

# 2018 ANNUAL WATER QUALITY REPORT

## THE BOROUGH OF CARLISLE AND APPLICABLE PORTIONS OF SOUTH MIDDLETON, NORTH MIDDLETON AND MIDDLESEX TOWNSHIPS

This is an annual report describing the quality of the water produced and delivered by the Borough of Carlisle Water Treatment Plant, Public Water Supply # 7210002. This report meets the federal Safe Drinking Water Act (SDWA) requirement for “Consumer Confidence Reports” and contains information on the source of our water, its constituents, and the health risks associated with any contaminants. Safe water is vital to our community. Please read this report carefully. If you have any questions, call Mr. David Runkle, the Borough of Carlisle Lab Supervisor at 717-240-6991. General questions can also be directed to Borough Offices at 717-249-4422.

*Este informe contiene información importante acerca de su agua potable. Haga que alguien lo traduzca para usted, ó hable con alguien que lo entienda.* (This report contains important information about your drinking water. Have someone translate it for you, or speak with someone who understands it.)

### THE BOROUGH OF CARLISLE’S DRINKING WATER MEETS OR SURPASSES ALL FEDERAL AND STATE DRINKING WATER STANDARDS

We encourage public interest and participation in our community’s decisions affecting drinking water. Regular Municipal Water Authority meetings occur the third Wednesday of January, April, and July at 5:00 p.m. and at 4:00 p.m. in October at the Carlisle Water Treatment Plant at 165 Longs Gap Road. The October meeting includes an annual tour. The public is welcome.

#### Overview

The Borough of Carlisle public water supply system provides potable water for the Borough of Carlisle, and small portions of North Middleton, South Middleton, and Middlesex Townships within Cumberland County.

The water plant located just outside the Borough on Longs Gap Road adjacent to the Conodoguinet Creek was originally constructed in 1949 and expanded in 1965 to a capacity of 6 million gallons per day. During the period 1993 to 1995, Carlisle undertook a \$7.5 million rehabilitation project, which increased the capacity of the plant to 9 million gallons per day (MGD), although Carlisle is currently permitted to withdraw 7 MGD from the Conodoguinet Creek. The project replaced worn equipment and upgraded the facilities to current design and regulatory standards. During 2001 Carlisle repaired our dam and installed a new source water intake to further enhance the quality of the potable water supply. This was a \$2 million improvement to our overall water facility. In 2010 nearly \$200,000 was spent to repair and rehabilitate the Ridge Street elevated water storage tank.

The watershed, or drainage area, providing our source water to the Conodoguinet Creek is detailed on a map included in this report. The Carlisle watershed contains approximately 383 square miles and extends to nearly Fort Loudon and Chambersburg to the southwest. Towns in the drainage area include Carlisle, Newville, and Shippensburg, among others.

Excess nutrients and soil runoff from agricultural sources, construction, and urban runoff are some of the major factors affecting water quality in your watershed. Proper nutrient management and soil conservation practices can protect source water quality. You can also protect water quality by applying lawn care fertilizers, herbicides, and pesticides only when absolutely necessary and then only in the minimum quantity required. You should also consider that storm water catch basins in urban areas lead to streams that supply drinking water. These storm water inlets are only designed for storm water. Disposal of vehicle oil or hazardous substances pollutes surface water. To learn more about protecting the source water quality in the Carlisle watershed a summary report of the Assessment is available on the *Source Water Assessment & Protection Web* page at (<http://www.dep.state.pa.us/dep/deputate/watermgt/wc/Subjects/SourceProt/SourceAssessment/default.htm>). For more information see the DEP Source Water Assessment Summary for Carlisle elsewhere in this report. Copies of the complete report are available for review at the Pa. DEP South Central Regional Office, Records Management Unit at (717) 705-4732.

Carlisle’s water treatment plant is a modern facility that purifies source water drawn from the Conodoguinet Creek. The source water contains impurities, which must be removed before the finished water is safe for human use. These impurities are removed as the water passes through a series of treatment processes. Chlorine is added for disinfection, fluoride is added to help prevent tooth decay and a blended ortho/polyphosphate corrosion control additive reduces corrosion in approximately 80 miles of distribution system piping. We also have the ability to add caustic soda for pH control on rare occasions.

