

# PFAS Technical Advisory Group

Waste Management Subgroup  
July 18, 2019





# Welcome

- Reminder to please mute your phone on WisLine
- Presentation can be found online at <https://dnr.wi.gov/topic/Contaminants/PFASGroup.html> under Subgroups

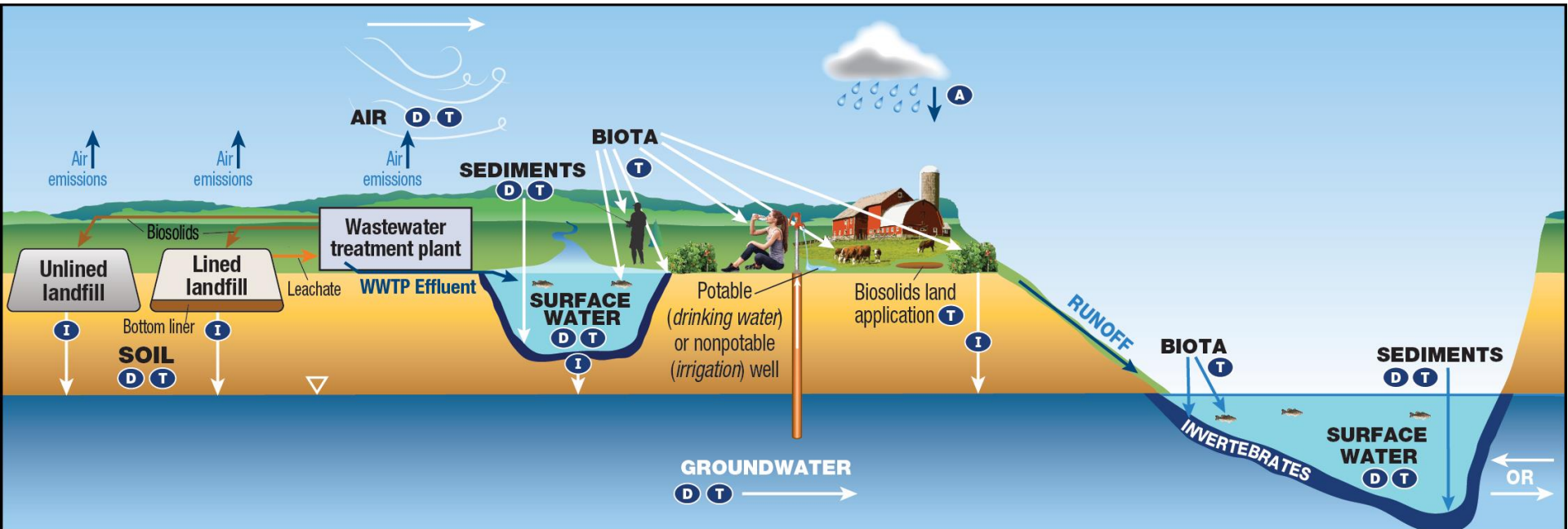


# Purpose and Scope

- Work with stakeholders to develop best management practices for handling and disposing of PFAS-containing waste
  - What wastes commonly contain PFAS?
  - Which closed and active landfills or other waste sites likely have those wastes and what engineering features are present?
  - What are safe levels of PFAS in leachate? How can it be treated at wastewater treatment plants?
- Information gathering
- Scope of this group: PFAS going to, at, and from waste sites
  - Other groups working on testing parameters, surface water, etc.

# PFAS in Waste

- Interstate Technology & Regulatory Council
- Fate and Transport



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



# Leachate

- ITRC:
  - landfill leachate PFAS concentrations are relatively high
  - leachate generally is considered only a minor source to the environment
  - Legacy industrial waste landfills, however, may constitute a major source to the environment



# Vermont DEC

- June 2019 report on PFAS statewide sampling plan
  - Leachate and groundwater at operating and closed, lined and unlined landfills
    - Findings
  - Additional investigation on LF leachate concentrations, waste water treatment facilities influent and effluent, surface water, and biosolids



# California State Water Resources Control Board

- March 2019 Investigatory Order:
  - Statewide effort determining groundwater impacts
  - Required submittal by MSW landfills that accepted, stored, or used materials that may contain PFAS
    - One-time leachate and groundwater assessment

