

The New Hampshire PFCs/PFAS Investigation

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- PFCs as Emerging Contaminants
- NH Regulatory Framework for PFCs
- Status of NH PFC Investigations
- Human Blood Testing
- Public Messaging/Challenges
- Q & A

Magnitude of the Issue

- Over 30 million dollars has been allocated for addressing PFCs at a couple of sites in NH. A full state-wide assessment is just beginning......
- Since March 2016 NH has sampled over 2,000 sources of drinking water for PFCs
 - 600+ homes on wells are been provided bottled water d
 - Public water systems are being extended to these homes (20+ miles of pipe)
 - March 2016 to Present NH has sampled over 2,000 sources of drinking water for PFCs



PFCs –

Just Not Another New Contaminant

- Two sites in NH Contaminated by Air Emissions
 - Undermines traditional waste site investigation/source water protection
 - Has caused contamination over standard over 30 sq. miles
- Its presence in drinking water is measurable in our residents' blood – health implication is not known
- Currently have standards for only two out of dozens of PFCs
- Short-term exposure is considered a health risk
- Public in NH is demanding "0". Other states contemplating standards 3-5 times lower than NH



The Expansive Use of PFCs

Commercial Products	Industrial Uses				
Cookware (Teflon®, Nonstick)	Photo Imaging				
Fast Food Containers	Metal Plating				
Candy Wrappers	Semiconductor Coatings				
Microwave Popcorn Bags	Aviation Hydraulic Fluids				
Personal Care Products (Shampoo, Dental	Medical Devices				
Floss)	Firefighting Aqueous Film-Forming Foam				
Cosmetics (Nail Polish, Eye Makeup)	Insect Baits				
Paints and Varnishes	Printer and Copy Machine Parts				
Stain Resistant Carpet	Chemically Driven Oil Production				
Stain Resistant Chemicals (Scotchgard®)	Textiles, Upholstery, Apparel and Carpets				
Water Resistant Apparel (Gore-Tex®)	Paper and Packaging				
Cleaning Products	Rubber and Plastics				
Electronics					
Ski Wax					

PFOA/PFOS Exposure Decreasing

- Most people have been exposed to PFOA/PFOS through everyday commercial products
- In 2006, PFOA/PFOS manufacturers joined an EPA global stewardship program:
 - Phased out by the end of 2015
- Materials imported not really addressed
- PFC chemistry is complex and PFOA and PFOS still show up in processes using other types of PFCs

Health Effects Being Studied

- Changes to the liver enzymes Tevels
- Increases in total cholesterol levels
- Increases in uric acid levels, which may affect blood pressure
- Changes in sex hormone levels that could affect reproductive development and puberty
- Changes in thyroid hormone levels
- Lower immune function (lower antibody response to immunization)
- Growth and development (lower birth weight in infants, obesity in adolescents/adults, cognitive and behavioral development)
- Decreased kidney function

- Incidence of insulin resistance and diabetes
- Occurrence of some types of cancers: prostate,
 - kidney, and testicular cancer



NH Regulatory Framework



PFCs as an Emerging Contaminant and EPA's Provisional Health Advisory

- PFOA/PFOS are not currently regulated under the Safe Drinking Water Act
- > 2009 EPA established a Provisional Health Advisory (PHA):
 - 400 parts per trillion (ppt) PFOA
 - 200 ppt PFOS
- The PHA was a health-based concentration, above which action should be taken to reduce exposure to PFOA through drinking water

The PHA was based upon short-term exposure



New Lifetime Health Advisories for PFOA and PFOS

- May 19, 2016 USEPA issued lifetime health advisories for PFOA and PFOS
- PFOA: 70 parts per trillion (ppt)
- PFOS: 70 ppt
- Combined PFOA and PFOS: 70 ppt
- Advisories set by USEPA based upon most sensitive human receptors
- NHDES reviewed and concluded to be appropriate and protective of public health



- May 31, 2016 NHDES filed an emergency rule to adopt ambient groundwater quality standards (AGQS) – rule became permanent October 22, 2016
- PFOA: 0.07 µg/l or 70 parts per trillion (ppt)
 PFOS: 0.07 µg/l or 70 ppt
 Combined PFOA and PFOS: 0.07 µg/l or 70 ppt
- AGQS is enforceable for purposes of site remediation requirements, provision of alternate drinking water, and for public water systems