Treated or finished water is pumped to two “new” bolted water tanks constructed in 2013 for \$2.9 million that replaced the aging reservoirs built circa 1890 and 1950. These tanks are ideal for preserving stored water quality. Three elevated storage tanks also store water throughout the distribution system. We maintain an approximate one-day supply of water in storage at any given time. We also maintain interconnections with adjacent Townships that can supply up to 2.7 MGD of potable water in the event of an emergency.

Carlisle’s water supply facilities have been constructed and are operated under the provisions of various permits issued by the Pennsylvania Department of Environmental Protection. These permits require that Carlisle provide water meeting Federal and State safe drinking water requirements.

Carlisle’s water plant produced an average of 2.48 MGD of water in 2018 with a permitted plant capacity of 7 MGD. **Therefore, the Borough has sufficient water supplies and treatment capacity to meet user demand well into the future.**

## 2018 Water Quality Table

This report is based upon tests conducted in 2018 by the Borough of Carlisle. Some of the contaminants listed below are monitored less than annually so the table may contain results from as long as 5 years ago if a contaminant was detected. The data presented below only includes contaminants that were found in detectable quantities. Carlisle routinely monitors for many other inorganic, organic, microbiological and radiological constituents in the water supply. In fact, water treatment plant and laboratory staff analyze or measure at least 140 parameters relating to water quality every day. This equates to many thousands of tests each year including multiple parameters tested continuously in real time to assure quality drinking water for our customers.

Chemical or Microbiological Contaminant	MCL In CCR Units	MCLG	Highest Level Detected	Range of Detection	Units or Sample Date	Violation YES/NO	Sources of Contamination
Chlorine <sup>1</sup> (Entry Point) (Distribution)	Minimum Disinfectant Residual = 0.2 MRDL = 4	n/a MRDLG=4	1.30 <sup>1</sup> 1.56 <sup>1</sup>	1.30 - 2.17 1.27 - 1.56	ppm	NO	Water additive used to control microbes
Fluoride*	2	2	1.46	0.17 - 1.46	ppm	NO	Erosion of natural deposits; water additive which promotes strong teeth; discharge from fertilizer & aluminum factories
Nitrate	10	10	4.6	3.0 - 4.6	ppm	NO	Runoff from fertilizer use; septic tank leaching, sewage; Erosion of natural deposits
Barium	2	2	0.036	single sample	ppm	NO	Discharge of drilling wastes; discharge from metal refineries; erosion of natural deposits
Total Haloacetic Acids (HAA)**	60	n/a	38.3	11.1 - 41.8	ppb	NO	By-product of drinking water disinfection (chlorination)
Total Trihalomethanes (TTHM's)**	80	n/a	39.9	9.4 - 63.2	ppb	NO	By-product of drinking water disinfection (chlorination)
Total Organic Carbon <sup>2</sup> (TOC)***	TT	n/a	34.8	34.8 - 54.5	% removal	NO	Naturally present in the environment

\* EPA's MCL for Fluoride is 4 ppm. However, Pennsylvania has set a lower MCL to better protect human health.

\*\* Compliance with the regulation for these disinfectant byproducts is based on a separate running annual average for four separate sample sites with the highest running annual average noted in the highest level detected column. The range of detections includes individual sample site data.

\*\*\*Total Organic Carbon provides a medium for the formation of disinfection byproducts such as trihalomethanes and haloacetic acids. We were required to remove at least 15 to 25% of the TOC based on the alkalinity of our source unless the source TOC was <2 ppm. The highest level detected is actually the least amount of TOC removed per quarter based on a running annual average.

Contaminant	Action Level (AL)	MCLG	90th Percentile Value	Units	# of Sites Above AL of Total Sites	Violation of TT YES/NO	Sources of Contamination
Copper	1.3	1.3	0.061	ppm	0 of 31	NO	Corrosion of household plumbing; erosion of natural deposits; leaching from wood preservatives
Lead	15	15	<2.0	ppb	0 of 31	NO	Corrosion of household plumbing systems; erosion of natural deposits

Contaminant	MCL	MCLG	Highest Level Detected	Violation of TT YES/NO	Sources of Contamination
Turbidity	TT = 1 NTU for a single measurement	0	0.05	NO	Soil runoff
	TT = at least 95% of monthly samples ≤ 0.3 NTU		100%	NO	

Turbidity is a measure of the cloudiness of the water. It is monitored because it is a good indicator of treatment plant filtration.