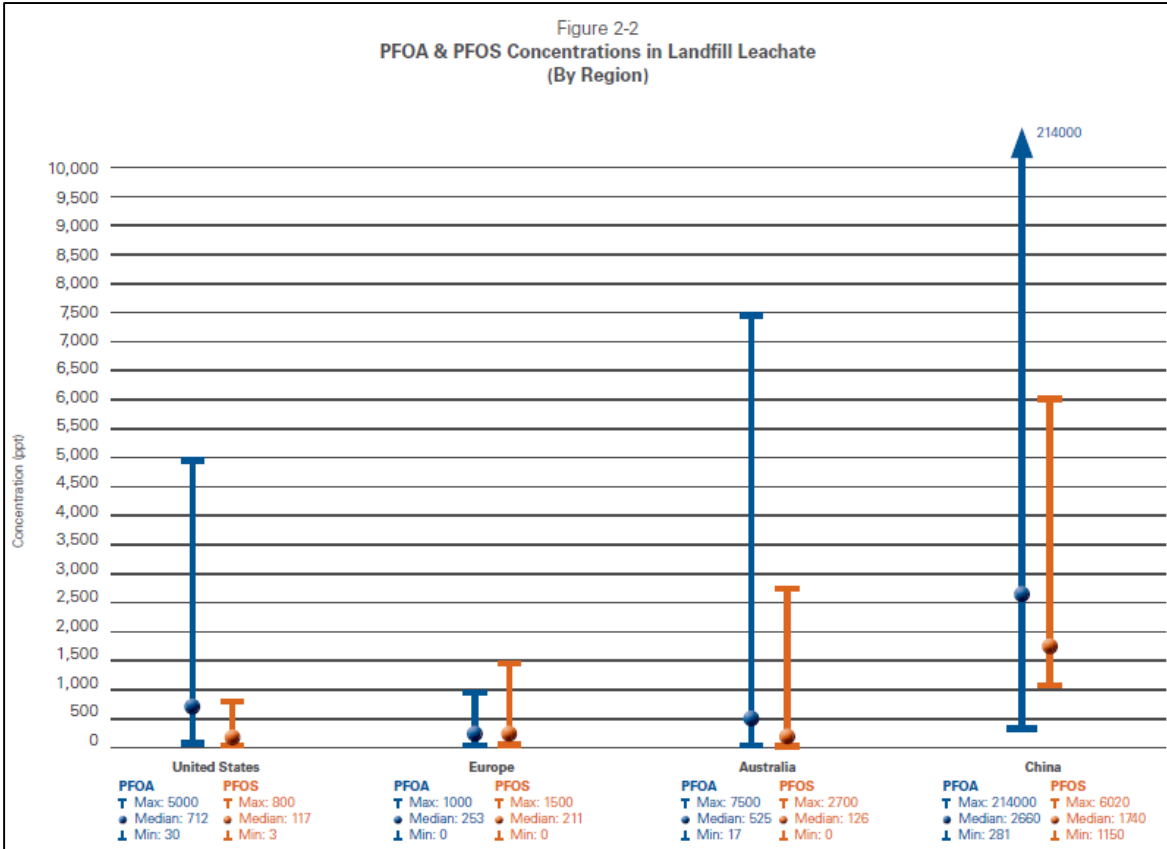


# Michigan EGLE

- Statewide study on landfill leachate completed by the Michigan Waste & Recycling Association (MWRA) in collaboration with EGLE
- 32 active municipal solid waste landfills (type II landfills) were sampled throughout the state
- Sampling guidance documents and sampling training provided by EGLE
- Goal was to determine magnitude of contamination in landfills throughout the state, assess which landfills needed further evaluation, and cooperate with landfill industry to develop best management practices



Figure 2-2  
PFOA & PFOS Concentrations in Landfill Leachate  
(By Region)



Sample Sizes	
United States	98
Europe (Sweden, Denmark, Germany, Spain, Nordic Countries)	26+
Australia	114
China	6

Region	PFOA (ppt)	PFOS (ppt)
Michigan*	16 to 3,200	9 to 960
United States	30 to 5,000	3 to 800
Europe	ND to 1,000	ND to 1,500
Australia	17 to 7,500	13 to 2,700
China	281 to 214,000	1,150 to 6,020
<b>Worldwide Range</b>	<b>ND to 214,000</b>	<b>ND to 6,020</b>



