



MISSOURI
DEPARTMENT OF
NATURAL RESOURCES

PFOS and PFOA in Missouri

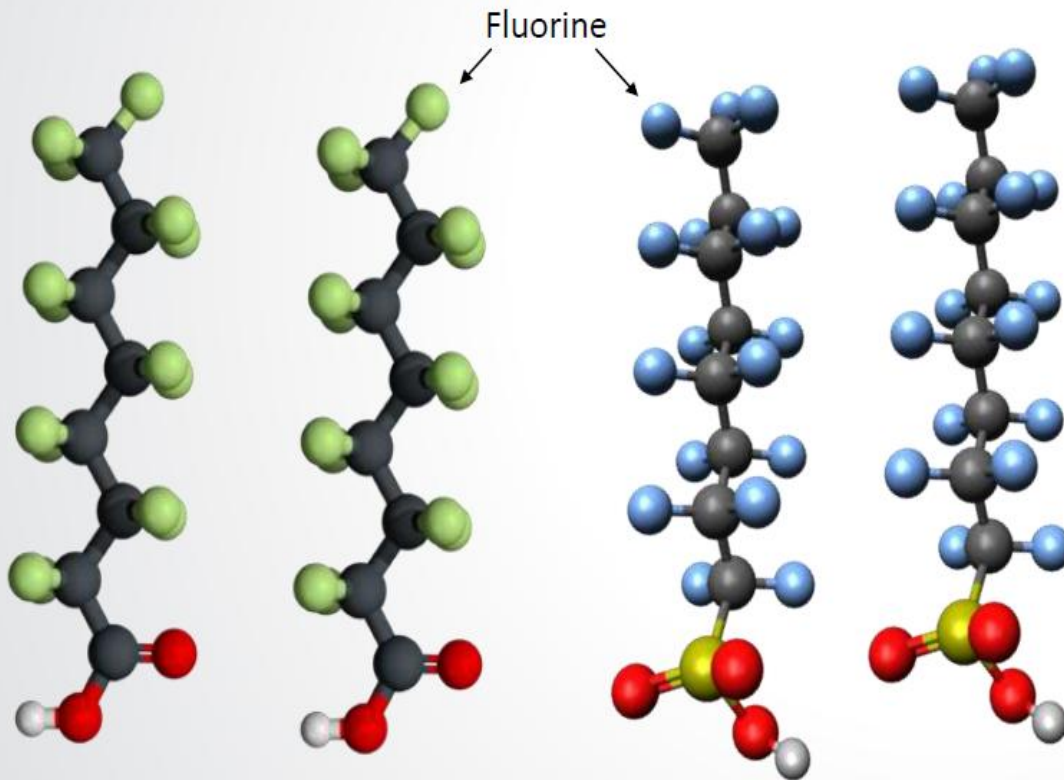
Targeted Sampling Done for Public Drinking Water Systems

Eric Medlock

Per- and Polyfluoroalkyl Substances (PFAS)

➤ A class of man-made chemicals

- Chains of carbon (C) atoms surrounded by fluorine (F) atoms
 - Water-repellent (hydrophobic)
 - Stable C-F bond
- Some PFAS include oxygen, hydrogen, sulfur and/or nitrogen atoms, creating a polar end