- Monitor evolution of health effects data
 - PFOA and PFOS
 - Other PFCs
- Consider further regulation of PFOA/PFOS
 - Hazardous waste listing?
 - Additional regulation of air emissions?
- Implications for wastewater discharges
 - Ability to control influent
 - Ability to treat effluent



Status of NH PFC Investigation



Large Contamination Sites in NH

- Pease Trade Port
 - Airplane crashes
 - Fire training
 - Leaks
 - Contaminated one large PWS well over standards and threatens two others
- Dover Madbury Metals
 - Contaminated one large PWS over standard and threatens others
- Saint Gobain (Merrimack, Litchfield, Manchester, Londonderry& Bedford)
 - Two large water supply wells & several small PWS wells
 Hundreds of private wells
- TCI Amherst (Amherst)
 - Dozens of private wells

SAMPLING STATUS FOR PFCs IN NEW HAMPSHIRE (1/11/17)

SAMPLES	APPOINTMENTS	RESULTS	PFOA & PFOS	PFOA & PFOS	PFOA & PFOS	PFOA & PFOS
	SCHEDULED	RECEIVED	<10	10 - <45	45 - <70	≥70
843	13	774	223	286	82	183
235	4	209	111	62	15	21
114		114	73	37	2	2
11	3	7	3			4
44		44	41	3		
30		30	30			
81	2	44	39	5		
28		28	18	8	2	
6		6	5	1		
21		9	6			3
41	2	18	4	9	1	4
17		14	11	2	1	
15		15	3	10		2
24	2	24	18	4		2
9		9	6	2	1	
16		16	9	3	4	
4		4	3			1
5		5	4		1	
75		68	63	4	1	
1619	26	1438	670	436	110	222
	SAMPLES 843 235 114 235 114 11 44 30 81 28 6 21 41 17 15 24 9 16 24 9 16 4 5 75 1619	SAMPLES APPOINTMENTS SCHEDULED 843 13 235 4 114 - 114 3 44 - 30 - 81 2 28 - 6 - 21 - 41 2 17 - 15 - 24 2 9 - 16 - 4 - 5 - 75 - 1619 26	SAMPLESAPPOINTMENTS SCHEDULEDRESULTS RECEIVED843137423542091141141141137441443030308124428282861621288171414151414151415242249161641555575261438	SAMPLES APPOINTMENTS SCHEDULED RESULTS RECEIVED PFOA & PFOS <10 843 13 774 223 235 4 209 111 114 73 111 114 73 3 11 3 7 3 44 41 30 30 81 2 44 39 28 1 3 30 6 2 28 18 6 5 1 1 17 2 18 4 16 1 1 1 17 1 1 1 15 3 3 3 24 2 24 18 9 6 1 1 16 9 3 1 17 1 16 9 1 16 9 3 1 1 16 6<	APPOINTMENTS SCHEDULED RESULTS RECEIVED PFOA & PFOS <10 PFOA & PFOS 10 PFOA & PFOS 11 PFOA & PFOS 10 PFOA & PFOS 10 PFOA & PFOS 11 PFOA & PFOS 10 PFOA & PFOS 10 PFOA & PFOS 11 PFOA & PFOS 10 PFOA & PFOS 10	SAMPLES APPOINTMENTS SCHEDULED RESULTS RECEIVED PFOA & PFOS <10 - <45 PFOA & PFOS 45 - <70 843 13 774 223 286 82 235 4 209 111 62 15 114 73 37 2 2 114 73 37 2 2 114 73 37 2 2 114 73 37 2 2 114 3 7 3 7 2 114 3 7 3 7 2 2 114 14 73 3 7 2 2 114 14 11 3 1 1 2 1 1 110 2 18 14 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1





Performance Plastics



MW-03

Alternate Water

- ~600 properties on bottled water
- POU systems
- Long-term solutions
 - Litchfield
 - Manchester
 - Merrimack
 - Bedford
 - Amherst



Identified Pre Bid (11)

Additional In Service Area (38)

Additional Outside Service Area (26)



- Manchester Water Works Brown Avenue, Manchester
 - 26 +/- connections nearly complete
- Pennichuck Water Works Litchfield
 - 400+ connections planned
 - Several miles of main and 100+/- connections completed
 - Remainder in 2017
- Merrimack Village District Merrimack
 - 15 +/- connections in process
- Pennichuck Water Works Amherst
 - 7+/- connections this fall
 - 100+/- in planning stage for 2017
- MVD or MWW Bedford

