Bureau of Waste Site Cleanup Advisory Committee Meeting

May 21, 2026
9:30 – 11:30

* *This meeting is being recorded.*

WSC Advisory Committee Meeting Agenda

Welcome / Agenda Review – Adoption	Millie Garcia-Serrano, BWSC
21E Program Updates - 30 minutes	
○ Administrative (5)	Millie Garcia-Serrano, BWSC
○ ER & MOSPRA (5)	Cathy Kiley, BWSC
○ Federal Programs & Brownfields (5)	Diane Baxter, BWSC
○ Policy & Program Development (5)	Brian Roden, BWSC
○ Natural Resource Damages (5)	Michelle Craddock, BWSC
○ Technical & Financial Support (5)	Linda Stafford, BWSC
LSP Board Updates - 5 minutes	Terry Wood, LSP Board
LSP Association Updates - 5 minutes	Katherine Kudzma, LSP Association
Technical Assistance Grant Program Update – 15 minutes	Peggy Shaw, BWSC

MassDEP

WSC Advisory Committee Meeting Agenda

AEPMM Annual Certification Update - 10 minutes	Sarah Hughes, BWSC
PFAS Destruction - 30 minutes	Greg Braun, BPE/ORS Nicole Moody, BPE/ORS
Advisory Committee Refresh - 10 minutes	Millie Garcia-Serrano, BWSC
Q&A – 15 minutes	Millie Garcia-Serrano, BWSC

Total: 120 minutes

Next WSC Advisory Committee Meeting:
Thursday, August 20, 2026 (Virtual)

Mary Dennison Park: Framingham

Administrative Updates

MassDEP
Commonwealth of Massachusetts
Department of Environmental Protection

Millie Garcia-Serrano, MPH, Assistant Commissioner
MassDEP | Bureau of Waste Site Cleanup

Administrative Updates

- Legislative:
  - Mass Ready, (s.2542), most significant environmental legislation moving through legislation
    - House & Senate have not reconciled it, as of yet
    - Conference Committee negotiates a single compromise bill
  - Current legislative session ends July 31st
- MassDEP Budget:
    - Governor's proposed budget $82.14M
  - House Proposal: $81.32M
  - Senate Proposal: $80.36M
  - FY26 GAA + Overrides baseline $85.76M
  - FTE Cap: 789
- What's **New** at MassDEP – *live 5/11/2026,* www.Mass.gov/DEP3
  - **Office of Permitting, Partnership and Performance (DEP3)**
    - Assistance with complex permitting processes, increased accessibility and project timelines transparency
    - Fast Track Permitting projects include:
      - Biotech, energy transit-oriented, **brownfields redevelopment**, solid waste recycling facilities, and smart growth projects

Emergency Response & MOSPRA Program Updates

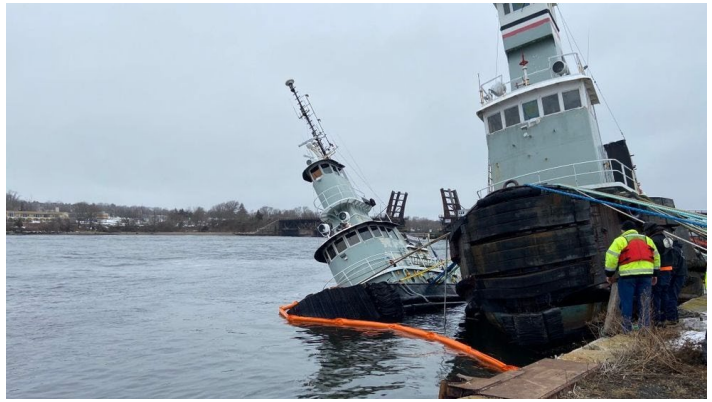
MassDEP
Commonwealth of Massachusetts
Department of Environmental Protection

Cathy Kiley, Emergency Planning & Response Coordinator
MassDEP | Bureau of Waste Site Cleanup

Emergency Response

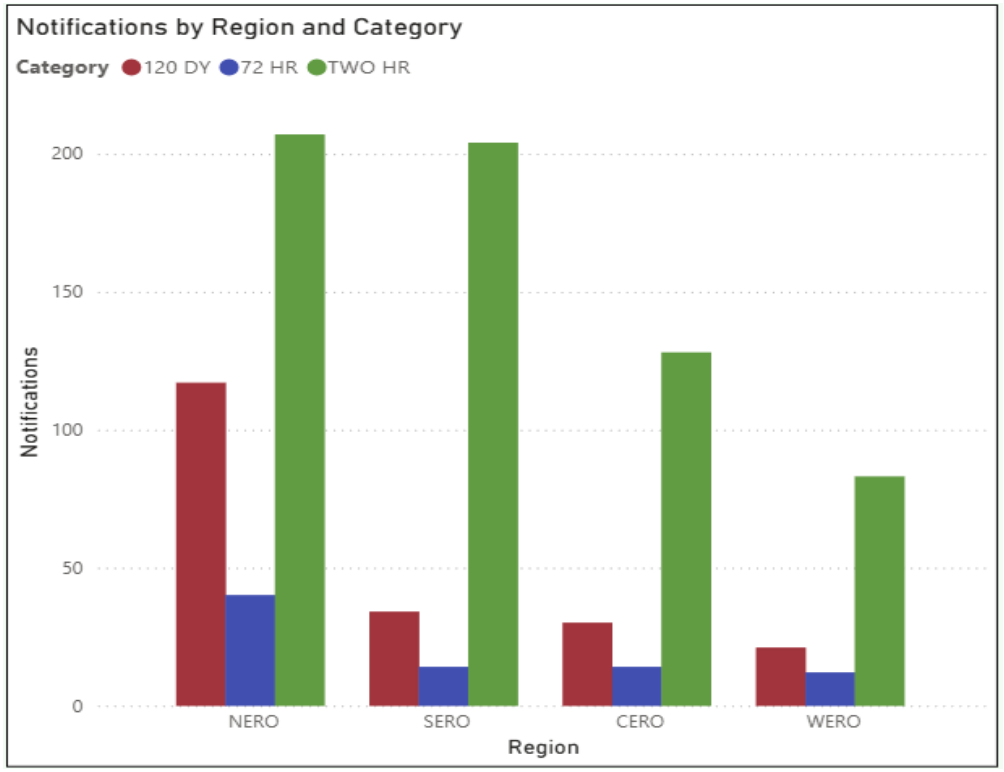
- **Notifications**:
  - FY26 – through 5/12/26: 904 Releases/962 Complaints
    - Majority are 2-hr notifications (622), and majority are roadway (189)

