at levels above the MCL for relatively short periods of time: nervous system damage.
Dalapon (sodium salt)	75-99-0	0.2	0.2	3	3	
Di (2-ethylhexyl) adipate	103-23-1	0.4	0.4	20	20	
Di (2-ethylexyl) phthalate	117-81-7	0	0.006	-	-	EPA has found phthalate to potentially cause the following health effects when people are exposed to it at levels above the MCL for relatively short periods of time: mild gastrointestinal disturbances, nausea, vertigo.
Dibromochloropropane (DBCP)	96-12-8	0	0.0002	0.2	0.05	EPA has found DBCP to potentially cause the following health effects when people are exposed to it at levels above the MCL for relatively short periods of time: kidney and liver damage and atrophy of the testes.

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		MCLG <sup>2</sup> (mg/L)	MCL <sup>2</sup> (mg/L)	One-Day (mg/L)	Ten-Day (mg/L)	
Dinoseb	88-85-7	0.007	0.007	0.3	0.3	EPA has found dinoseb to potentially cause the following health effects when people are exposed to it at levels above the MCL for relatively short periods of time: sweating, headache, mood changes.
Dioxin (2,3,7,8-TCDD)	1746-01-6	0	3 X 10 <sup>-8</sup>	1 X 10 <sup>-6</sup>	1 X 10 <sup>-7</sup>	EPA has found dioxin to potentially cause the following health effects when people are exposed to it at levels above the MCL for relatively short periods of time: liver damage, weight loss, wasting of glands important to the body's immune system.
Diquat	85-00-7	0.02	0.02	-	-	EPA has found diquat to potentially cause the following health effects when people are exposed to it at levels above the MCL for relatively short periods of time: dehydration.
Endothall	145-73-3	0.1	0.1	0.8	0.8	EPA has found endothall to potentially cause the following health effects when people are exposed to it at levels above the MCL for relatively short periods of time: depressed breathing and heart rate.
Endrin	72-20-8	0.002	0.002	0.02	0.005	EPA has found endrin to potentially cause the following health effects when people are exposed to it at levels above the MCL for relatively short periods of time: tremors, labored breathing, mental confusion, convulsions.
Ethylene Dibromide (EDB)	106-93-4	0	0.00005	0.008	0.008	EPA has found EDB to potentially cause the following health effects when people are exposed to it at levels above the MCL for relatively short periods of time: damage to the liver, stomach, and adrenal glands, along with significant reproductive system toxicity, particularly the testes.

Chemicals	CASRN Number	Standards <sup>1</sup>		Health Advisories 10-kg (22 lb) Child		Tier 1 Acute Health Effects Language <sup>3</sup>
		MCLG <sup>2</sup> (mg/L)	MCL <sup>2</sup> (mg/L)	One-Day (mg/L)	Ten-Day (mg/L)	
Glyphosate	1071-83-6	0.7	0.7	20	20	EPA has found glyphosate to potentially cause the following health effects in people are exposed to it at levels above the MCL for relatively short periods of time: congestion of the lungs; increased breathing rate.
Heptachlor	76-44-8	0	0.0004	0.01	0.01	EPA has found heptachlor and its epoxide to potentially cause the following health effects when people are exposed to it at levels above the MCL for relatively short periods of time: liver and central nervous system damage.
Heptachlor epoxide	1024-57-3	0	0.0002	0.01	-	
Hexachlorobenzene (HCB)	118-74-1	0	0.001	0.05	0.05	EPA has found HCB to potentially cause the following health effects when people are exposed to it at levels above the MCL for relatively short periods of time: skin lesions, nerve and liver damage.
Hexachlorocyclopentadiene (HEX)	77-47-4	0.05	0.05	-	-	EPA has found HEX to potentially cause the following health effects when people are exposed to it at levels above the MCL for relatively short periods of time: gastrointestinal distress; damage to liver, kidneys and heart.
Lindane <sup>6</sup>	58-89-9	0.0002	0.0002	1	1	EPA has found lindane to potentially cause the following health effects when people are exposed to it at levels above the MCL for relatively short periods of time: high body temperature and pulmonary edema.
Methoxychlor	72-43-5	0.04	0.04	0.05	0.05	EPA has found methoxychlor to potentially cause the following health effects when people are exposed to it at levels above the MCL for relatively short periods of time: central nervous system depression, diarrhea, and damage to liver, kidney and heart tissue.

