

Emerging Contaminants

For more than 90 years, the Washington Suburban Sanitary Commission (WSSC) has met or exceeded federal and state safe drinking water standards. To assure our customers continue to get safe drinking water, WSSC and its partners in the industry have studied the issue of trace amounts of man-made chemicals, known as Emerging Contaminants (ECs) found in our drinking water. Emerging contaminants are commonly described as chemicals or materials that have a real or perceived threat to human health or the environment. These contaminants include endocrine disrupting compounds (EDCs), pharmaceutical drugs and personal care products (PPCPs).

Working with two regional partners and coordinating with the Metropolitan Washington Council of Governments (COG), WSSC collected samples from the Potomac and Patuxent rivers. Tests showed the presence of extremely small amounts of ECs in the area's water supply.

The U.S. Geological Survey (USGS) also recently analyzed samples drawn from the Potomac River and eight other selected U.S. rivers used as sources for public water systems. "Low level detection does not necessarily indicate a concern to human health, but rather indicates what types of chemicals we can expect to find in different areas of the country," said USGS lead scientist, Gregory Delzer. "Recent scientific advances have given USGS scientists the analytical tools to detect a variety of contaminants in the environment at low concentrations; often 100 to 1,000 times lower than drinking-water standards and other human-health benchmarks."

FAQs about Emerging Contaminants

Working with regional and national partners, the Washington Suburban Sanitary Commission (WSSC) tested the Potomac River source water, Patuxent River source water and its drinking water during the second quarter of 2008 for "emerging contaminants" or ECs.

Emerging contaminants are commonly described as chemicals or materials that have a real or perceived threat to human health or the environment or have a lack of published health standards. They include endocrine disrupting compounds (EDCs), pharmaceutical drugs and personal care products (PPCPs).

Is my drinking water safe?

Although a few EC compounds were detected, **WSSC drinking water is safe to consume.** The compounds detected were found at the part per billion or part per trillion levels. The best research to date does not demonstrate that there is a human health risk due to the extremely low levels that were found in WSSC's drinking water. One part per billion is equal to ½ teaspoon in an Olympic-size swimming pool. One part per trillion is equal to one drop in 26

Olympic-size swimming pools. Throughout our 90-year history, WSSC has always met or exceeded — and continues to meet or exceed — prevailing federal and state drinking water standards.

Should I use a filter or drink bottled water?

The best research to date does not demonstrate that there is a human health risk due to the extremely low levels of PPCPs or EDCs that may sometimes be present in drinking water. If you are concerned about this issue, we recommend that you consult your physician. If you choose to use home water filtration devices or bottled water to minimize risk, you would need to consult with manufacturers or providers of these alternatives on their ability to remove emerging contaminants.

How did WSSC know what to test for?

There are tens of thousands of compounds that are considered potential EDCs or PPCPs. The water suppliers carefully considered the most prudent use of their resources in researching a suitable list of compounds. We looked at the different influences on the Potomac River Watershed (industrial, agricultural uses, etc.) to determine which compounds are most likely to be present. We then looked at the various treatment processes used by the utilities to determine which compounds would not be readily removed through treatment. Finally, we looked at which compounds could be measured in water. Nineteen (19) compounds were chosen to test for in the source and treated waters.

What were the nineteen EC compounds WSSC tested for? What are they used for?

- 17 β -estradiol (natural human hormone)
- Atrazine (herbicide)
- Bisphenol A (used as an intermediate in the manufacture of plastics and resins)
- Butylbenzyl phthalate (plasticizer)
- Caffeine (stimulant)
- Carbamazepine (anti-epileptic pharmaceutical)
- DEHP [di(2-ethylhexyl)phthalate] (plasticizer)
- Dibutyl phthalate (plasticizer)
- Estrone (natural human hormone)
- Ethynyl estradiol (synthetic estrogenic pharmaceutical)
- Ibuprofen (anti-inflammatory pharmaceutical)
- Lindane (BHC-gamma) (insecticide)
- Linuron (herbicide)
- Methoxychlor (pesticide)
- Monensin (antibiotic)
- Naproxen (anti-inflammatory pharmaceutical)
- Nonylphenol (used as an intermediate in manufacture of chemicals and detergents)
- Octylphenol (used as an intermediate in manufacture of chemicals and

detergents)

- Sulfamethoxazole (antibacterial antibiotic)

Compounds found in June 2008 water testing

		Compounds Detected - June 2008				
		MRL	Atrazine (ug/L)	Carbamazepine (ug/L)	Sulfamethoxazole (ug/L)	Estrone (ug/L)
			0.1	0.001	0.002	0.0005
Source Water	Plant					
Potomac	Potomac-WSSC		0.1	0.012	0.003	ND
Patuxent	Patuxent-WSSC		0.3	0.001	ND	ND
						ND
In-Treatment	Process					
Potomac-WSSC	Filter Effluent		0.1	0.012	0.003	
Patuxent-WSSC	Settled		0.4	0.001	ND	
Finished Water	Plant					ND
Potomac	Potomac-WSSC		0.1	0.010	ND	ND
Patuxent	Patuxent-WSSC		0.3	ND	ND	ND
						ND
						ND

Note: Values in bold are the maximum values for each water type regardless of source.

What did you find in the Potomac River source water in 2008?

Not surprisingly, extremely small amounts of three compounds in the Potomac River source water were detected. They were:

- Atrazine – a commonly used herbicide for maize products – found at 0.1 parts per billion.
- Carbamazepine – an anti-epileptic medication – found at a maximum of 0.012 parts per billion; and
- Sulfamethoxazole – an antibiotic – found at 0.003 parts per billion.

