

Emerging Compound Periodic Testing Effort by Fairfax Water Quarterly Data for 2011 (updated 3/26/12)

There are tens of thousands of compounds emerging that are considered suspected Endocrine Disrupting Compounds or Pharmaceuticals and Personal Care Products. Fairfax Water carefully considered the most prudent use of its resources in researching a suitable list of compounds to test in both source and treated waters. We looked at influences in the Potomac and Occoquan River Watersheds (industrial, agricultural uses, etc.) to determine which compounds are most likely to be present. We then looked at our treatment process to determine which compounds would not be readily removed through treatment. Finally, we looked at which compounds could be measured in water. The list of compounds in the tables below were tested in the source and treated waters. Samples were sent to an independent laboratory proficient in this type of analysis.

Table 1

Source Waters (Water from the Potomac River or Occoquan Reservoir prior to any chemical or physical treatment application)												
Compounds	Common Use of Compound	EPA Maximum Contaminant Level for Drinking Water	Lowest level of instrument detection ⁽¹⁾	Occoquan Reservoir Data				Potomac River Data				# of 8 oz glasses of Treated drinking water per day ingested before exceeding Acceptable Daily Intake (ADI) Levels ⁽²⁾
				Mar-11	Jun-11	Sep-11	Dec-11	Mar-11	Jun-11	Sep-11	Dec-11	
Atrazine	Commonly used herbicide for maize crops	3 ppb	0.1 ppb	ND	1.4	ND	ND	ND	0.8	ND	ND	18 glasses if at 1.4 ppb concentration
Desethylatrazine	Metabolite of herbicide Atrazine		1.0 ppb	ND	ND	ND	ND	ND	ND	ND	ND	25 glasses if at detection level
Desisopropylatrazine	Metabolite of herbicide Atrazine		1.0 ppb	ND	ND	ND	ND	ND	ND	ND	ND	25 glasses if at detection level
Di-n-butyl phthalate	Plasticizer		2.0 ppb	ND	ND	ND	ND	ND	ND	ND	ND	59 glasses if at detection level
Di(2-ethylhexyl)phthalate	Plasticizer	6 ppb	0.6 ppb	ND	ND	ND	ND	ND	ND	ND	ND	85 glasses if at detection level
Simazine	Pesticide	4 ppb	0.07 ppb	ND	0.36	ND	ND	ND	0.16	ND	ND	84 glasses if at 0.36 ppb concentration
17beta-Estradiol	Natural human hormone		0.5 ppt	ND	ND	ND	ND	ND	ND	ND	ND	30,456 glasses if at detection level
Estrone	Natural human hormone		0.5 ppt	0.6	ND	ND	0.7	ND	0.9	ND	ND	4,324 glasses at a 0.9 ppt concentration
17alpha-Ethinyl estradiol	Synthetic estrogen drug		0.5 ppt	ND	ND	ND	ND	ND	ND	ND	ND	59 glasses if at detection level
Progesterone	Natural human hormone		0.1 ppt	ND	ND	0.1	0.2	ND	0.1	0.1	0.1	1,480,500 glasses if at 0.2 ppt concentration
Caffeine	Stimulant		0.05 ppb	ND	ND	ND	ND	ND	ND	ND	ND	14,805,000 glasses if at detection level
Carbamazepine	Anti-epileptic drug		0.001 ppb	0.001	0.004	0.001	ND	0.001	0.006	0.003	0.002	16,920 glasses at a 0.006 ppb concentration
Ciprofloxacin	Antibiotic		0.05 ppb	ND	ND	ND	ND	ND	ND	ND	ND	2,876 glasses if at detection level
DEET	Insecticide		0.005 ppb	0.008	0.015	0.034	0.029	ND	0.058	0.009	0.006	11,815 glasses at a 0.058 ppb concentration
Monensin	Antibiotic		0.001 ppb	ND	ND	ND	ND	ND	ND	ND	ND	3,637,800 glasses if at detection level
Sulfamethoxazole	Antibacterial antibiotic		0.001 ppb	0.004	0.006	0.003	0.003	0.005	0.009	0.009	0.004	16,920,000 glasses at a 0.009 ppb concentration
Ibuprofen	Anti-inflammatory pharmaceutical		0.05 ppb	ND	ND	ND	ND	ND	ND	ND	ND	2,369 glasses if at detection level
Naproxen	Anti-inflammatory pharmaceutical		0.002 ppb	0.003	ND	ND	ND	0.005	ND	ND	ND	33,840,000 glasses at a 0.005 ppb concentration
Salicylic acid	Skin care product ingredient		0.05 ppb	ND	ND	ND	ND	ND	ND	ND	ND	9,137 glasses if at detection level
Bisphenol A	Intermediate in manufacture of plastics and resins		100 ppt	ND	ND	ND	ND	ND	ND	ND	ND	152,280 glasses if at detection level
TCEP	Flame retardant - Plasticizer		10 ppt	ND	ND	12	ND	ND	ND	ND	ND	3,102 glasses if at 12 ppt concentration
2,4-D	Herbicide	70,000 ppt	5.0 ppt	44	55	58	40	19	242	5.9	6.9	2,447 glasses at a 242 ppt concentration
Diuron	Herbicide		1.0 ppt	3.2	125	25	8.1	1.2	4.1	2.1	1.3	4,738 glasses at a 125 ppt concentration
Hexavalent Chromium*	Used in manufacture of paints		0.02 ppb	0.057	ND	0.048	0.045	ND	ND	0.047	0.057	Not yet determined (in research)
Perchlorate*	Ingredient of explosives, fertilizers		0.5 ppb	ND	ND	ND	ND	ND	ND	ND	ND	254 glasses if at detection level