**Cryptosporidium** Cryptosporidium is a microbial pathogen found in surface waters throughout the U.S. Although filtration removes Cryptosporidium, the most commonly used filtration methods cannot guarantee 100% removal. The U.S. EPA issued a rule that requires public water systems of our size to monitor our source water for the presence of Cryptosporidium. Systems with higher levels of Cryptosporidium will have to provide additional treatment. Our monitoring in 2016 - 2018 indicated the presence of these organisms in our Conodoguinet Creek source water at a low level. 24 months of monitoring was completed in September 2018. At this time no additional treatment is required due to the low level of Cryptosporidium detected in our source water.

**Unregulated Contaminant Monitoring Rule 2** - Beginning in late 2008 through August 2009 we sampled for a series of unregulated contaminants. This will help EPA decide if these contaminants should have a standard set in the future. Monitoring has not detected the presence of any of these unregulated compounds. Additional information on this monitoring is available by calling 717-240-6991.

**Unregulated Contaminant Monitoring Rule 3** - From May 2014 - February 2015 we sampled quarterly for a list of 21 new unregulated contaminants. These contaminants are those that don't yet have a drinking water standard set by EPA. The purpose of this monitoring is to help EPA decide whether the contaminants should have a standard. The following table lists the contaminants that we have detected in 2014 to 2015. (Note that chromium does have an MCL of 100 ppb but is included here to compare with chromium-6)

**Detected Unregulated Contaminants - UCMR 3**

Unregulated Contaminant	Average Level Detected	Range of Detection	Units	Sources of Contamination
Chromium	0.38	0.28 - 0.47	ppb	Naturally occurring element; used in making steel and other alloys; chromium -3 or -6 forms are used for chrome plating, dyes and pigments, leather tanning, and wood preservation
Chromium-6	0.15	0.11 - 0.22	ppb	
Strontium	245	217 - 307	ppb	Naturally occurring elemental metal; historically used for faceplate glass of cathode-ray tube televisions to block x-ray emissions
Vanadium	only 1 of 8 samples had a detectable level of 0.22	ND - 0.22	ppb	Naturally occurring elemental metal; used as vanadium pentoxide which is a chemical intermediate and a catalyst
1,4 Dioxane	only 1 of 4 samples had a detectable level of 0.098	ND - 0.098	ppb	Cyclic aliphatic ether; used as a solvent or solvent stabilizer in manufacturing & processing of paper, cotton, textile products, automotive coolant, cosmetics & shampoos

**Unregulated Contaminant Monitoring Rule 4** - Beginning in November 2018 through most of 2019 three additional disinfection byproduct groups, and seventeen additional contaminants including two metals, eight pesticides plus one pesticide manufacturing byproduct, three alcohols and three semivolatiles organic chemicals as well as a group of ten cyanotoxins will be monitored. As noted above, unregulated contaminant monitoring helps EPA to determine where certain contaminants occur, and whether the Agency should consider regulating those contaminants in the future. The following table lists the new contaminants detected to date. Further information about UCMR3 or UCMR4 contaminants is available by contacting David Runkle, Laboratory Supervisor at 717-240-6991.

**Detected Unregulated Contaminants - UCMR 4**

Unregulated Contaminant	Average Level Detected	Range of Detection	Units	Sources of Contamination
Brominated Haloacetic Acid Groups (HAA)	2.07	0.51 - 4.61	ppb	By-product of drinking water disinfection. Includes Bromochloroacetic Acid, Bromodichloroacetic Acid & Chlorodibromoacetic Acid
Manganese	0.687	single sample	ppb	Naturally occurring element. By-product of drinking water treatment/disinfection (potassium permanganate addition).

**Key to Table**

**NTU**= Nephelometric Turbidity Units, measure of very small particulate matter in water.

**PCi/L** = picocuries per liter (a measure of radioactivity).

**ppm** = parts per million, or milligrams per liter (mg/l), the equivalent of 1 cent in \$10,000.

**ppb** = parts per billion, or micrograms per liter (ug/l), the equivalent of 1 cent in \$10,000,000.

**Minimum Residual Disinfectant Level:** The minimum level of residual disinfectant required at the entry point to the distribution system.