What did you find in the Patuxent River source water?

There were also extremely small amounts of carbamazepine found in the source water (0.001 parts per billion). For atrazine, an extremely small amount (0.3

parts per billion) was detected in the source water.

Were any compounds found in WSSC's treated drinking water?

Atrazine and carbamazepine were found in the Washington Suburban Sanitary Commission's treated waters.

Atrazine was detected at a level of 0.1 parts per billion in the drinking water from the Potomac River, and at 0.3 parts per billion in the drinking water from the Patuxent River. This concentration of atrazine is ten times lower than the Maximum Contaminant Level (MCL) set by the EPA, which is 3 parts per billion. The concentration of carbamazepine was 0.010 parts per billion in the drinking water from the Potomac River, but none was detected in the Patuxent River drinking water. The detected level of carbamazepine in drinking water from the Potomac River is about 1,200 times lower than a conservatively estimated acceptable daily intake level of 12 parts per billion.

What does "extremely small" mean?

For these test results, the phrase "extremely small" means parts per billion or parts per trillion. One part per billion is equal to ½ teaspoon of an emerging contaminant in an Olympic-size swimming pool. One part per trillion is equal to one drop of an emerging contaminant in 26 Olympic-size swimming pools.

What does the presence of "emerging contaminants" mean to me?

The fact that a substance is detectable does not mean its presence is harmful to people. While more research is needed to fully understand the implications of extremely small levels of EDCs and PPCPs in water, the best research to date does not demonstrate that there is a human health risk due to the extremely low levels of emerging contaminants that may sometimes be present in drinking water.

People regularly consume or expose themselves to products containing emerging contaminants in much higher concentrations through medicines, foods, beverages and other sources. The levels in which they are found in drinking water are extremely small by comparison.

What is WSSC doing about this issue?

WSSC, along with other water utilities nationally, will continue to work to advance the science in the areas of understanding and treating EDCs and PPCPs in water.

- The Washington Suburban Sanitary Commission, Fairfax Water and the Washington Aqueduct founded the Potomac Partnership to promote and coordinate source water quality protection efforts in the Potomac watershed, including addressing emerging contaminant issues.
- The Washington Suburban Sanitary Commission, Fairfax Water and the Washington Aqueduct, along with many water utilities across the nation, have contributed to and participated with the American Water Works Association Research Foundation (AwwaRF) to study endocrine disruptors, personal care products and pharmaceuticals. To date,

AwwaRF has conducted 21 projects on this subject totaling approximately \$4.9 million.

- The Washington Suburban Sanitary Commission, Fairfax Water and the Washington Aqueduct will continue to work with regional and national partners to advance the science regarding these issues.

What other studies have been done recently?

On December 5, 2008, the United States Geological Survey (USGS) released a study on the water quality of nine community water systems across the nation. The USGS did not disclose the names of the utilities but one of the monitoring locations was the Potomac River. More than 270 compounds were analyzed from 2003-2005.

www.usgs.gov/newsroom/article.asp?ID=2086&from=rss_home

<http://water.usgs.gov/nawqa/swqa/>

Just prior to that, the American Water Works Association Research Foundation (AwwaRF) released a nationwide study of 62 emerging contaminants and their relevance to human health. Information on this study is available at www.awwarf.com/research/topicsandprojects/execSum/3085.aspx.

The USGS and AwwaRF studies had similar findings; that traces of various ECs can be found at extremely minute levels; there is no evidence that human health is affected at these levels; and that more research needs to be done on a national level where more resources are available.

Also, the US Department of Agriculture (USDA) has been monitoring the Potomac River water supply (along with a number of other locations nationwide) for nearly 400 ECs since 2006; data which has been released to date is available at www.ams.usda.gov/science/pdp/Index.htm.

Finally, USGS also collected one sample from each of our two source waters (Potomac and Patuxent) in June 2002. Similar to the more recent studies, trace levels of some ECs (17 in Potomac and 11 in Patuxent) were found, but the vast majority of the 230 compounds that were tested were not detected. The ECs found in these samples were all at part per billion or part per trillion levels and include:

- herbicides and their metabolites

 - alachlor

 - atrazine

 - metolachlor

 - simazine

 - bromacil

- household or personal care product compounds

 - caffeine

 - cholesterol

 - cotinine (metabolite of nicotine)

DEET (insecticide)
para-nonylphenol (detergent metabolite)
tri(2-chloroethyl)phosphate (flame retardant)
tri(dichlorisopropyl)phosphate (flame retardant)
tributyl phosphate (flame retardant)
pharmaceuticals
 carbamazepine (anti-epileptic)

There have been stories in media about sex changes in fish that are attributed to some of these same compounds. However, the AwwaRF study essentially concludes that humans should not be concerned about these same compounds in our drinking water. How can this be true?

The fish in those studies had been living in and feeding on organisms living in the source water, which is a far different level of exposure than the minute human exposure through drinking water. It is also important to note that, to date, no clear association has been established between the fish impacts and emerging contaminants present in the Potomac River.

For further background information, it might be useful to visit the following sites:

<http://www.awwa.org/Resources/topicspecific.cfm?ItemNumber=3647&navItemNumber=32969>

<http://www.waterresearchfoundation.org/research/TopicsAndProjects/topicSnapsHot.aspx?topic=EDCS>

<http://www.epa.gov/waterscience/ppcp/>