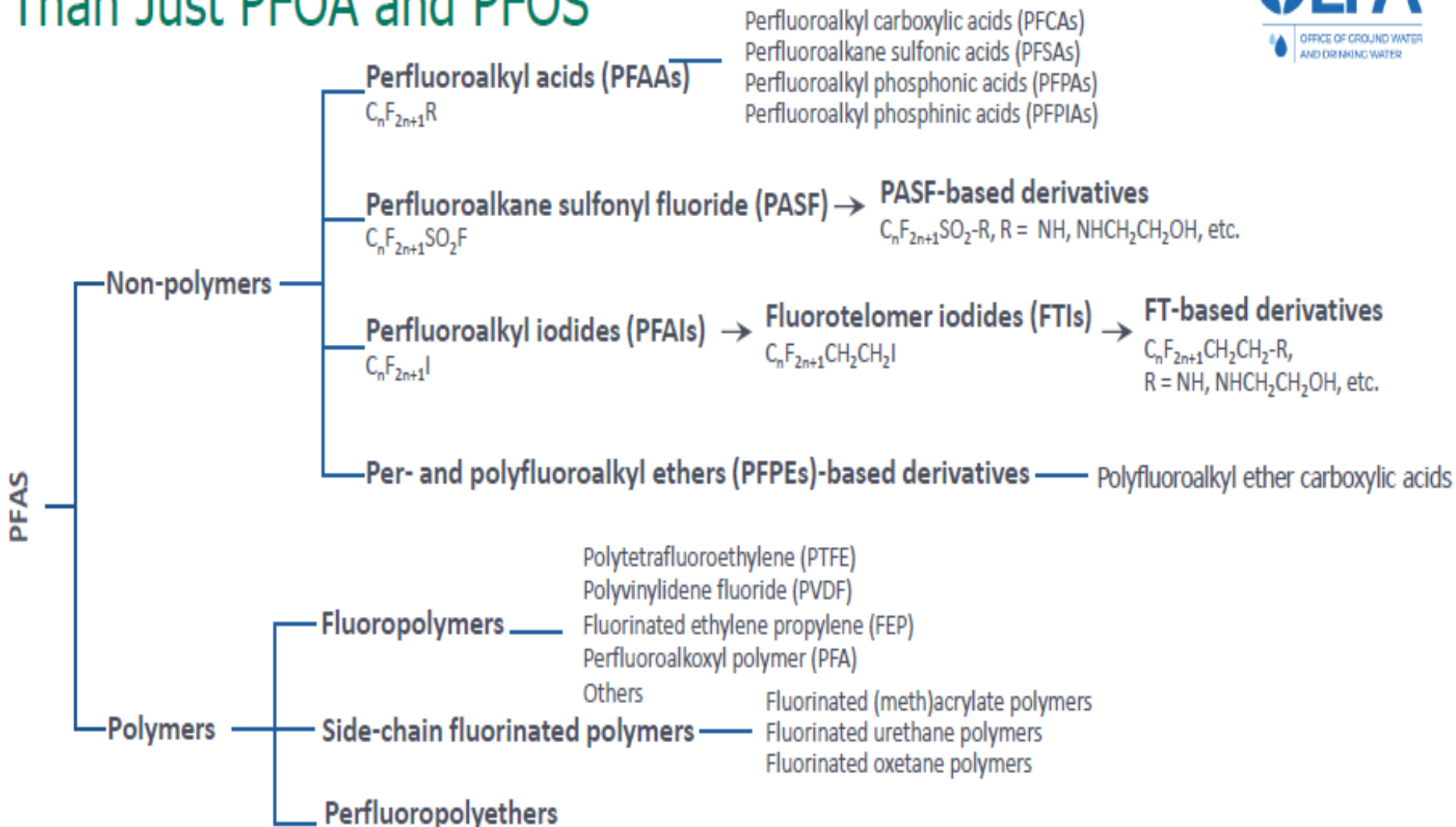


Perfluorooctanoic acid (PFOA)

Perfluorooctanesulfonic acid (PFOS)

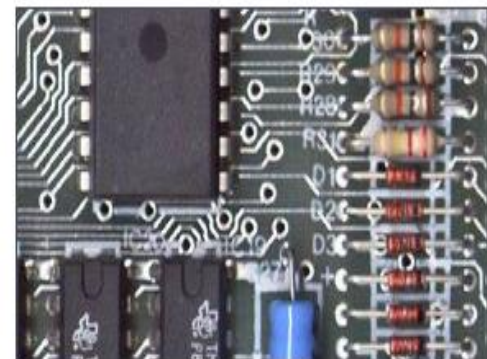


PFAS: More Than Just PFOA and PFOS



Used in Homes, Businesses & Industry

- Food contact surfaces such as cookware, pizza boxes, fast food wrappers, popcorn bags, etc.
- Polishes, waxes, and paints
- Stain repellants for carpets, clothing, upholstered furniture, etc.
- Cleaning products
- Dust suppression for chrome plating
- Electronics manufacturing
- Oil and mining for enhanced recovery
- Performance chemicals such as hydraulic fluid, fuel additives, etc.