Chemicals	CASRN Number	Standards <sup>1</sup>		Health Advisories 10-kg (22 lb) Child		Tier 1 Acute Health Effects Language <sup>3</sup>
		MCLG <sup>2</sup> (mg/L)	MCL <sup>2</sup> (mg/L)	One-Day (mg/L)	Ten-Day (mg/L)	
Oxamyl (Vydate)	23135-22-0	0.2	0.2	-	-	EPA has found oxamyl to potentially cause the following health effects when people are exposed to it at levels above the MCL for relatively short periods of time: tremors, salivation and tearing due to interference with nerve function.
Pentachlorophenol	87-86-5	0	0.001	1	0.3	EPA has found pentachlorophenol to potentially cause the following health effects when people are exposed to it at levels above the MCL for relatively short periods of time: damage to the central nervous system
Picloram	1918-02-1	0.5	0.5	20	20	EPA has found picloram to potentially cause the following health effects when people are exposed at levels above the MCL for relatively short periods of time: central nervous system damage, weakness, diarrhea, weight loss.
Polychlorinated Biphenyls (PCBs)	1336-36-3	0	0.0005	-	-	EPA has found PCBs to potentially cause the following health effects from short-term exposures at levels above the MCL: acne-like eruptions and pigmentation of the skin; hearing and vision problems; and spasms.
Simazine	122-34-9	0.004	0.004	-	-	EPA has found simazine to potentially cause the following health effects in people exposed at levels above the MCL for relatively short periods of time: weight loss, changes in blood.
Toxaphene	8001-35-2	0	0.003	0.004	0.004	EPA has found toxaphene to potentially cause the following health effects in people exposed at levels above the MCL for relatively short periods of time: central nervous system effects including restlessness, tremors, spasms hyperexcitability, or convulsions.

Chemicals	CASRN Number	Standards <sup>1</sup>		Health Advisories 10-kg (22 lb) Child		Tier 1 Acute Health Effects Language <sup>3</sup>
		MCLG <sup>2</sup> (mg/L)	MCL <sup>2</sup> (mg/L)	One-Day (mg/L)	Ten-Day (mg/L)	
2,4,5-TP (Silvex)	93-72-1	0.05	0.05	0.2	0.2	EPA has found 2,4,5-TP to potentially cause the following health effects in people exposed at levels above the MCL for relatively short periods of time: depression and other nervous system effects, weakness, stomach irritation and minor damage to liver and kidneys.
<b>Disinfectants:</b>						
Chloramines (as Cl <sub>2</sub> )	10599-90-3	MRDLG <sup>2</sup> 4	MRDL <sup>2</sup> 4.0	Note <sup>7</sup>	Note <sup>7</sup>	
Chlorine (as Cl <sub>2</sub> )	7782-50-5	MRDLG <sup>2</sup> 4	MRDL <sup>2</sup> 4.0	Note <sup>7</sup>	Note <sup>7</sup>	
Chlorine Dioxide (as ClO <sub>2</sub> )	10049-04-4	MRDLG <sup>2</sup> 0.8	MRDL <sup>2</sup> 0.8	0.84	0.84	If the HA levels are exceeded in <b>distribution samples</b> , insert the acute health effects language:  The chlorine dioxide violations reported today include exceedances of the EPA standard within the distribution system which delivers water to consumers. Violations of the chlorine dioxide standard within the distribution system may harm human health based on short-term exposures. Certain groups, including fetuses, infants, and young children may be especially susceptible to nervous system effects from excessive chlorine dioxide exposure.
<b>Disinfection Byproducts:</b>						
Bromate	7789-38-0	0	0.010	0.2	-	
Chlorite	7758-19-2	0.8	1.0	-	-	