Treated Waters (Water which has been physically and chemically treated to drinking water quality)												
Compounds	Common Use of Compound	EPA Maximum Contaminant Level for Drinking Water	Lowest level of instrument detection ⁽¹⁾	Griffith Treatment Plant Data				Corbalis Treatment Plant Data				# of 8 oz glasses of Treated drinking water per day ingested before exceeding Acceptable Daily Intake (ADI) Levels ⁽²⁾
				Mar-11	Jun-11	Sep-11	Dec-11	Mar-11	Jun-11	Sep-11	Dec-11	
Atrazine	Commonly used herbicide for maize crops	3 ppb	0.1 ppb	ND	0.3	ND	ND	ND	0.3	ND	ND	85 glasses if at 0.3 ppb concentration
Desethylatrazine	Metabolite of herbicide Atrazine		1.0 ppb	ND	ND	ND	ND	ND	ND	ND	ND	25 glasses if at detection level
Desisopropylatrazine	Metabolite of herbicide Atrazine		1.0 ppb	ND	ND	ND	ND	ND	ND	ND	ND	25 glasses if at detection level
Di-n-butyl phthalate	Plasticizer		2.0 ppb	ND	ND	ND	ND	ND	ND	ND	ND	59 glasses if at detection level
Di(2-ethylhexyl)phthalate	Plasticizer	6 ppb	0.6 ppb	ND	ND	ND	ND	ND	ND	ND	ND	85 glasses if at detection level
Simazine	Pesticide	4 ppb	0.07 ppb	ND	ND	ND	ND	ND	0.08	ND	ND	423 glasses if at 0.08 ppb concentration
17beta-Estradiol	Natural human hormone		0.5 ppt	ND	ND	ND	ND	ND	ND	ND	ND	30,456 glasses if at detection level
Estrone	Natural human hormone		0.5 ppt	ND	ND	ND	ND	ND	ND	ND	ND	7,783 glasses if at detection level
17alpha-Ethinyl estradiol	Synthetic estrogen drug		0.5 ppt	ND	ND	ND	ND	ND	ND	ND	ND	59 glasses if at detection level
Progesterone	Natural human hormone		0.1 ppt	ND	ND	ND	ND	ND	ND	ND	ND	2,961,000 glasses if at detection level
Caffeine	Stimulant		0.05 ppb	ND	ND	ND	ND	ND	ND	ND	ND	14,805,000 glasses if at detection level
Carbamazepine	Anti-epileptic drug		0.001 ppb	ND	ND	ND	ND	ND	ND	ND	ND	101,520 glasses if at detection level
Ciprofloxacin	Antibiotic		0.05 ppb	ND	ND	ND	ND	ND	ND	ND	ND	2,876 glasses if at detection level
DEET	Insecticide		0.005 ppb	ND	ND	ND	ND	ND	0.015	ND	0.039	17,571 glasses if at 0.039 ppb concentration
Monensin	Antibiotic		0.001 ppb	ND	ND	ND	ND	ND	ND	ND	0.004	909,450 glasses if at 0.004 ppb concentration
Sulfamethoxazole	Antibacterial antibiotic		0.001 ppb	ND	ND	ND	ND	ND	ND	ND	ND	152,280,000 glasses if at detection level
Ibuprofen	Anti-inflammatory pharmaceutical		0.05 ppb	ND	ND	ND	ND	ND	ND	ND	ND	2,369 glasses if at detection level
Naproxen	Anti-inflammatory pharmaceutical		0.002 ppb	ND	ND	ND	ND	ND	ND	ND	ND	84,600,000 glasses if at detection level
Salicylic acid	Skin care product ingredient		0.05 ppb	ND	ND	ND	ND	ND	ND	ND	ND	9,137 glasses if at detection level
Bisphenol A	Intermediate in manufacture of plastics and resins		100 ppt	ND	ND	ND	ND	ND	ND	ND	ND	152,280 glasses if at detection level
TCEP	Flame retardant - Plasticizer		10 ppt	ND	14	14	ND	ND	ND	ND	ND	2,659 glasses if at 14 ppt concentration
2,4-D	Herbicide	70,000 ppt	5.0 ppt	ND	11	ND	9.4	ND	60	5.8	ND	9,870 glasses if at 60 ppt concentration
Diuron	Herbicide		1.0 ppt	ND	ND	ND	ND	ND	ND	ND	ND	592,200 glasses if at detection level
Hexavalent Chromium*	Used in manufacture of paints		0.02 ppb	ND	0.083	0.088	0.076	ND	0.12	0.062	0.067	Not determined (in research)
Perchlorate*	Ingredient of explosives, fertilizers		0.5 ppb	ND	2.2	ND	ND	ND	ND	ND	ND	58 glasses if at 2.2 ppb concentration

Key to terms: ND = Non-Detect

* Compound added to Fairfax Water's research list due to EPA recent interest in health effects.

ppb = part per billion ppt = part per trillion

Acceptable Daily Intake or ADIs is a measure of the amount of a specific substance in food or drinking water that can be ingested orally over a lifetime without an appreciable health risk.

⁽¹⁾ Lowest Level of Instrument Detection is the concentration at which the compound cannot be enumerated lower than, and thus the result termed a Non-Detect (N)

⁽²⁾ Source of information obtained from a review of ADI's and correlated data by Intertox, Inc. April 2009 and September 2010; and the Water Research Foundation 2008 Publication 91 Toxicological Relevance of EDC's and Pharmaceuticals in Drinking Water

Additional information about water quality can be viewed at <http://www.fairfaxwater.org/water/index.htm>.