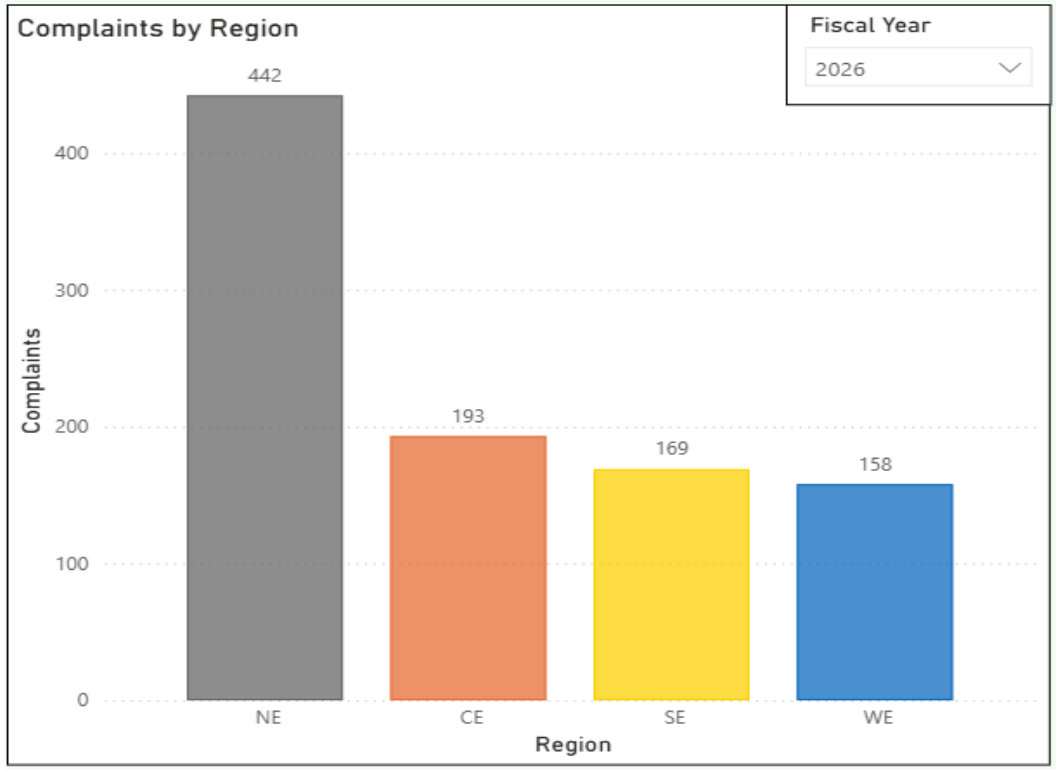
- **Significant Incidents**: 64 through 5/12/26
  - 3/7/26 – Tug sinking, Fall River
  - 5/4/26 –Mid City Scrap Fire, Westport



Emergency Response

- Notifications and Complaints FY2026





Emergency Response

- **Support MEMA/USCG**
  - ESF10 – Operations Support Branch, Debris Assessment and Rapid Damage Assessment
  - February Blizzard 2026 – ESF-10 support to MEMA
  - Marathon April 2026 – ESF-10 support to MEMA
  - FIFA World Cup June/July 2026 – ESF-10

  - Sail Boston July 2026 – ER support to USCG

MOSPRA Program

- https://www.mass.gov/oil-spill-prevention-response
  - Contact: Julie Hutcheson, Julie.Hutcheson@mass.gov
- **Coastal First Responder Training and GRS Testing Exercises**
  - 6 Exercises/Training in Spring 2026
  - 4 Exercises/Training in Fall 2026

2026 Planned Exercises - Spring

Date	Region	Towns
08 APR	North Shore	Beverly, **Salem,** Danvers
13 APR	Mount Hope Bay	**Fall River**
20 MAY	Cape & Islands	Provincetown, Truro, **Wellfleet**
07 MAY	Boston Harbor	Chelsea, **Everett**
13 MAY	Buzzards Bay	Dartmouth, **Westport**
19 MAY	Cape & Islands	Brewster, Dennis, **Harwich**

MOSPRA Highlights

- **Oil Spill Trailers** – 2026 replace 5 trailers due to age/condition
  - Replacement Trailers delivered to:
    - New Bedford, Falmouth, Marshfield, Wellfleet and Provincetown.
- **Grant Program**
  - Round 3 – Announce/Post Grant April 24, 2026 – expect to award >$1 million in grants.
  - Applications due June 19, 2026
  - Available to local communities, non-profits, academia, public and non-public entities, etc.
  - Benefit coastal communities and advance the goals of MOSPRA program – oil spill prevention and response
  - https://www.mass.gov/info-details/marine-oil-spill-prevention-response-grant-program

