



PFAS Update January 2020

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Maine DEP - BRWM

MAINE DEPARTMENT OF ENVIRONMENTAL PROTECTION

Protecting Maine's Air, Land and Water

Overview

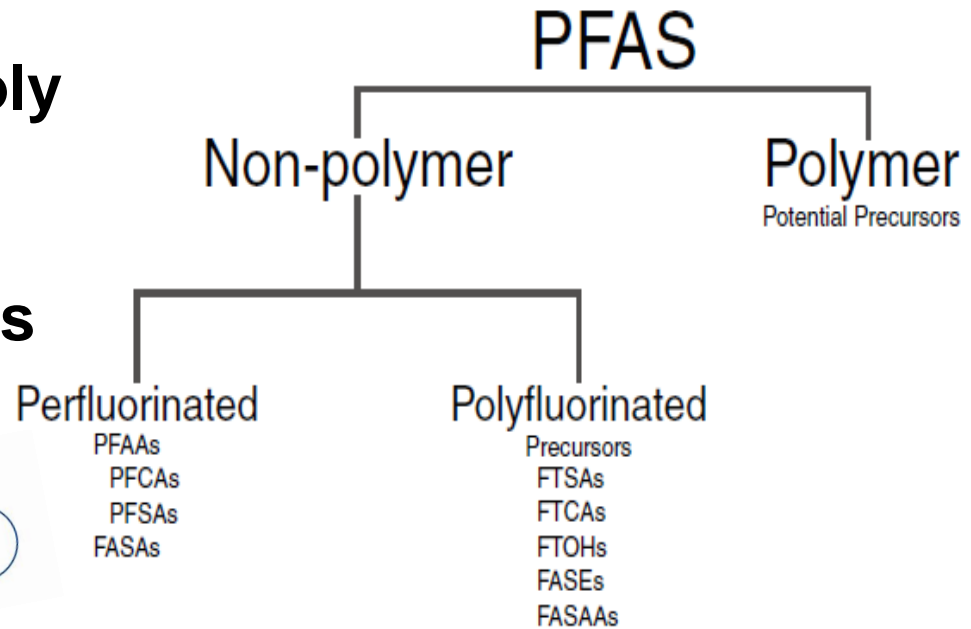
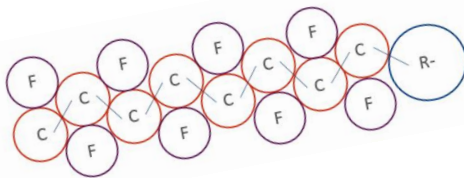
- What is PFAS?
- Where are they found in the environment?
- Why did they come to our attention?
- What has the DEP done so far?
- Sludge/biosolids impacts
- Other PFAS testing
- Task Force and the future



Emerging Issue

PFAS Terminology

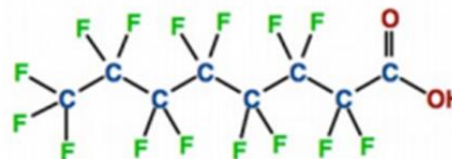
P per and poly
F fluoro
A alkyl
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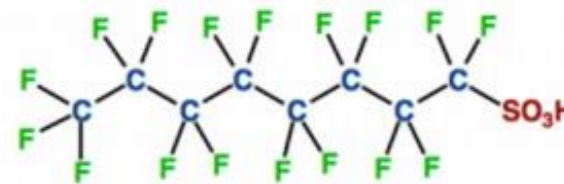
ITRC Naming Conventions, 2017

PFAS – What Are They?

- Stable, C-F bond strength
Low volatility
High molecular weight
- Thermally stable
Hydrophobic
Lipophobic
Surfactant properties
- Focus on small percentage of the total number of PFAS compounds (3,000+)



PFOA - perfluorooctanoic acid



PFOS - perfluorooctanesulfonic acid



Where Used

Previous and **Current Uses:** Industrial and Consumer Products

PFOA

- Cooking surfaces (Teflon)
- **Fire fighting foams**
- Toothpaste, Shampoos, cosmetics
- Polishes and waxes
- Electronics
- **Lubricants/surfactants/emulsifiers**
- Pesticide
- Plumbing Tape
- Food containers and contact paper
- Textiles (Gore-Tex) and Leather
- Paints, varnishes, sealants
- Cleaning products
- And more...