Sources of PFAS in the Environment



- Direct release of PFAS or PFAS products into the environment
 - Use of aqueous film forming foam (AFFF) in training and emergency response
 - Release from industrial facility
- Chrome plating and etching facilities
- Landfills and leachates from disposal of consumer and industrial products containing PFAS
- Wastewater treatment effluent and land application of biosolids

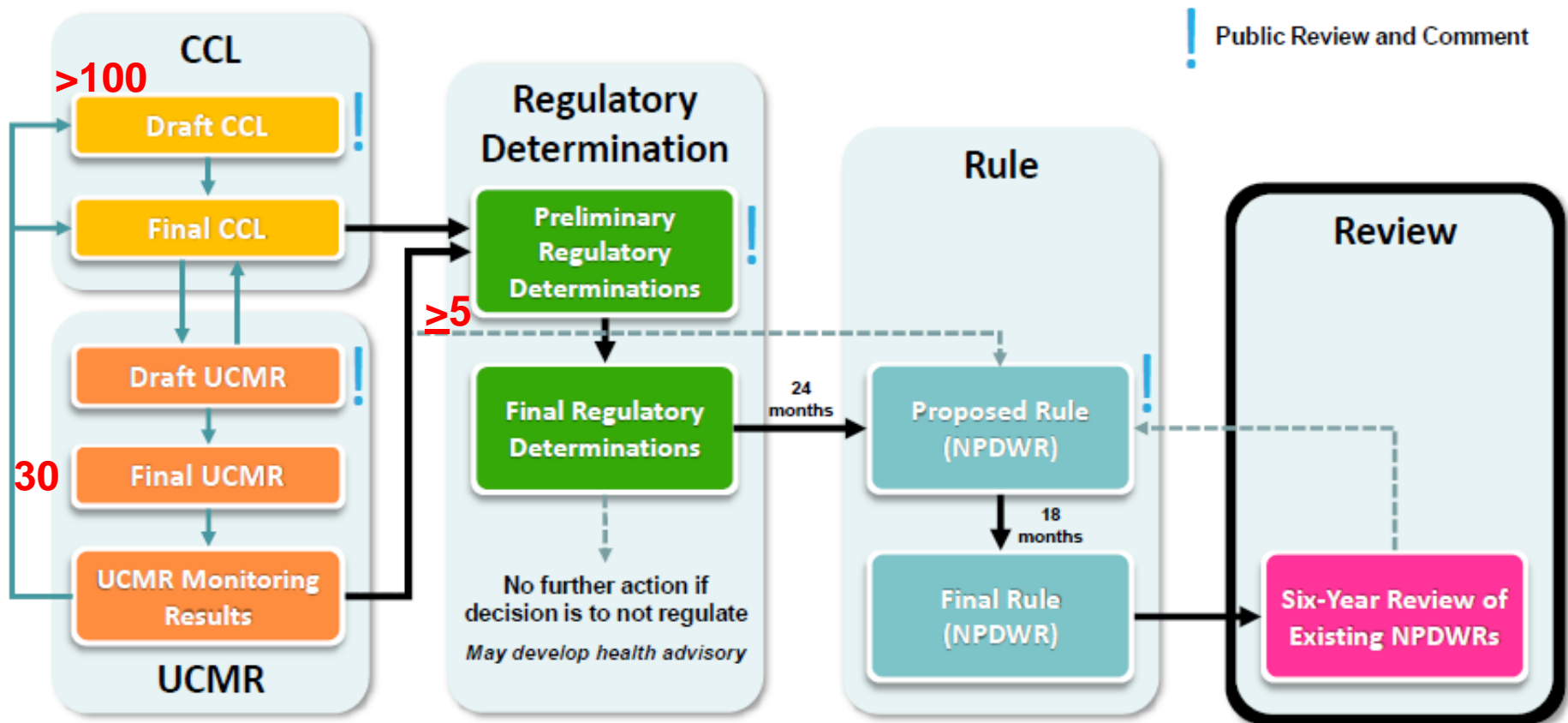


Potential Reasons for Concern

- Known or suspected toxicity
- PFAS and/or breakdown products are persistent in the environment
- Persistence in biota vary greatly across PFASs and species
- Used by a variety of industries
- Found in a variety of consumer products
- Most people have been exposed to PFAS



General Flow of SDWA Regulatory Processes



Increased specificity and confidence in the type of supporting data used (e.g., health, occurrence, treatment) is needed at each stage.