# Michigan EGLE

- Sample groundwater at solid waste landfills with previous known releases and potential downgradient receptors through 2019
  - HWS to assist when needed
- Additional sampling conducted at landfills and WWTP to produce more accurate conclusions
- Reduce release of PFAS in leachate to WWTP immediately at appropriate facilities
- Continue to work with MWRA to Develop best management practices for managing leachate disposal in the future
  - Determine appropriate treatment technology



# DNR Water Quality

- Request for sampling by POTW and Industrial facilities
  - Still finalizing
  - Influent & Effluent
  - Extent of the issue
- Fate and transport study
  - Mass balance
  - Assess how compounds behave



# Groundwater Monitoring

## Potential Strategy for Looking at Landfills:

- Compile a priority list of landfills to be sampled based on:
  - Known GW contamination
  - PFAS concentrations in leachate
  - Receptors
  - Waste Types Likely Received based on location and landfill type (e.g. MSW, papermill, etc.)
    - (e.g. Landfills located in industrial and manufacturing areas or accepted large volumes of certain waste types)



# Groundwater Monitoring

How do we know if GW Quality is Impacted?

- Look at concentration trends over time of substances analyzed in GW samples collected from monitoring wells.
- Compare concentrations with NR 140 standards and baseline data



# Groundwater Monitoring

## How do we know if GW Quality is Impacted?

- Typical Health and Public Welfare Related Substances:
  - Volatile Organic Compounds (VOCs)
    - Volatile
    - Soluble
    - Mobile
  - Semi-Volatile Organic Compounds (SVOCs)
    - Less Volatile
    - Soluble
    - Mobile



# Groundwater Monitoring

## How do we know if GW Quality is Impacted?

- Typical Health and Public Welfare Related Substances:
  - Inorganic Compounds- Not Volatile (except Hg)
    - Metals – Manganese, Iron, cadmium, chromium, selenium, etc. – Often less mobile than VOCs
  - Others- Arsenic, Boron, Sulfate – Potential for high mobility
    - Often mobility of metals depends on pH and alkalinity.



# Groundwater Monitoring

## How do we know if GW Quality is Impacted?

- Indicator Parameters:
  - Chloride
  - pH
  - Temperature
  - Specific Conductance
  - Alkalinity
  - Hardness
  - Dissolved Organic Carbon (DOC)





