


The Alphabet of Emerging Contaminants



TEFLON C8 AUTO IMMUNE LINK

The Intercept
<http://bit.ly/TEFLONTOXIN>



THE TEFLON TOXIN

DuPont and the Chemistry of Deception
Exposure has been associated with increased cholesterol and uric acid levels,
and recently higher serum levels of PFOA were found to be associated with
increased risk of chronic kidney disease in the general United States population,
consistent with earlier animal studies, according to the
American Journal of Epidemiology study
"Perfluoroalkyl Chemicals and Chronic Kidney Disease in U.S. Adults."



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PFOA and PFOS: All in the Family of PFAS

P - Per (totally) and Poly (many)

F - Fluorinated

A - Alkyl (straight chain hydrocarbons)

S – Substances

Approximately 3500 PFAS compounds

The Many Uses of PFAS

- Fabric water & stain repellents
 - Gore-tex
 - Scotch Guard
- Non-Stick Coatings
- Flame retardants
- Paper coatings
 - Pizza boxes
 - Fast food wrappers
 - Microwave popcorn bags
 - Pet food bags
 - Baking papers
- Wire coatings & insulation
- Metal fume suppressants
- Corrosion prevention
- Plastic resins
- Mold release coatings
- Plumbing tape & flux agents
- Anti-reflective coatings
- Wetting agents
-  Class B firefighting foams
 - Flammable liquid fires
 - Aqueous film-forming foam (AFFF)



PFAS Production History

PFAS ¹	Development Time Period							
	1930s	1940s	1950s	1960s	1970s	1980s	1990s	2000s
PTFE	Invented	Non-Stick Coatings			Waterproof Fabrics			
PFOS		Initial Production	Stain & Water Resistant Products	Firefighting foam				U.S. Reduction of PFOS, PFOA, PFNA (and other select PFAS ²)
PFOA		Initial Production	Protective Coatings					
PFNA					Initial Production	Architectural Resins		
Fluoro-telomers					Initial Production	Firefighting Foams		Predominant form of firefighting foam
Dominant Process ³		Electrochemical Fluorination (ECF)						Fluoro-telomerization (shorter chain ECF)
Pre-Invention of Chemistry /			Initial Chemical Synthesis / Production			Commercial Products Introduced and Used		