**Maximum Contaminant Level (MCL):** The highest level of a contaminant that is allowed in drinking water. MCL's are set as close to the MCLG's as feasible using the best available treatment technology.

**Maximum Contaminant Level Goal (MCLG):** The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLG's allow for a margin of safety.

**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.

**Maximum Residual Disinfectant Level Goal (MRDLG):** The level of a drinking water disinfectant below which there is no known or expected risk to health. MRDLG's do not reflect the benefits of the use of disinfectants to control microbial contamination.

**Action Level (AL):** The concentration of a contaminant that, if exceeded, triggers treatment or other requirements that a water system must follow. For example, the lead action level is that 90% of sample sites must be below 15 parts per billion of lead.

**Treatment Technique (TT):** Required process intended to reduce the level of a contaminant in drinking water (95% samples 0.3NTU).

**Water-Quality Table Footnotes**

- Free or total chlorine residual is measured in the water system to assure that the water supply is properly disinfected. The entry point value is the lowest level of chlorine detected at the water plant. The distribution system value is the highest monthly average level of chlorine detected among all of the distribution system sample sites.
- Compliance for TOC removal is based on a running annual average, therefore some of the data in the table is from 2017.

**Reporting**

Carlisle collected and submitted the required monthly raw and finished water Total Organic Carbon (TOC) samples for November to our outside environmental testing lab, ALS Environmental, Middletown PA, in a timely manner on November 7. Due to multiple errors by the contract lab, the TOC samples were not properly accounted for or analyzed properly. Carlisle was not notified about these errors by the laboratory until December, which precluded resampling within the month. This resulted in a failure to monitor notification from PA DEP for the November TOC samples. The situation remains under review by PA DEP at the time of this publication.

**Source Water Assessment Summary  
Carlisle Borough Municipal Authority  
Conodoguinet Creek Watershed**

**Introduction**

Pennsylvania Department of Environmental Protection (Pa. DEP) is required by the 1996 Safe Drinking Water Act to complete assessments of potential contaminants that may degrade the raw water quality of public drinking water sources. This Source Water Assessment and Protection (SWAP) Summary provides information to support local and state efforts to preserve raw water quality within the Conodoguinet Creek Watershed. The assessment covers the intake operated by the Carlisle Borough Municipal Authority (CBMA). The assessment addresses raw water quality only, not the finished drinking water distributed by the water suppliers.

**Drinking Water Sources**

The CBMA intake is located on the Conodoguinet Creek, near Carlisle, Cumberland County. Land use in the watershed is approximately 62% agriculture, 33% forested, and 5% developed lands. The remaining less than 1% is water and transitional land. Approximately 3 million gallons of water is withdrawn from the intake daily. The population served by the intake is approximately 27,000 to 30,000 people depending on the time of year. The communities served by the water supplier include Carlisle and surrounding areas.

**Water Quality and Water Treatment Information**

Raw water is filtered and treated with chlorine for disinfection, prior to being distributed to the customers. Additional information about treated water quality can be obtained from the water supplier's *Annual Water Supply Report*.

**Evaluation of Significant Potential Sources of Contamination**

The assessment addresses contaminants that may enter the water drawn from the Conodoguinet Creek. The contaminants evaluated in the assessment include regulated discharges and nonpoint sources of pollution. The table below describes the significant potential sources of contamination. Each source has been given a qualitative susceptibility rating according to its potential to impact the water supply source. An "A" rating represents the highest priority rating. An "F" rating is considered to be the lowest priority contaminant issue. The complete matrix analyses can be found in the full SWAP report.

**Table 1. – Contaminant Priority Listing for the Conodoguinet Creek Watershed**

Source of Contaminants	Protection Priority
Agriculture - crops	A
Agriculture - livestock	A
Urban Runoff	A
Industrial Discharges	B
Transportation Corridors	C
Sewage Treatment Facilities	C
Residential / Golf Courses	C
On-Lot Septic	D
Petroleum Storage Tanks, Gas/Service Stations	D
Landfills	E

As indicated above, agricultural activities, urban runoff, and potential for spills from industrial sites and transportation corridors are the most significant potential sources of contamination to Conodoguinet Creek. Increasing residential development also poses some threat to raw water quality. Lawn care chemicals, septic systems and increased runoff from these areas contribute to water quality degradation. However, no contaminants are found in concentrations that require the water supplier to significantly alter their treatment procedures.