Federal Programs & Brownfields Updates

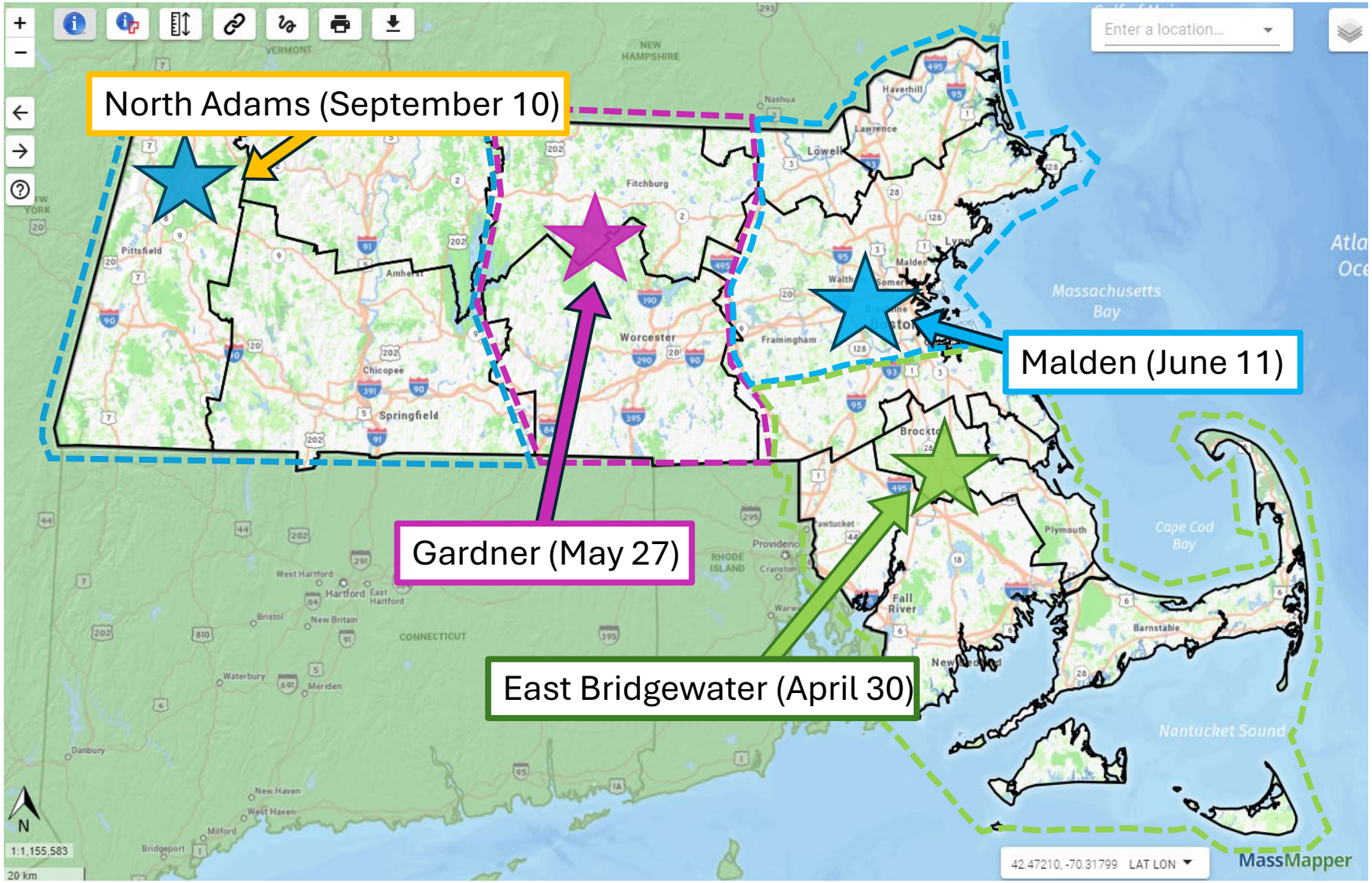
MassDEP
Commonwealth of Massachusetts
Department of Environmental Protection

Diane Baxter, Director,
Division of Federal Grant Programs
MassDEP | Bureau of Waste Site Cleanup

Program Components

- Federal Sites – Superfund and DOD Sites
- CERCLA Pre-Remedial
- RCRA Corrective Action
- Leaking Underground Storage Tanks (LUST)
- ❖ Brownfields

2026 BROWNFIELDS ROUNDTABLES

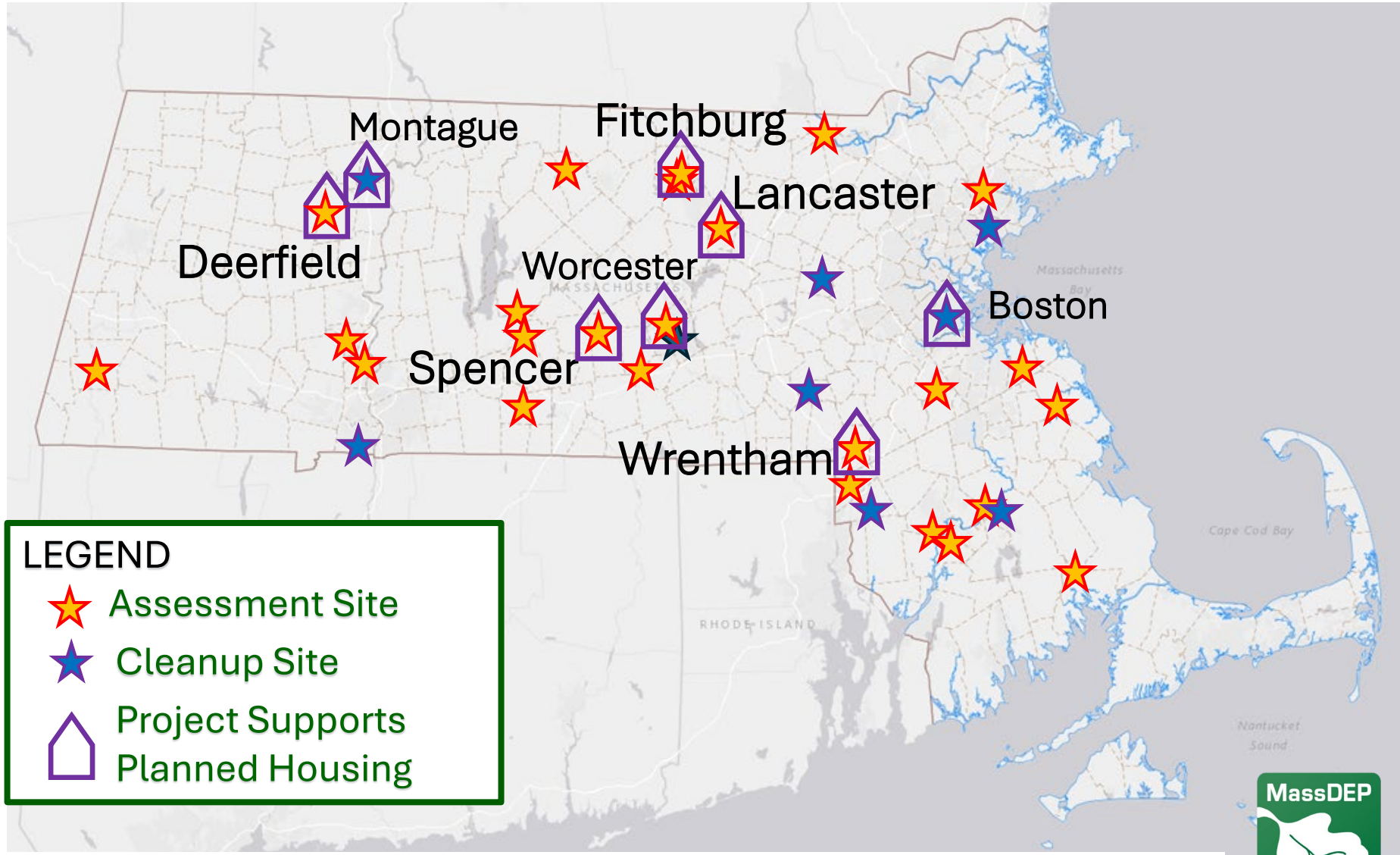


Links to Register: https://www.mass.gov/info-details/brownfields-roundtables

Active & Recent Projects with DEP Funding

CWAG-ST
Assessment
$2,000,000 thru 2029

128a BIL
Assess. or Cleanup
≈ $4,000,000 thru 2027



Assistance Request Form: https://www.mass.gov/doc/brownfields-assistance-request-form/download