Pre-design stage – 60+ connections

Kingston Fire Department





PFC INVESTIGATION January 3, 2017 PFOA + PFOS (PPT)



Sampling Status



Distribution

Undeveloped

Sampling Candidates

Transportation

- US/ NH Route
- Road
- Driveway

Political Boundary



Summary of PFOA/PFOS Data Public Water System Sampling in NH (partial data)

- Approximately 400 water sources have been sampled
 - 69% Not Detected (reporting limits ranged from (0.7-40 ppt)
 - 23% <= 10 parts-per-trillion
 - 4% 10-20 parts-per-trillion
 - 4% >= 20 parts-per-trillion
- Frequency of detection increases if non-regulated PFCs are included
- Frequency of detection increases if only data with very low reporting limits are shown



- Reviewing other potential source facilities
 - Information requests/inspections/sampling
- Targeted public water supply sampling near high-risk activities
- Voluntary Public Water System Sampling Request Letter
- Letter to fire departments, health officers and town administrators about Class B Firefighting Foam/AFFF to be issued soon



- Initial letter to stakeholders Nov 2016
 - 800-1000 sites to be sampled over the next couple of years
- Web page additions
- Training
 - NEWMOA
 - NHDES
 - Analytical methods, target analyte list, sampling SOP, guidance materials, electronic data uploads, health effects
- Incorporate as a contaminant of concern

What Level is "Non Detect"? What compounds to look for? What to do with results for compounds with no health guidance values?

- EPA 537 Method covers 14 compounds most labs report 6 of these
- More modern analytical method (isotope dilution) include 20+ compounds and have lower reporting limits.
 - "In-house" lab methods
 - Should accreditation be required?
 - Do data from lab to lab compare well? Not always
 - Need to make sure labs are reporting BOTH linear and branched isomers of PFOA

NHDES requires/recommends lower reporting limits

Lab Discrepancies

- Labs performing PFC testing interpret Method 537 differently
 - Some labs only report linear isomers of PFOA only
 - Some lab report both branched and linear isomers
 - Different Types of PFOA
 - 3M PFOA (30% branched isomer / 70% linear isomer)
 - Dupont (linear isomer only)
 - NHDES split samples have varied by 20%-40% between labs when branched isomers are not accounted for
 - NHDES/EPA Region 1
 staff documented this issue
 -PE sampling
 -Split sampling
 EPA HQ recently provided
 guidance



Southern NH and Pease (round 2) PFC Blood Testing Program Are Ongoing

New Hampshire PFC Testing Program Data: July 15, 2016 - January 13, 2016

	MVD#	Southern NH	Pease	Total
Completed registrations	193	279	487	959
Laboratory requisitions mailed to eligible participants	178	275	482	935
Blood samples received at DHHS	102	178	224	504
Blood samples sent to testing lab	73	176	223	472
Test results back from testing lab	0	147	175	322
Test results mailed to participants*	0	0	0	0

Round 1 Testing Results for Pease: <u>http://www.dhhs.nh.gov/dphs/pfcs/blood-testing.htm</u>

Comparison of Average Blood PFOS Levels in Various U.S. Populations to NH Pease Adolescents/Adults (Age ≥ 12) and Children (Age < 12)



Average PFOS Levels in Blood (Micrograms per liter)

Comparison of Average Blood PFOA Levels in Various U.S. Populations to NH Pease Adolescents/Adults (Age \geq 12) and Children (Age < 12)



Average PFOA Levels in Blood (Micrograms per Liter)

Public Messaging/Concerns

- Some members of the public and toxicologists are demanding "0" PFOA/PFOS
 - Water systems using labs with low reporting limits likely detect PFCs and suddenly have a PR issue.
 - Cite proposed standards in NJ or a standard in VT
 - NH is one of the few states that have adopted a standard and is broadly sampling for PFOA & PFOS
 - NH has a lot of detects because we are addressing the issue
 - Other states contemplating very low standards have not committed to rigorous testing
 - Other important exposure pathways (especially building interiors) are not being addressed
- Understanding of relative risk is missing. Should also be concerned about
 - Radon, arsenic, manganese, sodium, nitrate/nitrate, uranium, bacteria.....

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Questions and Answers