**Ongoing Watershed Protection Activities**

Industrial and municipal discharges into the Conodoguinet Creek and its tributaries are controlled by state and federal regulations. Several efforts are also currently addressing problems associated with nonpoint source pollution. Several grant projects are focused on reducing agricultural runoff to selected tributaries in the Conodoguinet Creek Watershed.

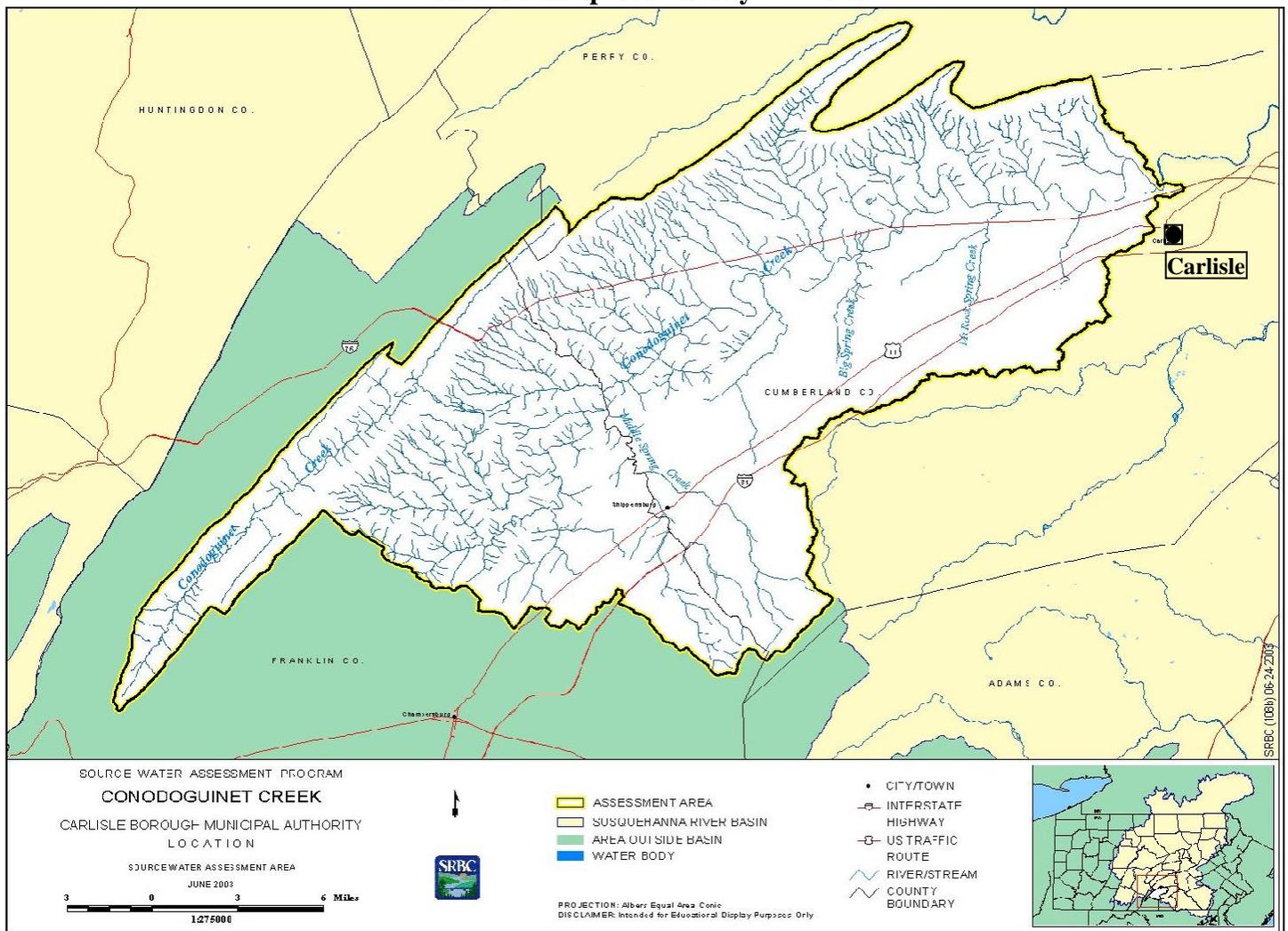
**Source Water Protection Needs**

Based on the assessment, several critical areas within the watershed require attention to reduce agricultural runoff. Best Management Practices would greatly diminish nutrient runoff from agricultural fields, and help to filter contaminants flushed from developed areas. An emergency response plan is available in the event of an accidental spill into the Conodoguinet Creek from a roadway or industrial facility.