Policy & Program Development Updates

MassDEP
Commonwealth of Massachusetts
Department of Environmental Protection

Brian Roden, Policy & Program Development
MassDEP | Bureau of Waste Site Cleanup

Policy/Guidance Updates

FINAL COMPLETE:

- MNA Training, On-Demand (April 9)
- PFAS Training, On-Demand (April 9)
- Petroleum Cleanup Guidance Training, On-Demand (April 9)
- AUL Training, Virtual / On-Demand (June 2)

PUBLIC COMMENT (released)

- Risk Characterization (multiple dates)
- Engineered Barriers (Oct 24, 2025)
- Financial Assurance Mechanisms (Oct 24, 2025)
- COMM-26 Soils (Dec 24, 2025)
- Hazardous Waste Generators at MCP Sites (May 29, 2026)

IN PROGRESS:

- Master Q&A
- UST Closure Assessment Manual
- Vapor Intrusion
- PFAS Q&A / Sampling
- PFAS CAM (533)
- Public Involvement
- AEPMM Operating Regimen
- Characterization of Petroleum Contaminated Sites

TBD:

- Monitored Natural Attenuation
- Asbestos in Soil
- Capping SOP
- Historic Fill

Risk Characterization Guidance Update

- Chapter 11 – Method 3 Risk Characterization
- Chapter 12 – Imminent Hazard Evaluation
- Chapter 13 – Risk of Harm to Safety and Public Welfare

- Posted for public comment on 2024 MCP Amendment webpage: https://www.mass.gov/lists/mcp-amendments

- Comments due by September 15, 2026 to Greg Braun (Greg.Braun@mass.gov)

Natural Resource Damages (NRD) Program Updates

MassDEP
Commonwealth of Massachusetts
Department of Environmental Protection

Michelle Craddock, NRD Program Manager
MassDEP | Bureau of Waste Site Cleanup

Natural Resource Damages Program Highlights

- Restoration Grant Implementation
  - Lowell Parks and Conservation Trust - Centennial Dam Fish Passage (Nyanza)
  - Walpole – Stormwater/Green Infrastructure Upgrades (Blackburn & Union)
  - Housatonic Valley Association – Flood Resilient and Fish Friendly Road Stream Crossings, Churchill Brook Culvert Replacement (GE/Housatonic)
  - Winchester – Davidson Park Riverine, Floodplain, and Riparian Restoration (IndustriPlex)

- Grant Solicitations
  - Mystic River Restoration Grant Announcement (closes May 29, 2026)
  - Rumney Marsh Restoration (anticipated release in fall 2026)

Horn Pond Fish Ladder Construction, Woburn

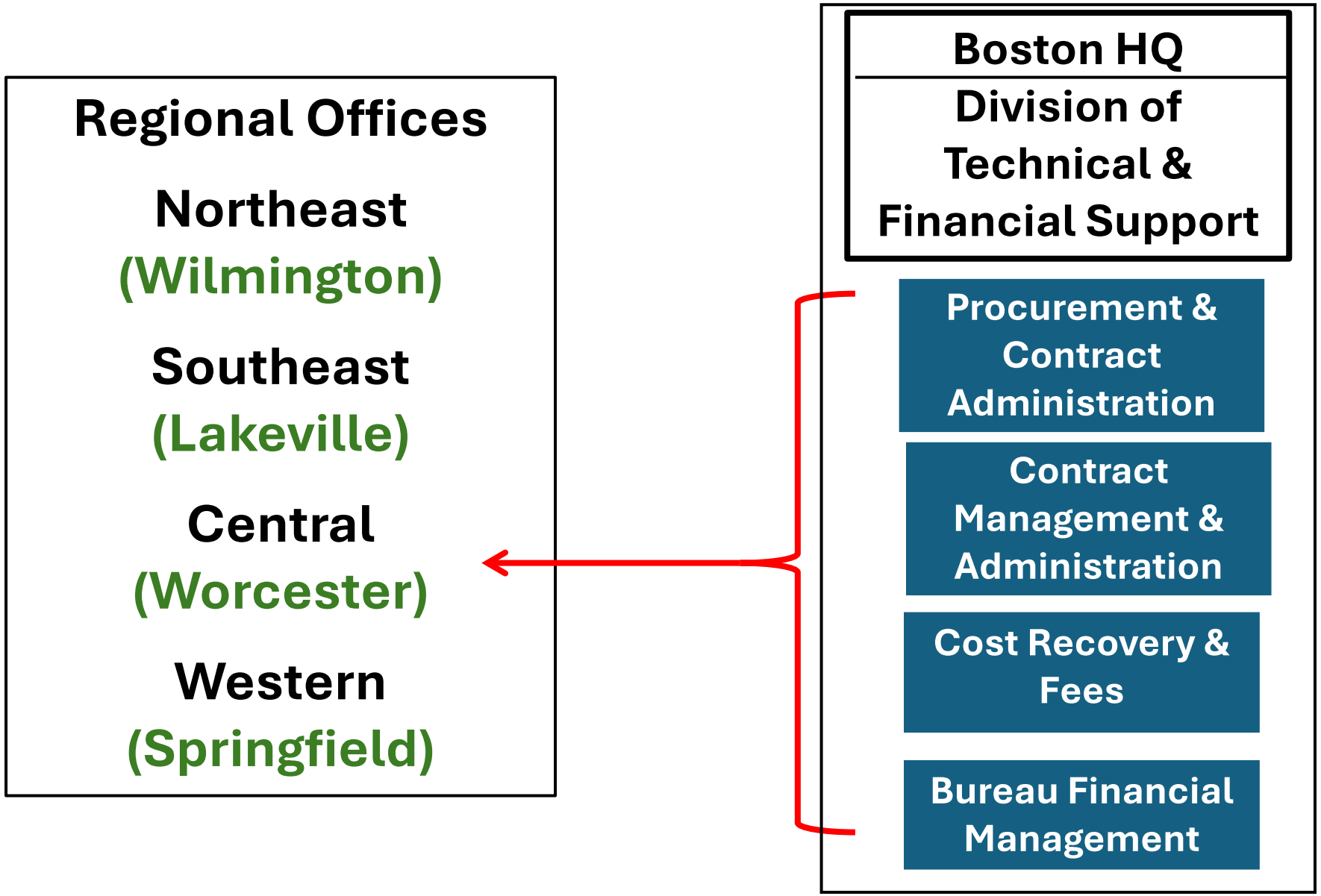
Construction in summer 2026, Funding from Industri-Plex NRD settlement