PFAS Background (continued)

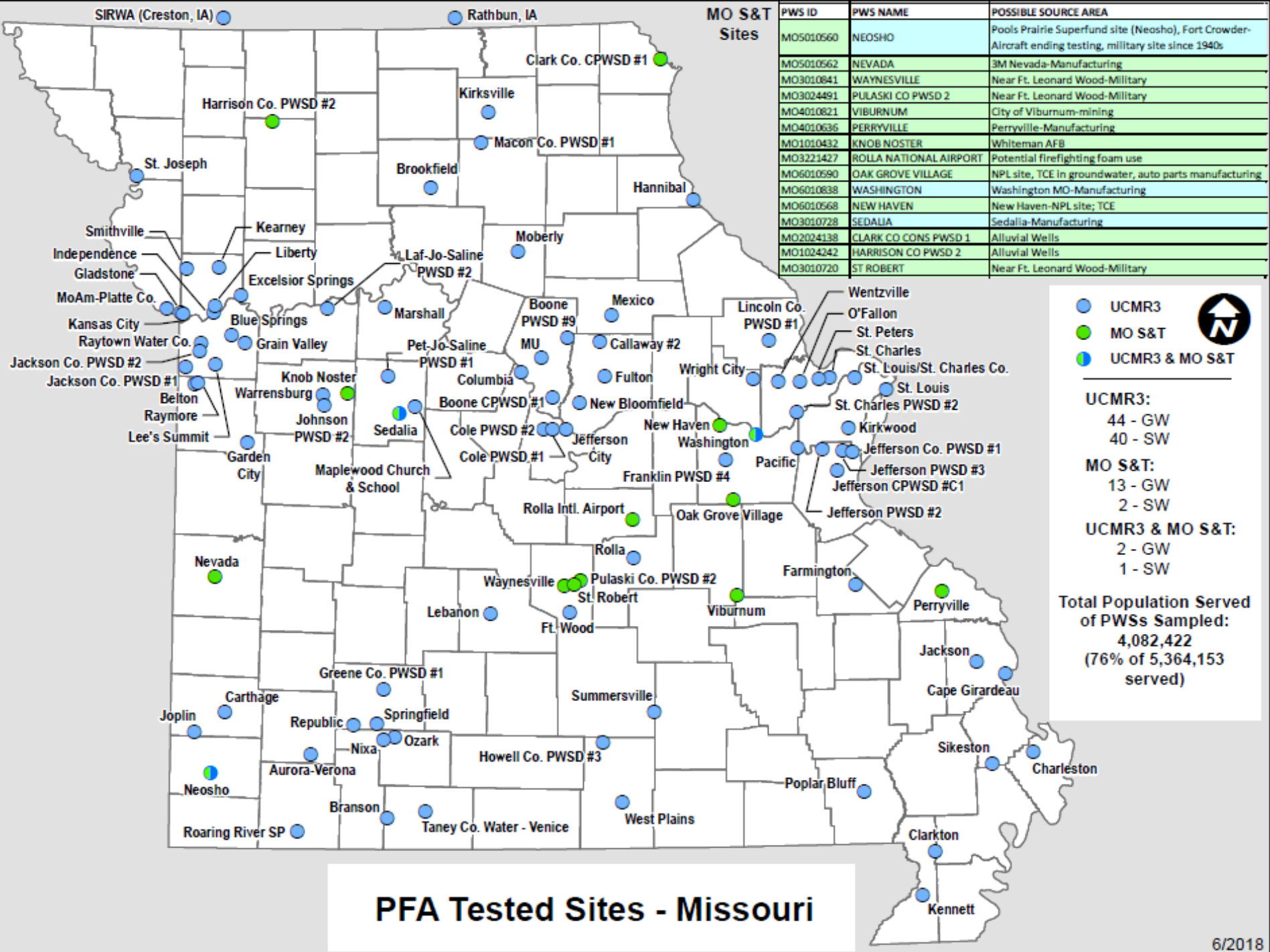
- In 2009, EPA established provisional health advisories (HAs) for PFOA at 400 parts per trillion (ppt) and for PFOS at 200 ppt, even though an EPA health effects review was underway.
- In May 2016, EPA released revised HAs for PFOA and PFOS set individually and combined at 70 ppt.



