



## PFAS in Biosolids: Investigations in Maine & Vermont May 27, 2020

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Residuals Management Unit

MAINE DEPARTMENT OF ENVIRONMENTAL PROTECTION

*Protecting Maine's Air, Land and Water*

## PFAS Screening Concentrations

- Chapter 418, Appendix A adopted July 8, 2018
  - Established screening concentrations for 3 PFAS
    - PFBS - 1,900 ng/g
    - PFOA - 2.5 ng/g
    - PFOS - 5.2 ng/g
  - Based on Maine Remedial Action Guidelines (RAGs)
  - Leaching to groundwater – endpoint 200 ppt
  - No plan to require residuals testing at that time



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## History

- 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, drinking water, groundwater, surface water, hay, manure, purchased feed, milk



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## Dairy Farm 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	476 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



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## Governor's PFAS Task Force

- March 6, 2019 Governor Mills signs Executive Order 5 FY 19/20 – “An Order to Study the Threats of PFAS Contamination to Public Health and the Environment”
- Purpose of Task Force:
  - Identify the extent of PFAS exposure in Maine
  - Examine the risks of PFAS to Maine residents and the environment
  - Recommend State approaches to most effectively address risk
- Public health experts, DHHS, DEP, DACF, MEMA, industry experts, drinking water sector
- 8 meetings held from May 2019 through December 2019



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## Residuals Testing

- Biosolids Land Application Programs and Composters notified March 22, 2019:
  - Required updated sampling plan by April 12, 2019
  - Required sampling by May 7, 2019
- Paper Mill Residual Land Application Programs notified April 16, 2019:
  - Required updated sampling plan by May 6, 2019
  - Required sampling by June 3, 2019
- No land application of biosolids/paper mill residuals or distribution of biosolids compost until approved by DEP



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## PFAS Testing Program

- 73 facilities notified of the requirement to test:
  - 23 composting facilities
  - 41 land application program licensees
  - 9 paper mills/former paper mills
- Some didn't test for various reasons (not producing residuals, out of business, etc.)
- If over the screening concentrations, were required to perform pollutant loading rate calculations and some required to test site-specific soils



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## PFAS Testing Program

- 52 sludges:
  - Data from some not required to test
  - 3 heat-dried pellet products
- 17 composting facilities:
  - 10 WWTP sludge composters
  - 5 dewatered residential septage only composters
  - 2 mixed WWTP sludge/dewatered septage
- 8 different paper mill residuals
- 86 site-specific soils