Technical & Financial Support (TFS) Program Updates

MassDEP
Commonwealth of Massachusetts
Department of Environmental Protection

Linda Stafford, Division Director
MassDEP | Bureau of Waste Site Cleanup

Bureau of Waste Site Cleanup



Contract Administration Highlights

166 projects provide contractor assistance to protect the Commonwealth's public health and the environment from releases of oil and hazardous material.

7 Total MSA Contracts	FY26 YTD Task Assignments/Projects	Dollar Value
Emergency Response	36	$282,475
Site Assessment and Remediation Support Services	60	$8,000,000
Immediate Response Action - Support Services	22	$633,441
Immediate Response Action – OMM	6	$300,852
Lab Support Services	17	$64,940
Marine Oil Spill Prevention & Response	12	$512,860
Natural Resource Damages	13	$1,555,911
Totals	**166**	**$11,350,480**

Procurement and Purchasing Updates

- State-wide Accounting System Replacement
  - MMARS to Mosaic Implementation went live in February 2026
  - Extensive Staff Training pre- and post-implementation

- BWSC Active Projects require TFS Administration and Management Support:
  - 118 Encumbrances FYTD
  - $12,573,445 Invoices Audited and Processed for Payment FYTD

Cost Recovery & Fee Updates

Fees recover a portion of MassDEP's costs to regulate sites where there has been a release or threat of release of oil or hazardous materials.

Program	Fiscal Year 2024	Fiscal Year 2025	Fiscal Year 2026 (through 5-14-26)
Hazardous Waste Transporter Fees	$5,900,746	$6,275,019	$5,114,995
Annual Compliance Fees	$3,220,889	$3,297,605	$1,636,998
Cost Recovery	$ 261,326	$ 257,614	$ 313,023
Totals	**$9,382,961**	**$9,830,238**	**$7,065,016***

*May trend lower in FY26 due to issues related to the transition from MMARS to Mosaic

BWSC - Financial Management

Where does the money come from to support the Bureau of Waste Site Cleanup Programs?

- Annual Operating Budget
- Capital Budget (Bond Funding)
- Federal Grants
- Trust Accounts
- Earmarks (State and Federally Funded)

Licensed Site Professional Board Updates

MassDEP
Commonwealth of Massachusetts
Department of Environmental Protection

Terry Wood, Executive Director
MA Licensed Site Professional Board (LSPB)

Licensed Site Professional Association Updates

MassDEP
Commonwealth of Massachusetts
Department of Environmental Protection

Katherine Kudzma, LSPA Board of Directors
MA Licensed Site Professional Association (LSPA)

LSP Association
assess. advise. restore.

LSPA UPDATE

MassDEP BWSC Advisory Committee Meeting
May 21, 2026

WWW.LSPA.ORG

UPCOMING COURSES & MEETINGS

- **May 28: Emerging Professionals Event:** *Soil Classification Training with a Focus on Historic Fill (Verdantas, Holden, MA)*—***SOLD OUT!***
- **June 2: Course:** *Getting AULs Right: Guidance Updates, Audit Trends and Enforcement Review* with MassDEP *(Zoom)*
- **June 10: June 2026 Membership Meeting:** *Lessons Learned from MassDEP Notice of Audit Findings (NOAFs): Vapor Intrusion (Zoom)*
- **June 16: Emerging Professionals Event:** *Path to the LSP—Considerations for LSP Exam Preparation (Zoom)*

Visit www.lspa.org for more information.

LSP Association
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SAVE THE DATE!

September 2026 Membership Meeting

MassDEP's BWSC Annual Program Updates and Year-in-Review

September 17, 2026 | Westborough, MA

MassDEP

2026 CONTRIBUTION TO THE PRACTICE AWARDS

Contribution to the LSP Practice Awards recognize outstanding individuals and organizations and their contributions to the field of hazardous waste site cleanup in Massachusetts.

Nominations are solicited in the following categories:

- The LSPA Member Award
- The LSPA Service Award
- The Contribution to the Practice Award
- The LSPA Environmental Justice Award
- The Lifetime Achievement Award

Nominate an individual or organization at www.lspa.org.

Deadline for nominations is July 31, 2026.

LSPA GRANT PROGRAMS

ENVIRONMENTAL JUSTICE (EJ) GRANT PROGRAM

- **WHO**: Nonprofit environmental advocacy groups, community-based groups, environmental education organizations, and/or volunteer efforts.
- **WHAT**: Projects that benefit the environment in MA communities with EJ populations.
- **FUNDING**: Up to $5000.
- **EXAMPLES**: Property and watershed clean-ups; restoration of natural habitats; community gardening; waste collection efforts; assessing and mitigating climate change impacts; water conservation; facility siting issues; youth education / career development; technical assistance.

WES LSP PRACTICE GRANT PROGRAM

- **WHO**: LSPA members.
- **WHAT**: Projects that advance the profession and generate practical resources for the LSPA membership and broader waste site cleanup community (e.g., white paper, article, presentation, webinar).
- **FUNDING**: Up to $7500.
- **EXAMPLES**: Air Monitoring Data at Asbestos-In-Soil Sites; High Viscosity LNAPL Recoverability Assessment; Assessment of PFAS Data in New England from Known Sites; Evaluation of Elevated Background Concentrations of Lead in Urban Fill; Background Indoor Air Levels of VOCs and APH in Office Buildings, Commercial Buildings, and Schools.

Applications open March 31, 2026; due by July 1, 2026.