**Additional Information**

The final SWAP report for the Carlisle Borough Municipal Authority intake is available from PA DEP.

## Carlisle Municipal Authority Watershed



### Additional Health Information

Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the Environmental Protection Agency's Safe Drinking Water Hotline at 800-426-4791.

The sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs, and wells. As water travels over the surface of the land or through the ground, it dissolves naturally occurring minerals and radioactive material, and can pick-up substances resulting from the presence of animals or from human activity. Contaminants that may be present in source water include:

- (A) Microbial contaminants, such as viruses and bacteria, which may come from sewage treatment plants, septic systems, agricultural livestock operations, and wildlife.
- (B) Inorganic contaminants, such as salts and metals, which can be naturally-occurring or result from urban storm runoff, industrial or domestic wastewater discharges, oil and gas production, mining or farming.
- (C) Pesticides and herbicides, which may come from a variety of sources such as agriculture, storm water runoff, and residential uses.
- (D) Organic chemical contaminants, including synthetic and volatile organics, which are by-products of industrial processes and petroleum production, and can also come from gas stations, urban storm water runoff and septic systems.
- (E) Radioactive contaminants, which can be naturally occurring or be the result of oil and gas production and mining activities.

### Water Hardness

Dissolved harmless minerals in water, such as calcium or magnesium, are responsible for that white residue in your coffee pot or on your showerhead. Carlisle's water is considered hard due to the amount of dissolved calcium and magnesium in our water source. The water hardness in Carlisle averages 151 ppm or mg/L, or expressed another way, 8.8 grains per gallon. The water will be harder during dry or drought periods than it will be during wet weather. Water hardness ranged from 84 - 237 ppm or 4.9 – 13.9 grains per gallon throughout the year.

**Why does the water sometimes taste or smell "funny"?** Some people do not like the taste of chlorine that is added to the water supply to kill germs. Also, as algae grow in surface water, such as the Conodoguinet Creek, they give off harmless, smelly chemicals that can cause unpleasant tastes in drinking water. This is more common during periods of drought. If you do not like the taste of the drinking water, store some in closed glass containers in the refrigerator. Warm drinking water has more "taste" than cold water.

**Information about Lead:**

If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with service lines and home plumbing. The Borough of Carlisle is responsible for providing high quality drinking water, but cannot control the variety of materials used in plumbing components. When your water has been sitting for several hours, you can minimize the potential for lead exposure by flushing your tap for 30 seconds to 2 minutes before using water for drinking or cooking. If you are concerned about lead in your water, you may wish to have your water tested. Information on lead in drinking water, testing methods, and steps you can take to minimize exposure is available from the Safe Drinking Water Hotline, 800-426-4791 or at <http://www.epa.gov/safewater/lead>.

**Special Notice To At Risk Populations**

*Some people may be more vulnerable to contaminants in drinking water than is the general population. Immuno-compromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. EPA/CDC guidelines on appropriate means to lessen the risk of infection by Cryptosporidium are available from the Safe Drinking Water Hotline (800-426-4791).*

In order to ensure that tap water is safe to drink, EPA prescribes regulations, which limit the amount of certain contaminants in water provided by public water systems. The FDA regulations establish limits for contaminants in bottled water, which must provide the same protection for public health.

Water quality data for community water systems throughout the United States is available at [www.waterdata.com](http://www.waterdata.com). Borough of Carlisle water plant staff are members of the American Water Works Association, which is dedicated to safe drinking water.



The Carlisle Borough Municipal Authority (Carlisle Water Treatment Plant) is a member of the **Partnership for Safe Water Program** (an association of water utilities and government) which is committed to drinking water quality far better than required by federal regulations.

**In 2010 Carlisle received the prestigious Phase IV Excellence in Water Treatment Award from the Partnership for Safe Water. This recognition signifies optimized water filtration plant performance. We are the first water utility in Pennsylvania to reach this milestone. We continue to meet this high level of water quality.**