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# PFAS Testing Program

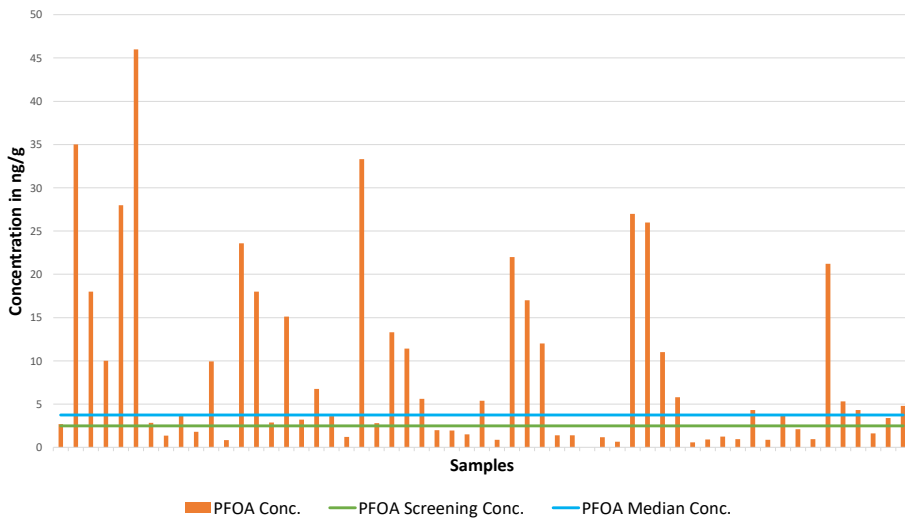