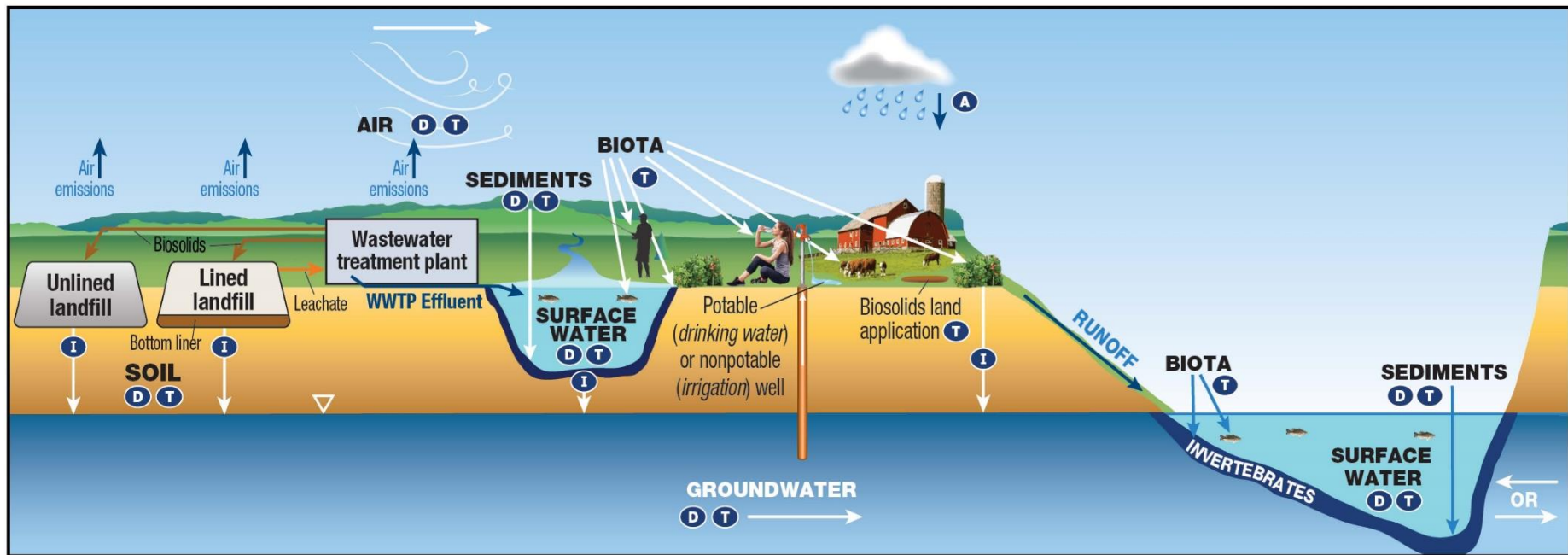
PFOS

- **Metal plating and finishing**
- **Fire fighting foams**
- **Photograph Development**
- Semiconductor industry
- **Aviation Fluids**
- Flame repellants
- Packaging Papers
- Oil and Mining
- Stain repellants on carpets and upholstery (e.g. Stainmaster, ScotchGard)
- Cleaning products
- Paints, varnishes, sealants
- Leathers, textiles
- And more...

ASWDA (2016)



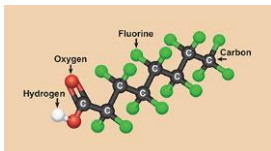
Where Are PFAS Found in the Environment



KEY A Atmospheric Deposition D Diffusion/Dispersion/Advection I Infiltration T Transformation of precursors (abiotic/biotic)

Figure 3. Conceptual site model for landfills and WWTPs.

(Source: Adapted from figure by L. Trozzolo, TRC, used with permission)



PFAS at a Dairy Farm

- Dairy farm in southern Maine showing impacts from PFAS
 - Site had received paper mill residuals and biosolids
 - Paper mill sludge and bioash ~1983-1985
 - Biosolids licensed in 1986, received biosolids 1989-2004
 - DEP became involved in early 2017
 - Tested soil, groundwater, surface water, hay, manure, purchased feed, milk



PFAS Results

- Dairy farm PFAS sampling results:

Matrix	Highest PFOA Conc.	Highest PFOS Conc.
Drinking Water	8.9 ng/L	42.1 ng/L
Surface Water	7.67 ng/L	33.4 ng/L
Groundwater	41.2 ng/L	2.5 ng/L
Milk	<50 ng/L	938 ng/L
Soil	23.6 ng/g	878 ng/g
Manure	3.2 ng/g	20.3 ng/g
Hay	2.1 ng/g	9.7 ng/g
Purchased Feed	<0.5 ng/g	<1 ng/g



Agency Work

- Worked with ME CDC to evaluate risk by establishing screening levels as well as to evaluate risk at individual remediation sites.
- In conjunction with ME CDC, established limited PFAS screening levels in RAGs and Chapter 418 (PFOA, PFOS, & PFBS)
- April 2, 2017 – DEP established a hierarchy to prioritize investigation of PFAS in drinking water



Agency Work

- Utilizing EPA's 70 ppt health advisory level for drinking water supplies
- Established meetings with Maine's Drinking Water Program staff
- March 2019 requirement for testing sludge that is land applied or composted
- Worked closely with MECDC & ACF



2019 Sludge Test Requirements

- All sludge/biosolids headed for land application sites
- All sludge/biosolids compost facilities required to test finished compost
- Compare results to screening concentrations
 - If over the screening concentrations, were required to perform pollutant loading rate calculations and some required to test site-specific soils



2019 PFAS Results Summary

- Compost Facilities
 - 23 licensed facilities
 - Results from 19 facilities
- Land Application
 - 41 facilities with agronomic utilization program licenses
 - Results from 34 facilities
- Papermills
 - 9 facilities with agronomic utilization program licenses
 - Results from 7 facilities



2019 PFAS Results Summary

- PFBS not an issue
- 65% of sludge samples exceeded for PFOA
- 93% of sludge samples exceeded for PFOS
- 89% of composts exceeded for PFOA
- 74% of composts exceeded for PFOS
- No paper mill residuals exceeded for PFOA or PFOS
- 19% of site-specific soils exceeded for PFOA
- 57% of site-specific soils exceeded for PFOS

PFAS Results

- Sludge Concentrations

- Average PFOA 8.5 ng/g and PFOS 25.5 ng/g
- Median PFOA 3.8 ng/g and PFOS 22.9 ng/g
- Maximum PFOA 46 ng/g and PFOS 120 ng/g

Ch. 418 Screening
Concentrations:

PFOA – 2.5 ng/g
PFOS – 5.2 ng/g

- Compost

- Average concentration PFOA 14.2 ng/g and PFOS 16 ng/g
- Median concentration PFOA 7.7 ng/g and PFOS 7.3 ng/g
- Maximum concentration PFOA 60 ng/g and PFOS 81.8 ng/g

- Site-Specific Soils

- Average concentration PFOA 2 ng/g and PFOS 9.6 ng/g
- Median concentration PFOA 1.3 ng/g and PFOS 7.1 ng/g
- Maximum concentration PFOA 12.9 ng/g and PFOS 36.6 ng/g

Other PFAS Testing

- Biosolids compost used in a home garden
- Closed, unlined landfill sites
- Remediation sites
- AFFF Class B firefighting foam sites
- 4 polymers used at treatment plants
- Septage
- Fish tissue



Where to find the Information

- All PFAS data located at:
 - <https://www.maine.gov/dep/spills/topics/pfas/PFAS-all-results-8.9.2019.pdf>
- Historical Records for Biosolids located at:
 - <https://www.maine.gov/dep/ftp/sludge-bioash/2019-09-06-sludge-bioash-land-application.xlsx>
- PFAS mapping tool located at:
 - <https://maine.maps.arcgis.com/apps/webappviewer/index.html?id=731ba8744cbe4de69abc5bfc33d5ede5>
- Feed back requested: <mailto:pfas.dep@maine.gov>



PFAS Task Force

- Governor's task force formed by Executive Order March 2019
- Purpose to identify the extent of PFAS exposure in Maine, examine risk of PFAS to Maine residents and the environment, and recommend State approaches to most effectively address this risk
- Report to Governor's Office anticipated soon
- <https://www.maine.gov/pfastaskforce/>



Future?

- Continue with requirements in Chapter 419, agronomic utilization of residuals, for the near term
- Follow-up with licensees will occur regarding testing and use requirements for 2020
- DEP, MECDC, and DACF working to gather information to support or modify our model for agronomic utilization





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