Chemicals	CASRN Number	Standards <sup>1</sup>		Health Advisories 10-kg (22 lb) Child		Tier 1 Acute Health Effects Language <sup>3</sup>
		MCLG <sup>2</sup> (mg/L)	MCL <sup>2</sup> (mg/L)	One-Day (mg/L)	Ten-Day (mg/L)	
Haloacetic acids (HAA5)		n/a <sup>8</sup>	0.060			
Monochloroacetic acid	79-11-8	-		0.2	0.2	
Dichloroacetic acid	76-43-6	0		5	5	
Trichloroacetic acid	76-03-9	0.3		3	3	
Bromoacetic acid	-	-		-	-	
Dibromoacetic acid	-	-		-	-	
Total Trihalomethanes (TTHMs)		n/a <sup>8</sup>	0.080			
Chloroform	67-66-3	-		4	4	
Bromodichloromethane	75-27-4	0		1	0.6	
Dibromochloromethane	124-48-1	0.06		0.6	0.6	
Bromoform	75-25-2	0		5	0.2	

\*Based on EPA One-Day/Ten-Day HAs.

Excerpted from EPA's 2006 Edition of the Drinking Water Standards and Health Advisories (EPA 822-R-06-013) and Technical Fact Sheets

“-” represents that either there are no known health effects or this level has not yet been established.

<sup>1</sup> Units are in milligrams per liter (mg/L) unless otherwise noted. Milligrams per liter are equivalent to parts per million (ppm).

<sup>2</sup> Definitions

Maximum Contaminant Level Goal (MCLG) - The level of a contaminant in drinking water below which there is no known or expected risk to health.

MCLGs allow for a margin of safety and are non-enforceable public health goals.

Maximum Contaminant Level (MCL) - The highest level of a contaminant that is allowed in drinking water. MCLs are set close to MCLGs as feasible using the best available treatment technology and taking cost into consideration. MCLs are enforceable standards.

Maximum Residual Disinfectant Level Goal (MRDLG) - The level of a drinking water disinfectant below which there is no known or expected risk to health.

MRDLGs do not reflect the benefits of the use of disinfectants to control microbial contaminants.

Maximum Residual Disinfectant Level (MRDL) - The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.

Treatment Technique (TT) - A required process intended to reduce the level of a contaminant in drinking water.

<sup>3</sup> Acute health effects language provided by EPA. When this column is blank, water suppliers must use EPA's mandatory health effects language for public notices.

<sup>4</sup>Copper action level 1.3 mg/L; Lead action level 0.015 mg/L

<sup>5</sup> These values are calculated for a 4-kg infant and are protective for all age groups.

<sup>6</sup> Lindane =  $\gamma$  - hexachlorocyclohexane

<sup>7</sup>Note: EPA's 2006 Edition of the Drinking Water Standards and Health Advisories (EPA 822-R-06-013) published one-day and ten-day HA for chloramines as 1 mg/L and one-day and ten-day HAs for chlorine as 3 mg/L. These HA levels have not been re-evaluated since EPA established the MRDLs for chloramines and chlorine at 4 mg/L in 2004. EPA Region III has recommended a range between 6 -10 mg/L (measured as free or total chlorine) as appropriate HA levels for chloramines and chlorine.

<sup>8</sup>Although there are no collective MCLG for this contaminant group, there are individual MCLGs for some of the individual contaminants (as indicated).

## **DRINKING WATER TREATMENT CHEMICALS AND HEALTH EFFECTS:**

When a supplier experiences a drinking water treatment chemical overfeed situation, decisions will need to be made regarding the impact to public health. DEP will use the National Sanitation Foundation (NSF) Standard 60 maximum use value as the level which constitutes an overfeed situation.

To access the Standard 60 maximum use value for each drinking water treatment chemical, water suppliers can go to NSF's Web site at <http://www.nsf.org/>.

In the upper right corner, click on the "Search Listings" link.

Under Product listings, click on the "Drinking Water Treatment Chemicals" link.

Or water suppliers can access the direct link to "Drinking Water Treatment Chemicals" which is:

<http://www.nsf.org/Certified/PwsChemicals/>

Water suppliers can search this database in the following ways:

- Manufacturer name
- Chemical trade name
- Chemical name
- Product function
- Manufacturer plant location

Maximum use values are specific to the manufacturer so water suppliers will need the name of their chemical manufacturer to access the manufacturer's specific maximum use value. Water suppliers should record their maximum use values in their standard operating procedures or post them in an area in the plant that operators can view to determine when an overfeed situation has occurred.