Sludge and Compost Sampling Locations

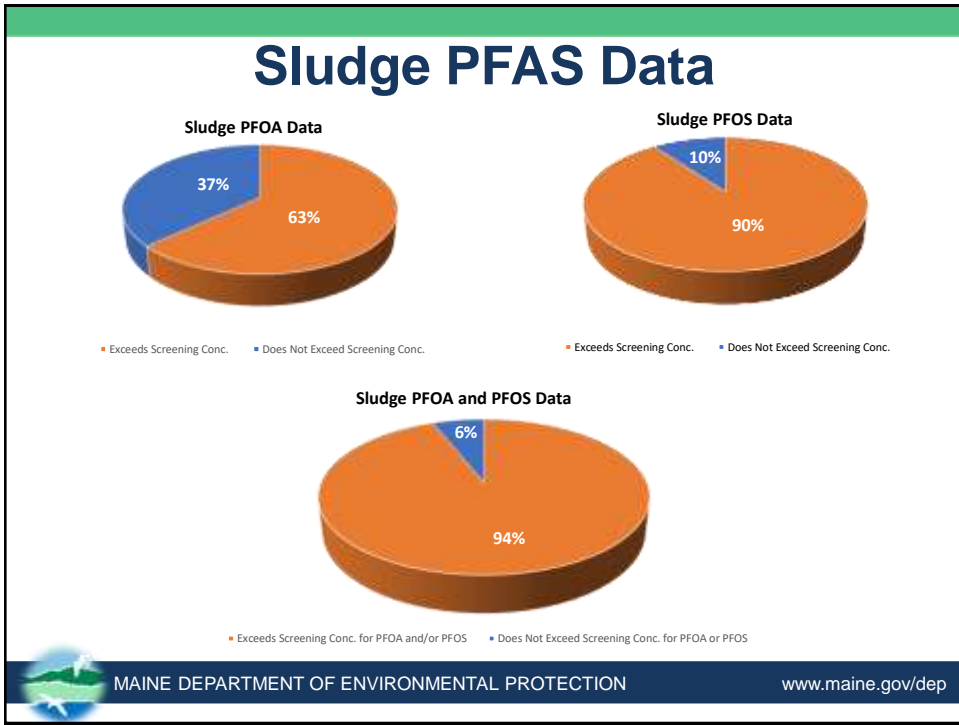
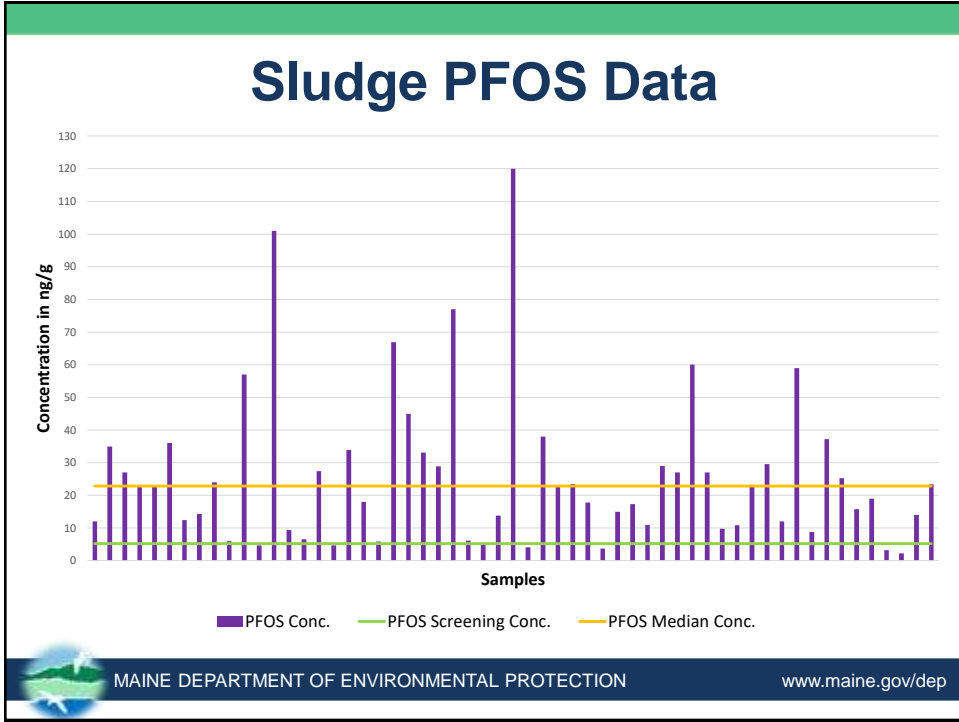


