Emerging Compound Periodic Testing Effort by Fairfax Water

Quarterly Data for 2013 (updated 3/19/14mab)

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			
				Mar-13	Jun-13	Sep-13	Dec-13	Mar-13	Jun-13	Sep-13	Dec-13
Atrazine	Commonly used herbicide for maize crops	3 ppb	0.1 ppb	ND	0.4	0.1	ND	ND	ND	ND	ND
Desethylatrazine	Metabolite of herbicide Atrazine		1.0 ppb	ND	ND	ND	ND	ND	ND	ND	ND
Desisopropylatrazine	Metabolite of herbicide Atrazine		1.0 ppb	ND	ND	ND	ND	ND	ND	ND	ND
Di-n-butyl phthalate	Plasticizer		2.0 ppb	ND	ND	ND	ND	ND	ND	ND	ND
Di(2-ethylhexyl)phthalate	Plasticizer	6 ppb	0.6 ppb	ND	ND	ND	ND	ND	ND	ND	ND
Simazine	Pesticide	4 ppb	0.07 ppb	ND	ND	ND	ND	ND	ND	ND	ND
17beta-Estradiol	Natural human hormone		0.5 ppt	ND	ND	ND	ND	ND	ND	ND	ND
Estrone	Natural human hormone		0.5 ppt	ND	ND	ND	ND	ND	0.7	ND	ND
17alpha-Ethynyl estradiol	Synthetic estrogen drug		0.5 ppt	ND	ND	ND	ND	ND	ND	ND	ND
Progesterone	Natural human hormone		0.1 ppt	0.1	ND	ND	0.1	0.2	0.2	0.1	0.2
Caffeine	Stimulant		0.05 ppb	ND	0.05	ND	ND	ND	0.05	ND	ND
Carbamazepine	Anti-epileptic drug		0.001 ppb	0.005	0.007	0.005	0.004	0.005	ND	0.012	0.003
Ciprofloxacin	Antibiotic		0.05 ppb	ND	ND	ND	ND	ND	ND	ND	ND
DEET	Insecticide		0.005 ppb	0.009	0.021	0.058	0.013	ND	0.112	0.033	ND
Monensin	Antibiotic		0.001 ppb	ND	ND	ND	ND	ND	ND	ND	ND
Sulfamethoxazole	Antibacterial antibiotic		0.001 ppb	0.008	0.010	0.006	0.007	0.016	0.003	0.020	0.007
Ibuprofen	Anti-inflammatory pharmaceutical		0.05 ppb	ND	ND	ND	0.12	ND	ND	ND	ND
Naproxen	Anti-inflammatory pharmaceutical		0.002 ppb	ND	ND	ND	ND	0.008	ND	ND	ND
Salicylic acid	Skin care product ingredient		0.05 ppb	0.05	ND	ND	ND	0.06	0.05	ND	ND
Bisphenol A	Intermediate in manufacture of plastics and resins		100 ppt	ND	ND	ND	ND	ND	ND	ND	ND
TCEP	Flame retardant - Plasticizer		10 ppt	ND	20	13	12	ND	29	ND	ND
2,4-D	Herbicide	70,000 ppt	5.0 ppt	49	240	130	290	7.2	2800	19	9.8
Diuron	Herbicide		1.0 ppt	3.4	25	39	6.4	ND	110	8.6	4.9
Hexavalent Chromium*	Used in manufacture of paints		0.02 ppb	0.10	ND	ND	0.077	0.081	0.031	0.021	0.059
Perchlorate*	Ingredient of explosives, fertilizers		0.5 ppb	ND	**	ND	ND	ND	**	ND	ND

Table 2

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			
				Mar-13	Jun-13	Sep-13	Dec-13	Mar-13	Jun-13	Sep-13	Dec-13
Atrazine	Commonly used herbicide for maize crops	3 ppb	0.1 ppb	ND	ND	ND	ND	ND	ND	ND	ND
Desethylatrazine	Metabolite of herbicide Atrazine		1.0 ppb	ND	ND	ND	ND	ND	ND	ND	ND
Desisopropylatrazine	Metabolite of herbicide Atrazine		1.0 ppb	ND	ND	ND	ND	ND	ND	ND	ND
Di-n-butyl phthalate	Plasticizer		2.0 ppb	ND	ND	ND	ND	ND	ND	ND	ND
Di(2-ethylhexyl)phthalate	Plasticizer	6 ppb	0.6 ppb	ND	ND	ND	ND	ND	0.6	ND	ND
Simazine	Pesticide	4 ppb	0.07 ppb	ND	ND	ND	ND	ND	ND	ND	ND
17beta-Estradiol	Natural human hormone		0.5 ppt	ND	ND	ND	ND	ND	ND	ND	ND
Estrone	Natural human hormone		0.5 ppt	ND	ND	ND	ND	ND	ND	ND	ND
17alpha-Ethynyl estradiol	Synthetic estrogen drug		0.5 ppt	ND	ND	ND	ND	ND	ND	ND	ND
Progesterone	Natural human hormone		0.1 ppt	ND	ND	ND	ND	ND	ND	ND	ND
Caffeine	Stimulant		0.05 ppb	ND	ND	ND	ND	ND	ND	ND	ND
Carbamazepine	Anti-epileptic drug		0.001 ppb	ND	ND	ND	ND	ND	ND	0.001	ND
Ciprofloxacin	Antibiotic		0.05 ppb	ND	ND	ND	ND	ND	ND	ND	ND
DEET	Insecticide		0.005 ppb	ND	ND	0.006	ND	ND	0.008	0.012	ND
Monensin	Antibiotic		0.001 ppb	ND	ND	ND	ND	ND	ND	ND	ND
Sulfamethoxazole	Antibacterial antibiotic		0.001 ppb	ND	ND	ND	ND	ND	ND	0.001	ND
Ibuprofen	Anti-inflammatory pharmaceutical		0.05 ppb	ND	ND	ND	ND	ND	ND	ND	ND
Naproxen	Anti-inflammatory pharmaceutical		0.002 ppb	ND	ND	ND	ND	ND	ND	ND	ND
Salicylic acid	Skin care product ingredient		0.05 ppb	ND	ND	ND	ND	ND	ND	ND	ND
Bisphenol A	Intermediate in manufacture of plastics and resins		100 ppt	ND	ND	ND	ND	ND	ND	ND	ND
TCEP	Flame retardant - Plasticizer		10 ppt	ND	ND	26	10	ND	ND	ND	ND
2,4-D	Herbicide	70,000 ppt	5.0 ppt	20	18	14	95	ND	23	ND	8.4
Diuron	Herbicide		1.0 ppt	ND	23	ND	ND	ND	ND	ND	ND
Hexavalent Chromium*	Used in manufacture of paints		0.02 ppb	0.11	0.089	0.060	0.11	0.088	0.041	0.070	0.070
Perchlorate*	Ingredient of explosives, fertilizers		0.5 ppb	ND	**	ND	ND	ND	**	ND	ND

Key to terms: ND = Non-Detect ppb = part per billion ppt = part per trillion

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

** Data not available for 2nd Q 2013 perchlorate samples due to instrument troubleshooting.

[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 (ND).

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