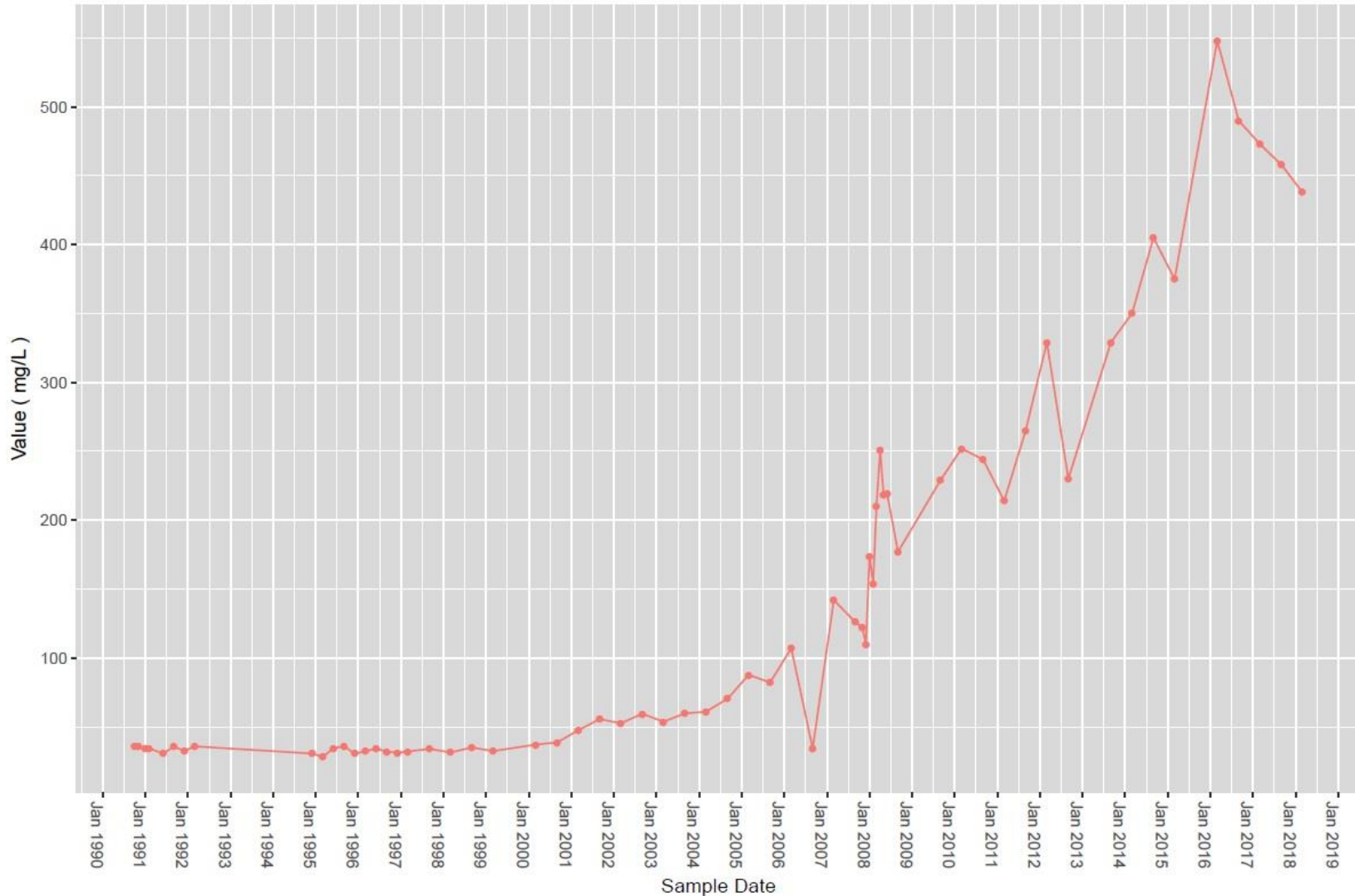
# Groundwater Monitoring

## What Do Indicators Tell You?

- Indicators can help you if you have a history of their data to show concentration trends over time.
- Indicators can give clues that there may be more going on than meets the eye.
- They may tell you that there may be other contaminants of concern than what has been analyzed.
- They may help identify a source of contamination.
- They may help you to see that other contaminants may be on their way.
- They may help to show if contaminants are coming from releases in the natural geological formation as a result of geochemical changes.