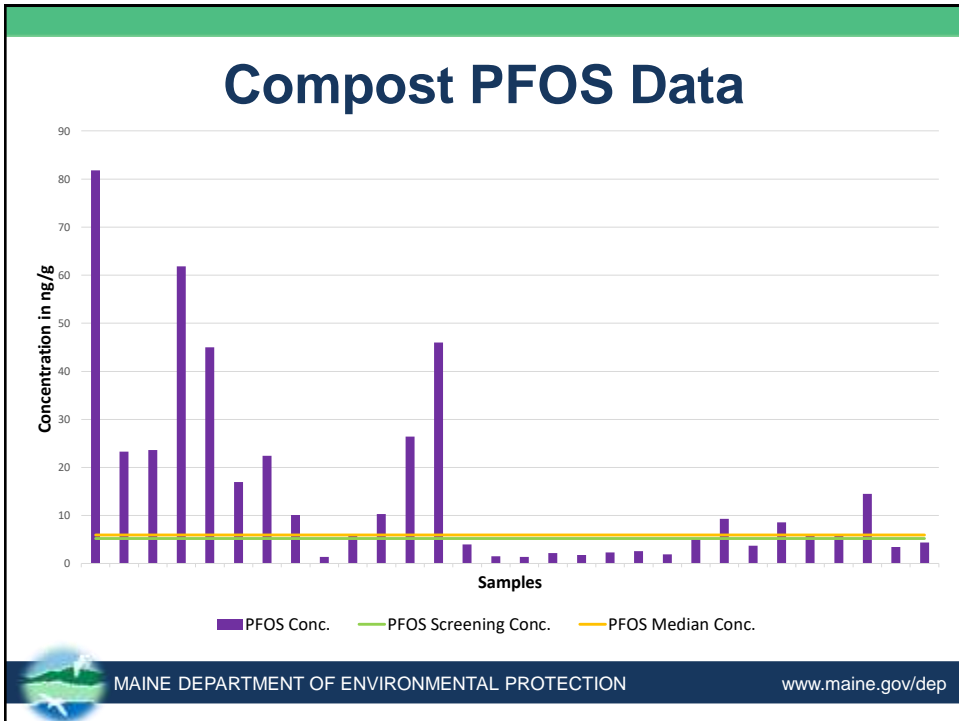
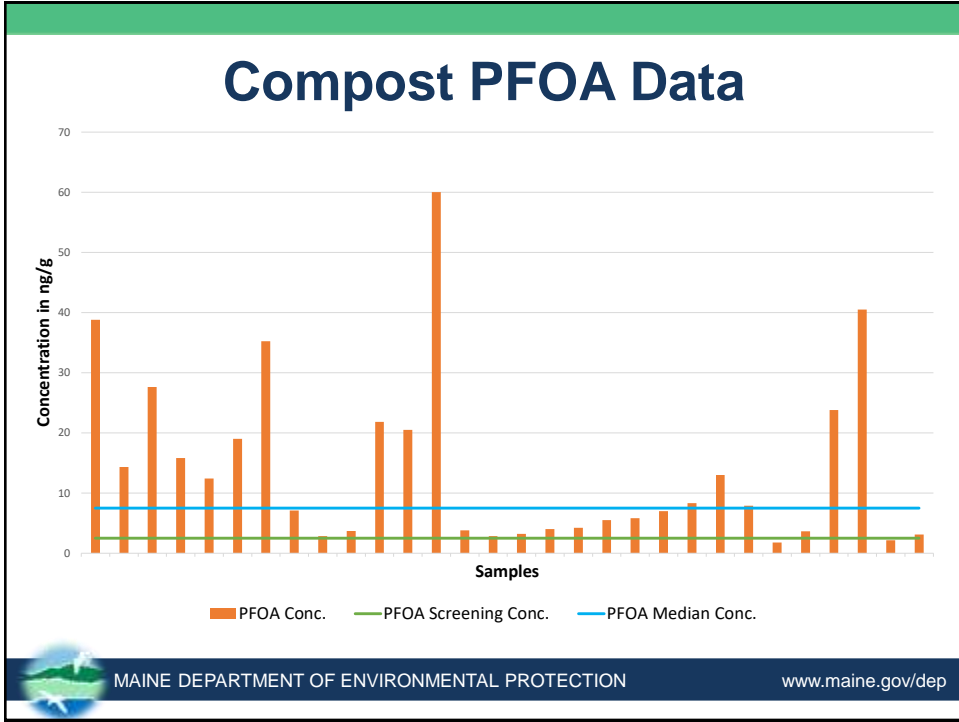
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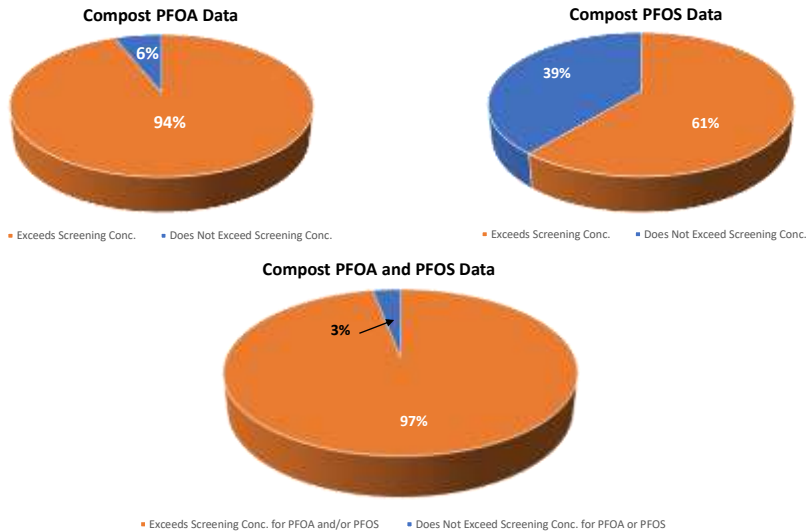
# Sludge PFOA Data