State	Drinking Water Action	Compound	Level (ppt)
California	Interim Response Levels	Sum of PFOA and PFOS	70
Connecticut	Action Level	Sum of PFOA, PFOS, PFNA, PFHxS, PFHpA	70
Maine	Maximum Exposure Guidelines	Sum of PFOA and PFOS	70
Massachusetts	Office of Research & Standards Guideline	Sum of PFOA, PFOS, PFNA PFHxS, PFHpA	70
Minnesota	Health Based Guidance for Water	PFOA	35
		PFOS	27
		Surrogate of PFOS HBV	27
New Hampshire	Groundwater Quality Standards	Sum of PFOA and PFOS	70
New Jersey	Proposed Regulation	PFNA	13
	Regulation in Development	PFOA	14
North Carolina	Health Advisory	GenX	140
Vermont	Groundwater Quality Enforcement Standards	Sum of PFOA, PFOS, PFNA, PFHxS, and PFHpA	20
West Virginia	EPA Health Advisory	Sum of PFOA and PFOS	70

HAs Versus Regulatory Standards Create Challenges

- Use of HAs as guidance, versus a Safe Drinking Water Act (SDWA) regulation with an established Maximum Contaminant Level (MCL) creates challenges for state drinking water programs and public water systems.
- The HAs for PFOA and PFOS do not provide clarity on necessary actions for water systems to address the compounds, and how to communicate their actions and the associated health risks to the public.





MOS&T PFOA & PFOS Results

Facility Number	Sample Site	September 2016		February 2017		Facility Number	Sample Site	September 2016		February 2017	
		PFOA (ppt)	PFOS (ppt)	PFOA (ppt)	PFOS (ppt)			PFOA (ppt)	PFOS (ppt)	PFOA (ppt)	PFOS (ppt)
1	Raw	0.68	1.04	0.42	1.59	9	Raw	<0.2	0.43	0.28	0.43
	Finished	0.67	1.05	0.31	0.60		Finished	<0.2	0.46	0.29	0.54
2	Raw	<0.2	<0.2	0.57	0.50	10	Raw	<0.2	<0.2	<0.2	<0.2
	Finished	<0.2	<0.2	<0.2	<0.2		Finished	<0.2	<0.2	<0.2	<0.2
3	Raw	0.43	<0.2	<0.2	<0.2	11	Raw	<0.2	<0.2	N/A	N/A
	Finished	0.26	<0.2	<0.2	<0.2		Finished	0.41	<0.2	<0.2	<0.2
4	Raw	N/A	N/A	N/A	N/A	12	Raw	<0.2	<0.2	<0.2	<0.2
	Finished	<0.2	0.32	<0.2	0.30		Finished	<0.2	1.21	<0.2	<0.2
5	Raw	<0.2	<0.2	<0.2	<0.2	13	Raw	<0.2	<0.2	<0.2	<0.2
	Finished	<0.2	<0.2	<0.2	<0.2		Finished	<0.2	<0.2	<0.2	<0.2
6	Raw	0.66	0.68	0.24	0.29	14	Raw	0.35	<0.2	N/A	N/A
	Finished	0.51	0.72	0.24	0.27		Finished	0.31	<0.2	N/A	N/A
7	Raw	<0.2	<0.2	<0.2	<0.2	15	Raw	<0.2	0.25	<0.2	0.24
	Finished	0.30	0.82	<0.2	<0.2		Finished	<0.2	0.25	<0.2	0.24
8	Raw	<0.2	<0.2	<0.2	<0.2						
	Finished	<0.2	<0.2	<0.2	<0.2						

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Eric Medlock

Chemical Monitoring Coordinator
Public Drinking Water Branch

Phone: (573) 522-5028

Email: eric.medlock@dnr.mo.gov