When a water supplier discovers that a treatment chemical has been overfed, they must notify DEP within one hour to report their appropriate responses and to determine whether PN should be issued. DEP is in the process of contracting with NSF to determine acute trigger levels for some of the most common drinking water treatment chemicals listed below and the associated acute health effects.

Sodium Hydroxide  
Potassium Permanganate  
Sodium Hypochlorite  
Phosphoric Acid  
Hydrofluosilic Acid

Blended Phosphates  
Zinc Orthophosphate  
Aluminum Sulfate  
Polyaluminum Chloride  
Ferric Chloride

This information will be updated when the NSF project has been completed. Once this information is available, water suppliers and DEP staff will be able to use the acute trigger levels as the level at which a chemical overfeed situation has a significant potential to have serious adverse effects on human health as a result of short-term exposure. If a chemical overfeed situation results in a level that meets or exceeds the trigger level, water suppliers would then need to issue a Tier 1 PN with the appropriate acute health effects language that may include some form of water supply warning.

## **SENSITIVE SUBPOPULATIONS:**

Sensitive subpopulations are groups of individuals who may be at greater risk than the general population of experiencing adverse health effects from exposure to contaminants in drinking water. Sensitive subpopulations may be considered in the context of various intrinsic (e.g. age, gender, genetic traits) or acquired (e.g. pre-existing disease, exposure) characteristics that may increase the risk of illness or disease. Generally, infants, pregnant women, nursing mothers, the elderly, and people with weakened immune systems (such as those infected with HIV/AIDS, cancer and transplant patients taking immunosuppressive drugs) may be more sensitive to adverse health effects than the general population of consumers. Tier 1 PN templates have been designed to warn the sensitive subpopulations, where known, for each Tier 1 violation or situation.

Water suppliers have an obligation to make a good faith effort to assure that facilities serving sensitive subpopulations are appropriately notified for each Tier 1 violation or situation because these consumers are more vulnerable than other consumers. To be prepared for Tier 1 violations or situations, water suppliers are encouraged to document a list of contact persons and their phone and FAX numbers for facilities within a water supplier's service area that serve sensitive subpopulations including, but not limited to, hospitals, schools, daycare facilities, nursing homes, and social service agencies (e.g. agencies that serve the visually and/or hearing-impaired).

## **TYPES OF WATER SUPPLY WARNINGS:**

Water supply warnings in the form of Tier 1 PN are generally required when water suppliers need to provide consumers with immediate and specific actions to take. Water supply warnings can be categorized as follows:

1. Boil Water Advisory
2. Do Not Drink Notice
3. Do Not Use Notice

### **1. Boil Water Advisory (BWA):**

A BWA is a public notice that directs consumers to boil their water or use an alternate source of drinking water. BWAs are typically issued when microbial contamination of drinking water presents a threat to public health and safety.

When a BWA is issued, consumers should be told to bring the water to a rolling boil, and then let the water boil for **one (1) minute**. Boiling water is recommended to inactivate or destroy pathogens that may be in contaminated water. Consumers should be told to use boiled or bottled water for the following activities: drinking, cooking, food preparation, dishwashing, making ice/coffee, and brushing teeth.

### **Deficiencies That May Require a BWA:**

- Acute Total Coliform Rule (TCR) violation.

- Surface water treatment technique violations (i.e., Combined Filter Effluent turbidity limits, disinfectant residual requirements).
- Failure or interruption of key water treatment process (i.e., disinfection and/or filtration).
- Confirmed waterborne disease outbreak.
- A situation that causes a loss of positive water pressure in any portion of the distribution system where there is evidence of known contamination or a water supplier suspects a high risk of contamination. (For more information, refer to “Policy for Determining When Loss of Positive Pressure Situations in the Distribution System Require One-Hour Reporting to the Department and Issuing Tier 1 Public Notification” 383-2129-004.)
- Unusual and significant loading of microbes into the source water from a spill, discharge, natural event, or other circumstance.
- Cross-connection incident involving a microbial contaminant.
- Natural disaster that adversely affects the water quality.
- Presence of pathogens in the finished water (i.e., *Giardia*, *Cryptosporidium*).
- Filter plant operational, equipment and/or performance problem that prevents the plant from meeting inactivation and/or removal requirements.