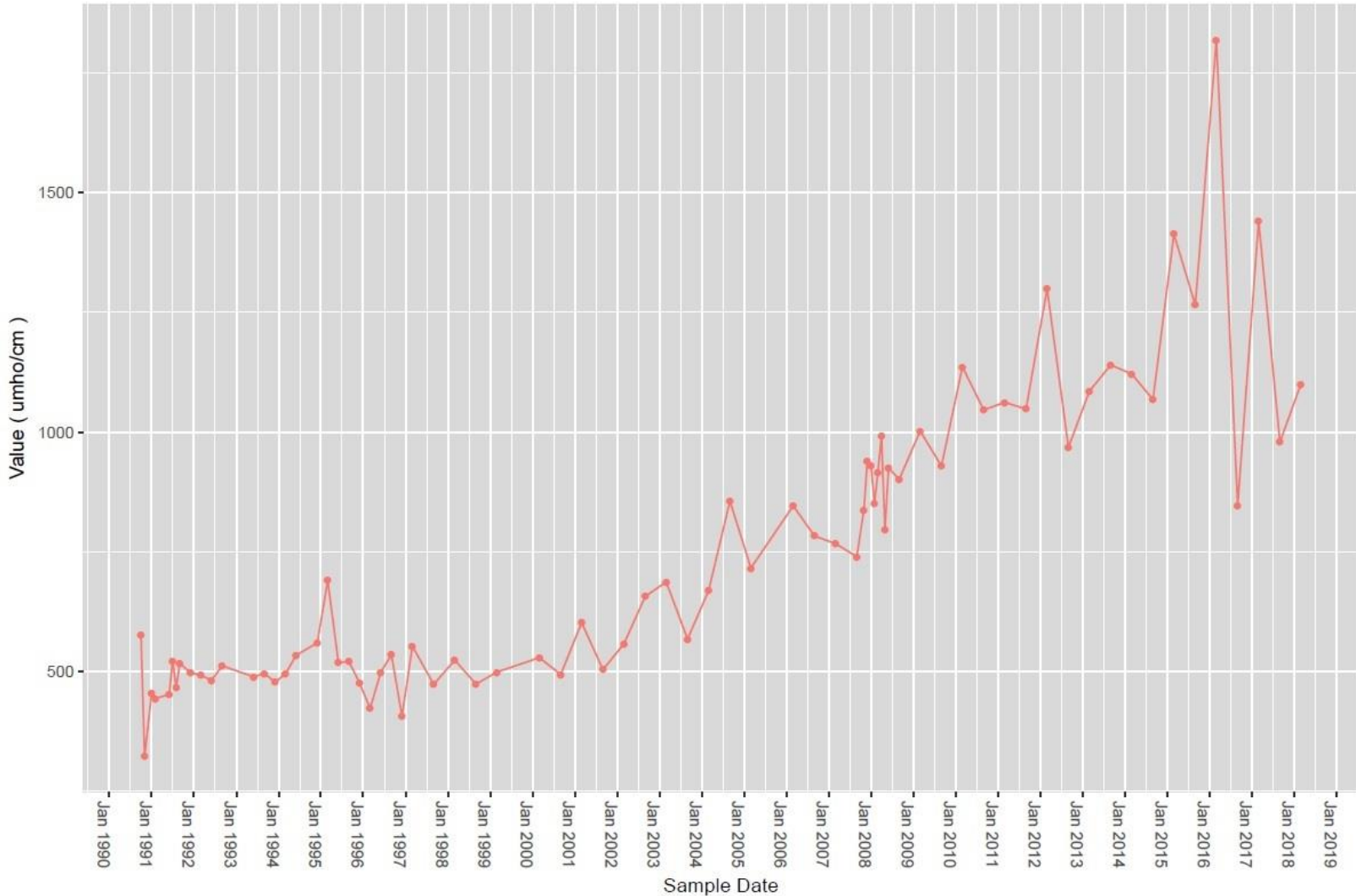
# Groundwater Monitoring

Parameter: 00946, SULFATE, DISSOLVED (MG/L SO4)



# Groundwater Monitoring

Parameter: 00094, SPECIFIC CONDUCTANCE, FIELD (UMHO/CM @ 25C)





# Managing PFAS Waste

- Treatment and Remediation – handling resulting waste
  - PFAS treatment in water is limited to sorption using carbon, mineral media (for example, clay), or a combination
  - Remedy selection based on source, release pathways, affected receptors, and fate and transport in the environment
- Landfill or incineration
- VT DEC guidelines for landfill leachate: 120,000 ppt for PFOA and 1,000 ppt for PFOS
  - Concentrations developed to ensure that receiving waters of WWTFs permitted to receive landfill leachate would not exceed Minnesota’s surface water criteria (standards), as Vermont has no such standard currently



# Managing PFAS Waste

- Storage
  - Hold until more is known
  - NR 502.05 storage facilities
  - Biosolids under WPDES
- Non-landfill facilities
  - Compost sites
  - Recycling facilities



# Managing PFAS Waste

- Generators
  - More scrutiny from landfills
  - Source reduction efforts (P2)
- Remediation or treatment
  - Fate and transport
  - Plan for end of life management (GAC)



# Low Hazard Waste Exemptions

- Sampling and testing
  - Site specific determinations
    - Source
    - Use location
  - Guided by site history
    - Industries known to use PFAS
    - Events – such as fires



# Registrant Issues

- Identifying sources
- Sampling requirements and costs
- Landspreading
- Is incineration the only effective way to destroy PFAS?
- Leachate management and treatment
- Proper PFAS waste management
- What happens if PFAS is detected in leachate?
- Lack of control over PFAS waste in landfills
- Effect on older, closed landfills
- Industrial discharge management and source reduction
- Managing waste filtration media
- Finding background level when “it’s everywhere”





# Next Steps

- More research and welcome input from all interested parties
- Discussions with other states and looking at their research
- Setting up next Waste Subgroup meeting, possible in early November



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# Thank you!

- Next meeting of the full PFAS Technical Advisory Group is September 20, 2019
  - 10:00-2:00
  - Natural Resources Building (GEF2)  
Room G09  
101 S Webster St

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DEPT. OF NATURAL RESOURCES