## Biosolids Compost PFAS Data



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## PFAS Results

- PFBS not approaching the screening concentration
- No paper mill residuals exceeded for PFOA or PFOS
- 15% of site-specific soils exceeded for PFOA
- 56% of site-specific soils exceeded for PFOS
- 58% of site-specific soils exceeded for PFOA, PFOS, or both
- Site-specific soil data skewed because of targeted testing



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## PFAS Results

- Sludge
  - Average concentration PFOA 8.2 ng/g and PFOS 24.3 ng/g
  - Median concentration PFOA 3.6 ng/g and PFOS 18.5 ng/g
  - Maximum concentration PFOA 46 ng/g and PFOS 120 ng/g
- Compost
  - Average concentration PFOA 14.1 ng/g and PFOS 16 ng/g
  - Median concentration PFOA 7.5 ng/g and PFOS 7.8 ng/g
  - Maximum concentration PFOA 60 ng/g and PFOS 81.8 ng/g
- Site-Specific Soils
  - Average concentration PFOA 1.8 ng/g and PFOS 9.1 ng/g
  - Median concentration PFOA 1.2 ng/g and PFOS 6.3 ng/g
  - Maximum concentration PFOA 12.9 ng/g and PFOS 36.6 ng/g



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## Spring/Summer 2019

- 13 composts approved for distribution
- 3 Class A pelletized products approved for distribution
- 7 Class B programs approved to land-apply on some fields
- 3 Class B programs not able to land-apply
- All paper mill residuals approved for distribution
- Bureau of Water Quality provided grants
  - Emergency dewatering grants
  - Planning grants for dewatering infrastructure
  - Possible construction grants



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## Septage

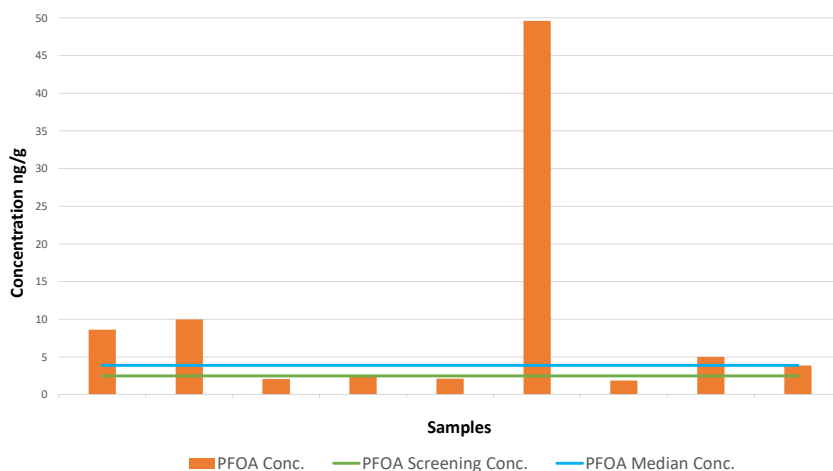
- 9 samples
- 3 types of facilities
  - Septage dewatering facilities
  - Septage storage at land application sites
  - Septage at WWTP receiving stations
- Results
  - Average concentration PFOA 9.5 ng/g and PFOS 6.7 ng/g
  - Median concentration PFOA 3.9 ng/g and PFOS 2.1 ng/g
  - Maximum concentration PFOA 49.6 ng/g and PFOS 24 ng/g