#### **Water Supplier Follow-Up Actions:**

The reasons for a BWA are varied. However, suppliers must typically respond with similar follow-up actions. For a BWA, water suppliers may need to take corrective actions necessary to return to compliance such as:

- Repairing, replacing or optimizing treatment processes.
- Repairing/replacing water lines.
- Establishing and maintaining higher chlorine residuals.
- Flushing lines/storage tanks.
- Conducting a cross-connection survey.
- Using an alternate, approved source.
- Collecting check samples.

#### **Criteria To Lift A BWA:**

Once a water supply warning has been issued, decisions will need to be made regarding the criteria to lift the warning. The decisions will probably be case-specific. However, suppliers should accomplish the following, at a minimum:

1. Complete the necessary corrective actions.
2. Displace/flush a sufficient volume of water from the distribution system to achieve satisfactory lab results (including storage tanks). Note: Suppliers must neutralize the discharged chlorinated water, where there is the possibility of environmental impact.

3. Obtain satisfactory lab results on **two** consecutive days (i.e., total coliform bacteria, disinfectant residual). The samples should be collected within the “affected area”. DEP recommends that the sample collection times are a minimum of 12 hours apart. The “population affected” is defined as the population of consumers who are experiencing a BWA.

<b>Minimum # Check Samples Required Each Day to Lift a BWA</b>	
<b>Population Affected<sup>1</sup></b>	<b>Minimum # of Samples</b>
1 – 500	1
501 - 1,000	2
1,001 – 2,000	3
2,001 – 3,000	4
3,001 – 4,000	5
4,001 – 5,000	6
5,001 – 7,500	7
7,501 – 10,000	8
10,001 – 25,000	9
25,001 – 50,000	10
> 50,000	11

<sup>1</sup>**Population affected = # service connections x 2.7 people**

**Note:** Corrective actions (including the # of check samples) can be adjusted, accordingly, if the contamination is not representative of the water quality in the distribution system.

## 2. “Do Not Drink” Notice:

A wide variety of naturally occurring and man-made chemicals may contaminate drinking water. A “Do Not Drink” notice may be necessary when the concentration of a **chemical** contaminant exceeds a HA level. Refer to Table 1 for information about HA levels. These situations will be addressed on a case-by-case basis in consultation with the water supplier and Central Office staff who will contact EPA if necessary. In these case-by-case situations, most of the PN language needs to be carefully developed because the impact of issuing such a notice could result in enormous public implications. Water suppliers and DEP staff should refer to the acute health effects language to determine if a “Do Not Drink” notice is the appropriate form of notice for the specific chemical.

“**Drinking**” use restrictions include:

- Drinking.
- Making coffee, tea, or other soda fountain drinks.
- Making ice cubes.

- Food washing.
- Dishwashing.
- Using water as an ingredient in food preparation.
- Other water-using equipment that requires water which might be ingested.
- Brushing teeth.

When inserting language into a “Do Not Drink” template, water suppliers may expand the “What Should I do?” Section of the template to include other “Drinking” restrictions or to provide information about ways consumers may obtain alternative sources of water. Water suppliers may also include allowable “Drinking” uses in this section of the template.

The water can be used for flushing the toilet, bathing or washing.

Chemical contaminants vary in terms of the types and severity of effects that they have on the general population and in groups that may be more sensitive. The extent to which a substance may be harmful is a function of:

- Exposure,
- The chemical and physical properties of the agent, and
- The inherent sensitivity of the host.

“Do Not Drink” notices should clearly identify sensitive subpopulations, as appropriate.

Remember, “Do Not Drink” notices should specifically tell consumers **NOT** to boil their water, as boiling will only serve to concentrate the contaminant.