PFOA and PFOS: The most studied PFAS

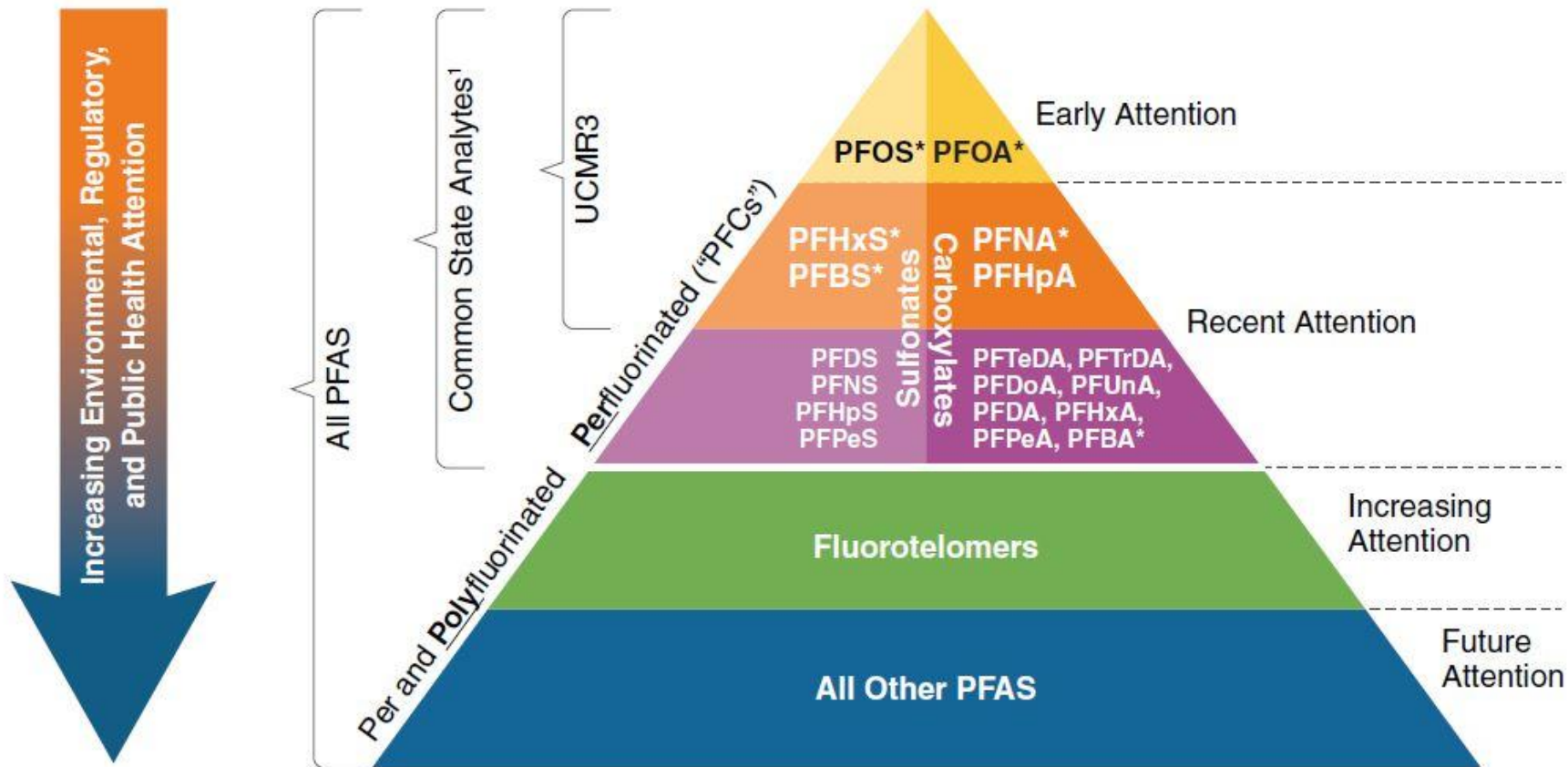
PF – Poly Fluorinated

OA – Octanoic Acid (8 carbons + HCO_2)

OS – Octane Sulfonate (8 carbons + HSO_3)

- Also known as C8s
- Studied by the C8 Science Panel in the mid-Ohio Valley
- Releases from a plant in Parkersburgh WV beginning in the 1950s
- Study of 69,000+ people established links to several health effects

Tip of the Iceberg?



Regulatory Status of PFOS & PFOA: Hazardous Substances in NYS

- Enables regulation of storage & use
 - Storage of Class B foams with 1% or more PFOA or PFOS requires registration of:
 - All underground storage tanks
 - Aboveground storage tanks 185 gallons or larger
 - Containers able to hold 2,200 lbs or more that are used to store foams for 90 consecutive days or more
 - Release of 1 lb. or more of PFOA or PFOS prohibited
 - Training with these foams should not be conducted even if less than 1 lb. would be released
- Enables State Superfund to investigate, and remediate when there is a significant threat



Regulatory Status of PFOS & PFOA

- No drinking water standard in NYS
- EPA Health Advisory Level (HAL) – 70 parts per trillion (ppt) PFOA+PFOS or individually
- NYS Water Quality Council developing standards (MCLs) for certain PFAS
- No SPDES discharge limits

Treatment of PFAS-contaminated Water

Primary treatment technologies

- Granular Activated Carbon (GAC)
- Ion Exchange Resin
- Reverse Osmosis

Short chain PFAS

- Effectively treated
- Break through GAC more quickly

GAC System Designed
for 8.5 MGD, \$37 M



Wastewater Treatment Plants

- PFAS are not removed by conventional WWTPs
- Biological activity transforms PFAS
 - Increases in PFOA and other acids in effluent
 - Increases in certain C6 and C8 PFAS
- WWTP discharges can be point sources of PFAS
 - Currently no discharge limits for PFAS
- PFAS in biosolids
 - Agricultural re-use creates low-level sources



DEC Initiatives

- Survey of 2550+ facilities for PFOA/PFOS use, etc.
- Survey of 91 private & municipal fire training centers
- Prioritize positive responses (241) with nearby water supplies for sampling (140 sampled)
- Screen all active and remediated Superfund sites (~1000) for PFAS
- Screen all active Brownfield sites for PFAS (~450)
- Evaluate ~2000 inactive landfills for potential groundwater impacts
 - 141 identified for sampling, 66 sampled
- State-wide database



Questions

George Heitzman, P.E.

Assistant Director

Division of Environmental Remediation

Department of Environmental Conservation

625 Broadway

Albany NY 12233-7014

Phone: 518-402-9662

george.heizman@dec.ny.gov



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