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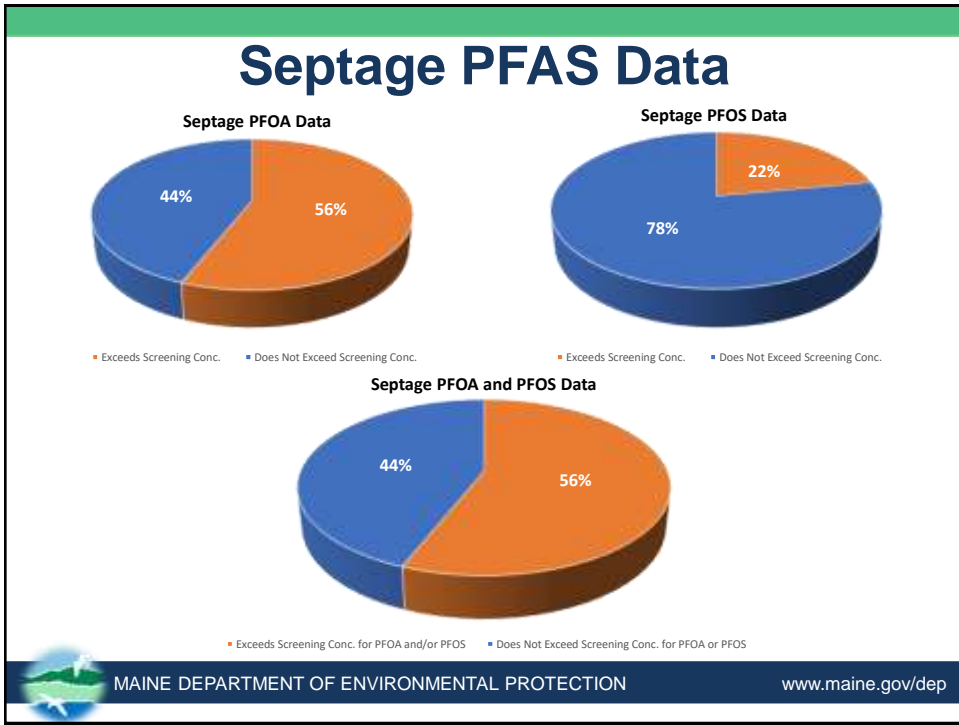
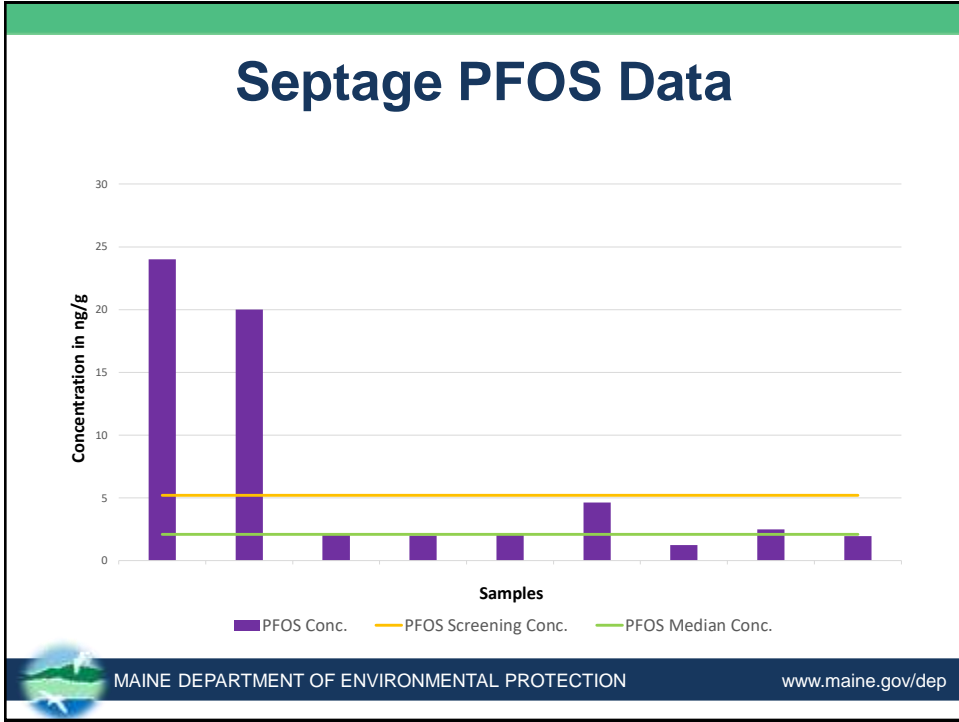
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## Septage PFOA Data



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## Task Force Recommendations

- Final Report Issued January 2020
  - See full report at: <http://www.maine.gov/pfastaskforce>
  - **Caution: this is not a complete list of all recommendations**
- **Providing Safe Drinking Water:**
  - Test all Community Water Systems (378) and all schools and daycare facilities regulated as Non-Transient Non-Community Water Systems (~223) for PFAS
  - Test private drinking water in areas where groundwater likely to have been impacted by PFAS at unsafe levels due to land application of residuals
  - Use EPA Health Advisory Level as action threshold and apply sum of PFHxS, PFNA, PFHpA, PFOA, and PFOS to threshold