### 3. “Do Not Use” Notice:

There may be situations where the water supply contains a chemical that causes acute health effects by ingestion, inhalation, or skin contact. A “Do Not Use” notice may be necessary when the concentration of a **chemical** contaminant exceeds a HA level. Refer to Table 1 for information about HA levels. These situations will be addressed on a case-by-case basis in consultation with the water supplier and Central Office staff who will contact EPA if necessary. In these case-by-case situations, most of the PN language needs to be carefully developed because the impact of issuing such a notice could result in enormous public implications. Water suppliers and DEP staff should refer to the acute health effects language to determine if a “Do Not Use” notice is the appropriate form of notice for the specific chemical.

“Do Not Use” restrictions include:

- Drinking.
- Making coffee, tea, or other soda fountain drinks.
- Making ice cubes.
- Food washing.

- Dishwashing.
- Using water as an ingredient in food preparation.
- Other water-using equipment that requires water which might be ingested.
- Brushing teeth.
- Bathing, showering, handwashing, or any use that involves skin contact.
- Activities that promote inhalation from water vapor.
- Supplying water to animals, aquatic life, or plants.

When inserting language into a “Do Not Use” template, water suppliers may expand the “What Should I do?” Section of the template to include other “Use” restrictions or to provide information about ways consumers may obtain alternative sources of water. Water suppliers may also include allowable “Uses” in this section of the template (i.e. flushing the toilet).

Consumers may need to use an alternate source of water for all consumptive uses.

**Criteria to Lift a “Do Not Drink” or “Do Not Use” Notice:**

Once a water supply warning has been issued, decisions will need to be made regarding the criteria to lift the warning. The decisions may be case-specific. In consultation with the Department, suppliers should accomplish the following, at a minimum:

1. Complete the necessary corrective actions to return to compliance (level drops below the MCL or health advisory) by:
  - Taking the contaminated source off-line.
  - Adding/repairing/replacing treatment.
  - Using blended sources to lower the concentration.
2. Displace/flush a sufficient volume of water from the distribution system (including storage tanks) to achieve satisfactory lab results.

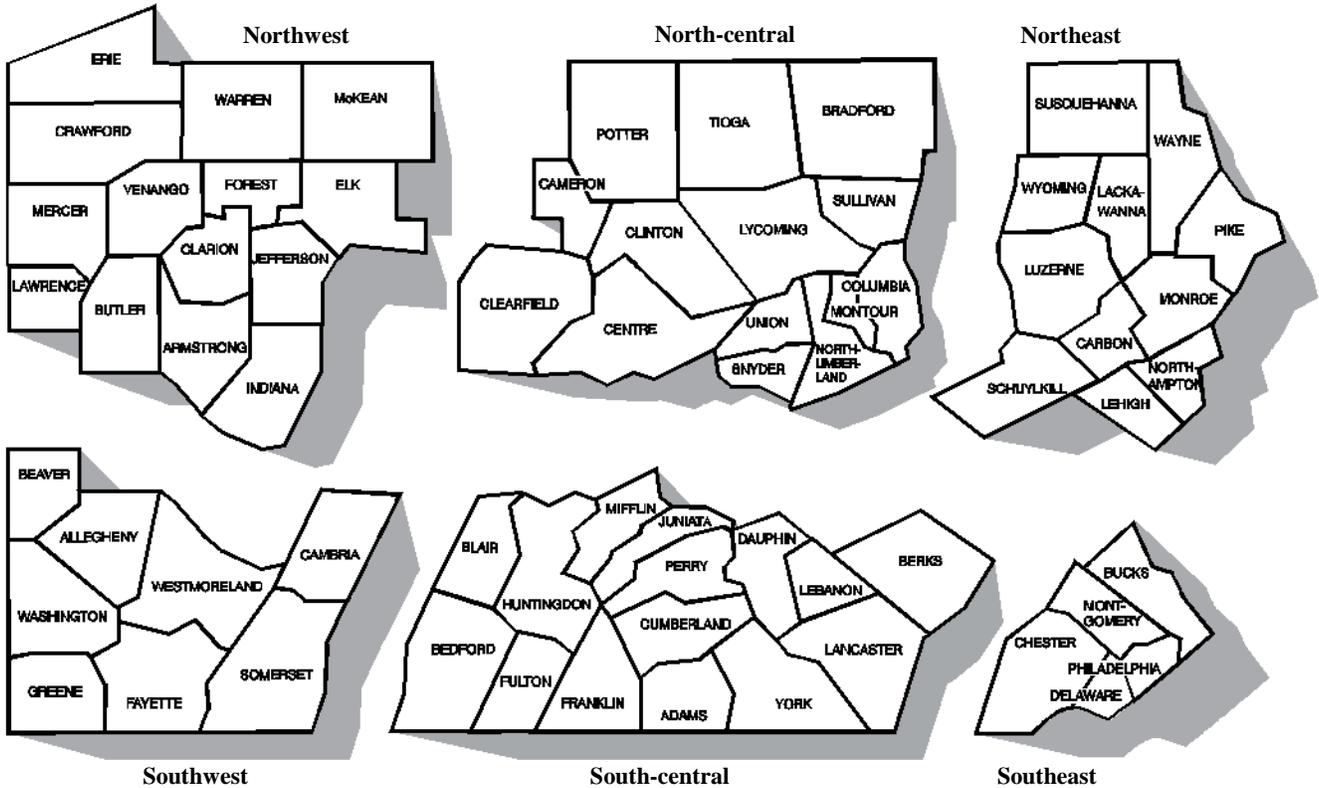
**ADDITIONAL RESOURCES FOR MORE INFORMATION:**