Visit www.lspa.org for more information.

LSP Association
assess. advise. restore.

THANK YOU!

WWW.LSPA.ORG

Technical Assistance Grant Program Updates

MassDEP
Commonwealth of Massachusetts
Department of Environmental Protection

Margaret Shaw
MassDEP | Bureau of Waste Site Cleanup

Overview of TAG Program

- Public Involvement is a key component of the Waste Site Cleanup Program and Massachusetts Contingency Plan (MCP)
- TAG purpose is to support effective public involvement during assessment and cleanup of disposal sites by:
  - Assisting community and citizens' groups in obtaining expert technical assistance to understand and evaluate disposal site cleanup response actions
  - Enhancing public education about and participation in disposal site assessment and cleanup activities

Background of TAG Program

- First TAGs were awarded in 1995
- Program continued most years through 2002
- Additional funding rounds 2007-2010
- Offered funding rounds annually from SFY2022 – SFY2026
- 26 TAGs awarded since reintroducing TAG Program

Current Funding Round - SFY27-28

- TAG Opportunity and Application were released on Wednesday, May 13, 2026
- Total funding available = $200,000
- Typical grant award to any individual applicant of up to $20,000

TAG Procurement Calendar

	Date	Time
Notice of Grant Opportunity (posted on COMMBUYS and MassDEP website)	Wednesday, May 13, 2026	
TAGs Grant Opportunity and Grant Application Release Date (Posting Date) on MassDEP website https://www.mass.gov/service-details/technical-assistance-grants-waste-site-cleanup	Wednesday, May 13, 2026	
Deadline for submission of written questions	Friday, July 10, 2026	5 P.M.
Official answers for Q&A published on MassDEP webpage	Friday, July 24, 2026	
GRANT APPLICATION DEADLINE	Friday, August 28, 2026	5 P.M.
Estimated date of announcement of Grant Awards (posted on COMMBUYS and MassDEP webpage)	Friday, December 11, 2026	
Estimated contract start date	Friday, February 12, 2027	

TAG Application Process

- All application materials are available for download at: https://www.mass.gov/service-details/technical-assistance-grants-waste-site-cleanup
  - ➢Application is a fillable Word document; submitted via email

- Applications and all supporting documents submitted electronically by 5pm on Friday, August 28, 2026 to TAG.BWSC@mass.gov

Who Can Apply?

Eligible applicants include:

- Groups of individuals, such as community groups and neighborhood associations (also, existing "PIP groups")
- A district or other body politic that owns or operates a public water supply
- A city, town or agency
- “[A]ffected by [OHM] from any eligible disposal site”

Who Can Not Apply?

Ineligible applicants include those who:

- Own or operate the disposal site
- Are conducting or funding assessment or cleanup work at the disposal site

Which Disposal Sites are Eligible?

Disposal sites in Massachusetts that are:

- Classified as Tier I and Tier II
- Considered to be “Adequately Regulated”
- Have not reached a Permanent Solution

How May TAG Funds Be Used?

Eligible activities include:

- Obtaining expert advice
  - Licensed Site Professional (LSP), environmental consultant, attorney, other professional (e.g., interpreter/translator)
- Interpreting technical information and environmental data from the disposal site
- Conducting public education activities

How are TAG Applications Evaluated?

- TAGs are subject to competitive bidding process
- Applications will be scored based on various criteria, including but not limited to:
  - Disposal site details (site status, contamination, ongoing response actions)
  - Impact of disposal site on affected community
  - Proposed project ability to increase public awareness and community engagement
  - Implementation capacity

Examples of TAG Projects

- Funded a technical expert to facilitate communication between the public and other stakeholders about ongoing response actions at an adequately regulated landfill
- Funded risk assessment expert to review existing disposal site data sets and provide an evaluation of risk characterization
- Funded translation of information on response actions being conducted at disposal site in a multilingual neighborhood
- Funded an LSP to assist a municipality in understanding and communicating to the public complex technical information related to PFAS contamination at an eligible disposal site that has been established to be impacting downgradient residential drinking water wells
- *See TAG webpage for full list of TAG recipients and projects*

TAG Award and Contract

- One award per applicant group per funding round
- One award per disposal site per funding round
- An award may be used by an applicant group for more than one disposal site
- Duration: contract ends on June 30, 2028
- Reimbursement for expenses incurred after TAG contract has been executed

For More Information…

General information about TAG Program:

https://www.mass.gov/service-details/technical-assistance-grants-waste-site-cleanup

General inquiries to: TAG.BWSC@mass.gov

TAG contacts:

Nancy Fitzpatrick
Nancy.Fitzpatrick@mass.gov
(617) 897-9474

Peggy Shaw
Margaret.Shaw@mass.gov
(617) 874-6467

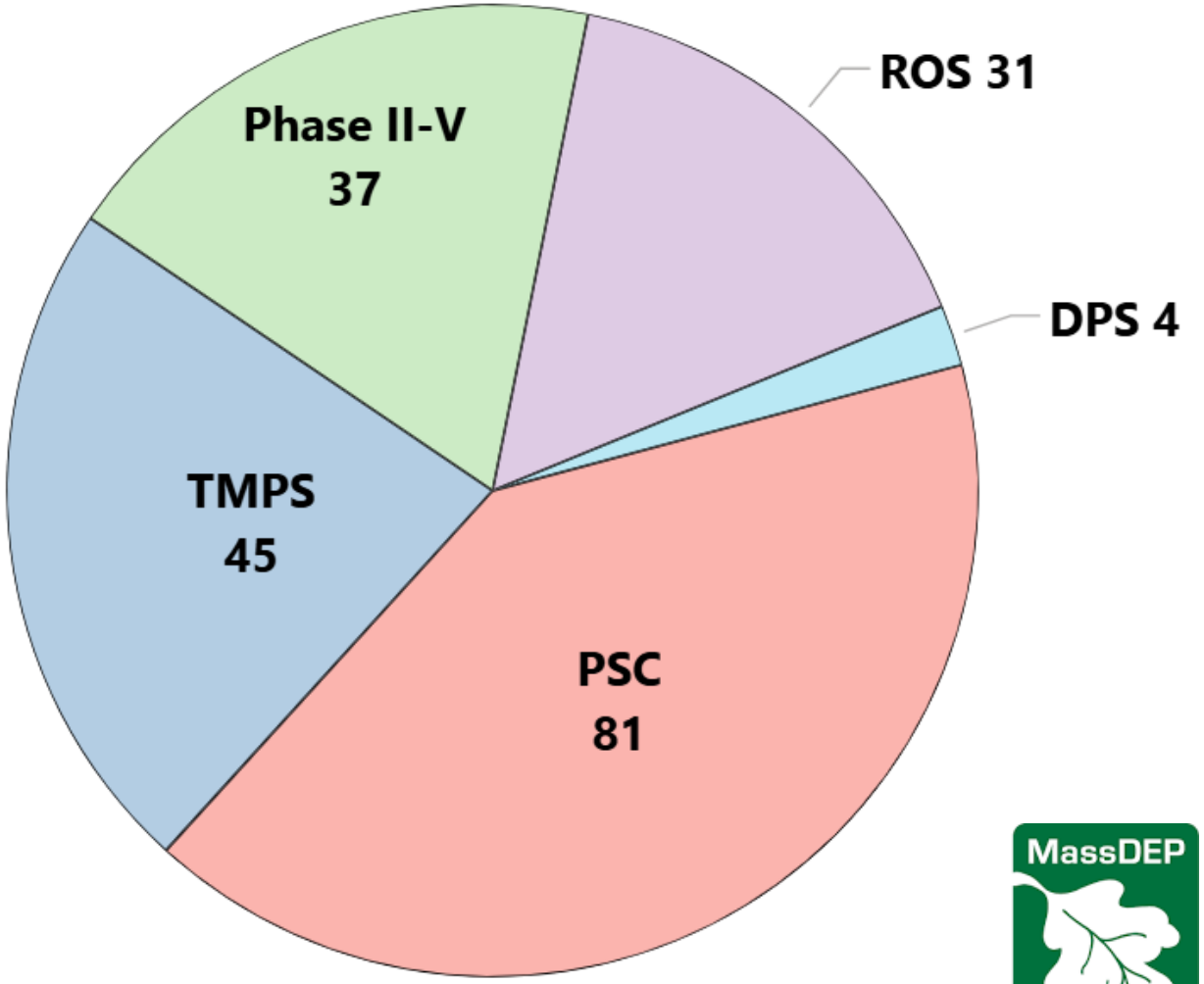
AEPMM Annual Certification Updates

MassDEP
Commonwealth of Massachusetts
Department of Environmental Protection

Sarah Hughes, Audit & Enforcement Assistant
MassDEP | Bureau of Waste Site Cleanup

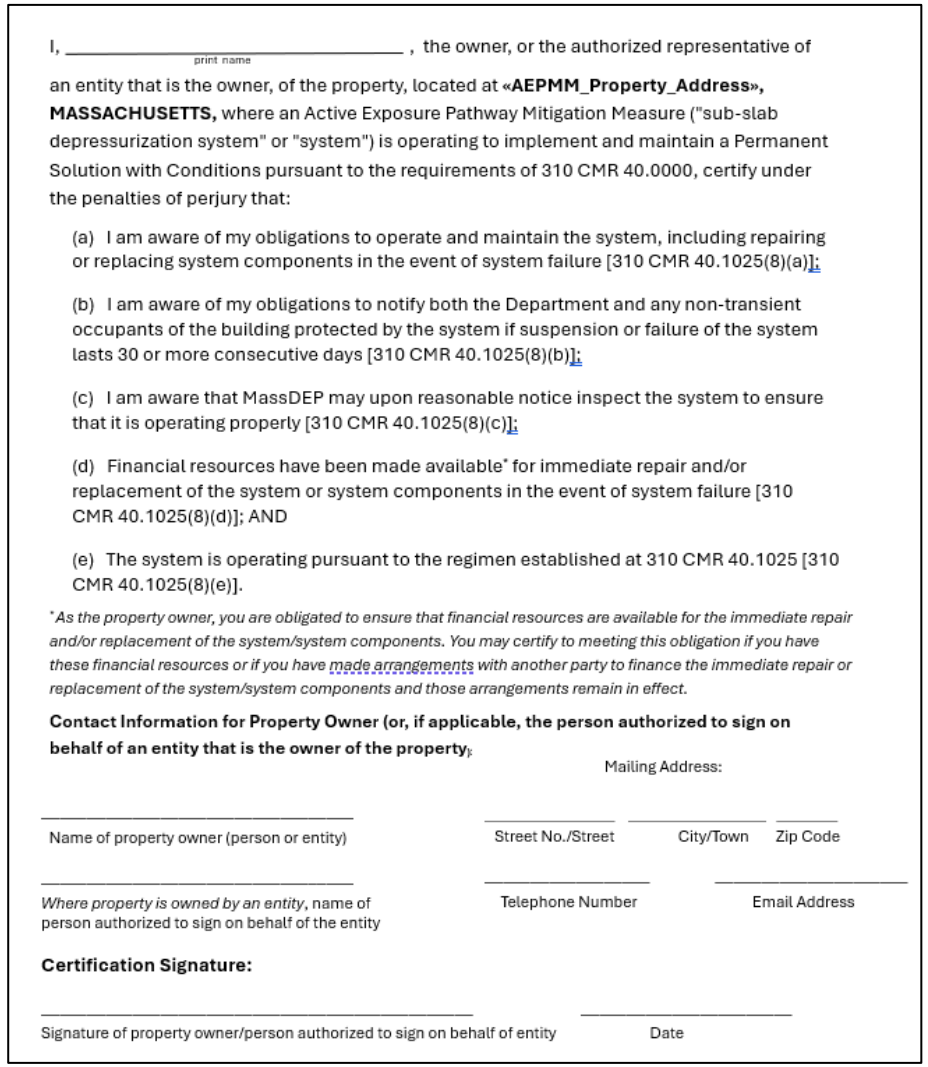
Registered AEPMMs

- 198 RTNs have registered telemetry for an AEPMM
- 87 of these RTNs have a Permanent Solution with Conditions requiring operation of the AEPMM
- Telemetry registration is only required for AEPMM as PS (310 CMR 40.1025) or TS/ROS (310 CMR 40.1026)
- Early registration encouraged



Annual Certification Letters

- As required by 310 CMR 40.1025(8), owners of properties where an AEPMM is operating under a PSC must annually certify that they are aware of their obligations regarding operation and maintenance of the AEPMM.
- The Annual Certification also requires property owners to complete a shutdown/restart test to confirm that the telemetry system is operating properly (310 CMR 40.1025(9)).