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## Task Force Recommendations

- **Protecting Our Food Supply:**
  - Restrictions on the agronomic utilization and land application of PFAS-containing residuals
  - Investigation and remediation of PFAS contamination
  - Greatly expand testing of agricultural produce and products grown and/or raised in soils where residuals have been agronomically utilized



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## Task Force Recommendations

- **Identifying and Reducing Uses of PFAS:**
  - Require manufacturers to report intentional use of PFAS in consumer products
  - Report discharges of Class B AFFF and locations of past fire training activities that utilized AFFF or other PFAS-containing material
  - State procurement guidelines should discourage purchase of PFAS-containing products



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## Task Force Recommendations

- **Investigating PFAS Contaminants in the Environment:**
  - Prioritize locations for sampling where residuals were spread on fields that produce crops for human consumption or feed
  - Amend Uncontrolled Sites Law which would give State authority to require removal and treatment of PFAS when they are a danger to public health (LR 3002)
  - Maine CDC to finalize agronomic uptake model
  - Continue to rely on federal agencies to establish toxicity values



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## Task Force Recommendations

- **Managing Waste and Waste Residuals Responsibly:**
  - Require regular testing of all wastewater residuals for PFAS prior to land spreading or commercial distribution in Maine (industrial, WWTP sludge, septage)
  - Modify testing frequency when concentrations diminish over time
  - Investigate availability of treatment and disposal technologies that minimize PFAS contamination



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## Task Force Recommendations

- **Public Education:**
  - Develop/identify educational materials at appropriate literacy levels for intended audience
  - Using websites, social media, training events, fairs
  - For healthcare providers, farmers, drinking water and wastewater utility customers, firefighters, educators/students, residential well owners
  - Different materials for general public and those at higher risk due to occupational exposures



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## Task Force Recommendations

- **Federal Action:**
  - Source reduction (reduce and report PFAS uses)
  - Add PFAS to CERCLA with exceptions for water and wastewater utilities
  - ATSDR – finalize toxicity values
  - EPA – establish MCLs, certify test methods for other matrices, and support states in addressing PFAS in residuals
  - USDA – funding to support farmers impacted by PFAS contamination
  - Research
  - Funding



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## Task Force Recommendations

- **Funding for State Actions:**
  - State is expending significant funds to investigate and control PFAS exposures
  - Substantial additional funding needed to implement recommendations
  - Municipalities, drinking water and wastewater utilities, farmers, businesses, property owners, Maine citizens bearing costs
  - Use funding/resources as available
  - Bond initiative for costs of PFAS sampling, analysis, remediation, and drinking water treatment
  - Damage claims to apply costs of PFAS contamination to responsible parties



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## Ongoing Testing Requirements

- Notified licensees February 25, 2020
- Facilities with Program License
  - If send for disposal – 1X per year
  - If send for composting – 1X per year
  - If land-apply material – 2X per year
- Composting Facilities
  - Finished compost – 2X per year
  - Sludge feedstocks – 1X per year



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## Ongoing Requirements

- Site-Specific Soil Testing at Class B Sites
  - Required if sludge over screening concentration and haven't tested fields for PFAS previously
- Pollutant Loading Rate Calculations
  - If over screening concentration
  - Class B land application, Class A pellet products, and compost
- Updated BMP/Information Sheets
  - Class A pellet products
  - Compost
  - Whenever PFAS levels increase
  - Must reflect **actual** recommended loading rates (agricultural uses **and** manufactured topsoil)



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## Moving Forward

- Corn Uptake Study – reviewing and validating data
- Limited Groundwater Study at Current and/or Former Land Application Sites – still identifying sites; have begun taking some samples
- Budget constraints due to economic downturn related to COVID-19?



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