For more information about PN, please refer to our Web site at <http://www.depweb.state.pa.us/watersupply/cwp/view.asp?a=1251&q=510149>. It includes:

- Questions and Answers about PN
- PN Certification form
- Tier 1 PN Templates
- Boil Water Advisory (BWA) Commonly Asked Questions
- Tier 2 PN Templates
- Health Effects Language for PN

- O&M Plan Template and ERP Template Locations
- EPA Contaminant Fact Sheets
- More Information on Public Notification
  - EPA's 2006 Edition of the Drinking Water Standards and Health Advisories
  - PA Final PN Revisions Regulations

**DEP FIELD OPERATIONS REGIONAL OFFICES:**



**Northwest Region**  
 230 Chestnut St.  
 Meadville, PA 16335-3481  
 Main Telephone: 814-332-6945  
 24-Hour Emergency: 800-373-3398

**Counties:** *Armstrong, Butler, Clarion, Crawford, Elk, Erie, Forest, Indiana, Jefferson, Lawrence, McKean, Mercer, Venango, and Warren*

**Southwest Region**  
 400 Waterfront Drive  
 Pittsburgh, PA 15222-4745  
 Main Telephone: 412-442-4000  
 24-Hour Emergency: 412-442-4000

**Counties:** *Allegheny, Beaver, Cambria, Fayette, Greene, Somerset, Washington, and Westmoreland*

**North-central Region**  
 208 W. Third St., Suite 101  
 Williamsport, PA 17701-6448  
 Main Telephone: 570-327-3636  
 24-Hour Emergency: 570-327-3636

**Counties:** *Bradford, Cameron, Clearfield, Centre, Clinton, Columbia, Lycoming, Montour, Northumberland, Potter, Snyder, Sullivan, Tioga, and Union*

**South-central Region**  
 909 Elmerton Ave.  
 Harrisburg, PA 17110-8200  
 Main Telephone: 717-705-4700  
 24-Hour Emergency: 866-825-0208

**Counties:** *Adams, Bedford, Berks, Blair, Cumberland, Dauphin, Franklin, Fulton, Huntingdon, Juniata, Lancaster, Lebanon, Mifflin, Perry, and York*

**Northeast Region**  
 2 Public Square  
 Wilkes-Barre, PA 18701-1915  
 Main Telephone: 570-826-2511  
 24-Hour Emergency: 570-826-2511

**Counties:** *Carbon, Lackawanna, Lehigh, Luzerne, Monroe, Northampton, Pike, Schuylkill, Susquehanna, Wayne, and Wyoming*

**Southeast Region**  
 2 E. Main St.  
 Norristown, PA 19401-4915  
 Main Telephone: 484-250-5900  
 24-Hour Emergency: 484-250-5900

**Counties:** *Bucks, Chester, Delaware, Montgomery, and Philadelphia*