I, _____ , the owner, or the authorized representative of
print name

an entity that is the owner, of the property, located at **«AEPMM_Property_Address», MASSACHUSETTS,** where an Active Exposure Pathway Mitigation Measure ("sub-slab depressurization system" or "system") is operating to implement and maintain a Permanent Solution with Conditions pursuant to the requirements of 310 CMR 40.0000, certify under the penalties of perjury that:

(a) I am aware of my obligations to operate and maintain the system, including repairing or replacing system components in the event of system failure [310 CMR 40.1025(8)(a)];

(b) I am aware of my obligations to notify both the Department and any non-transient occupants of the building protected by the system if suspension or failure of the system lasts 30 or more consecutive days [310 CMR 40.1025(8)(b)];

(c) I am aware that MassDEP may upon reasonable notice inspect the system to ensure that it is operating properly [310 CMR 40.1025(8)(c)];

(d) Financial resources have been made available* for immediate repair and/or replacement of the system or system components in the event of system failure [310 CMR 40.1025(8)(d)]; AND

(e) The system is operating pursuant to the regimen established at 310 CMR 40.1025 [310 CMR 40.1025(8)(e)].

***** *As the property owner, you are obligated to ensure that financial resources are available for the immediate repair and/or replacement of the system/system components. You may certify to meeting this obligation if you have these financial resources or if you have made arrangements with another party to finance the immediate repair or replacement of the system/system components and those arrangements remain in effect.*

Contact Information for Property Owner (or, if applicable, the person authorized to sign on behalf of an entity that is the owner of the property):

Mailing Address:

Name of property owner (person or entity) | Street No./Street | City/Town | Zip Code

Where property is owned by an entity, name of person authorized to sign on behalf of the entity | Telephone Number | Email Address

Certification Signature:

Signature of property owner/person authorized to sign on behalf of entity | Date

Shutdown and Restart Test

- Property owners must document a shutdown and restart test of each fan or blower.
- Verify that MassDEP receives both shutdown and restart notifications from the remote telemetry device in the proper format and follow-up with the property owner if the test was not successful.

Requested System Shutdown and Restart Test: Please document the shutdown and restart for each device (fan or blower) using the table below or attach additional documentation.

Device Number	Event Description	Event Date	Event Time

Annual Certification Letters & Compliance History (2024 – 2026)

- This year, 85 letters were mailed to property owners on March 12, 2026
  - 26 Interim Deadline Letters (IDLs) issued on May 12, 2026 via certified mail
  - 59 signed Annual Certification Forms returned to DEP
- In 2025, 74 letters issued, followed by 32 IDLs, 7 NONs, and 1 ACOP
- In 2024, 72 letters issued, followed by 16 IDLs, 5 NONs, and 1 ACOP

- Please contact Sarah Hughes (sarah.m.hughes@mass.gov) for more information

Accounting for Fluorine Mass from PFAS Destruction Technologies: A Regulatory Perspective

Nicole Moody, PhD

Bureau of Policy and Evaluation

Office of Research and Standards, MassDEP

Collaborators

Wendy Heiger-Bernays, PhD

Chief, Research Division

Office of Research and Standards

Greg Braun, MS

Chief, Risk Analysis Division

Office of Research and Standards

C. Mark Smith, PhD, MS

Director

Office of Research and Standards and Science Program,

Division of Environmental Laboratory Sciences,

Wall Experiment Station

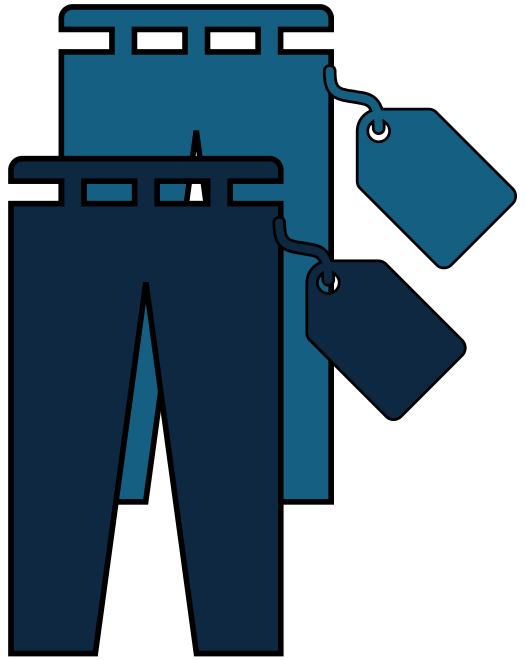
Traditional Compliance Monitoring

Is the PFAS below the regulatory limit?

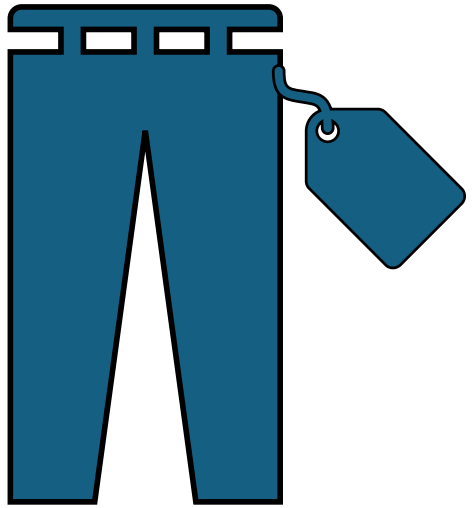
Is the PFAS removed or destroyed?

Verifying PFAS Destruction

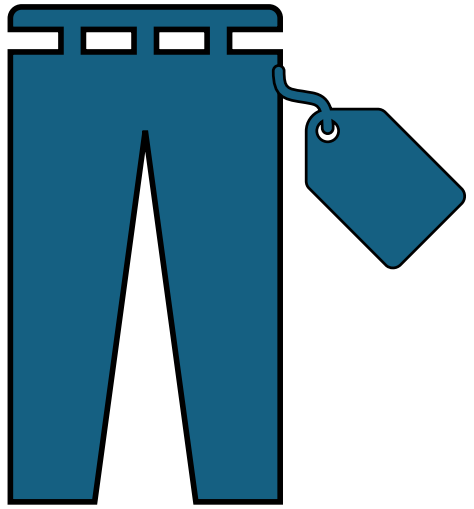
Target PFAS Analysis – An Analogy



Target PFAS Analysis – An Analogy

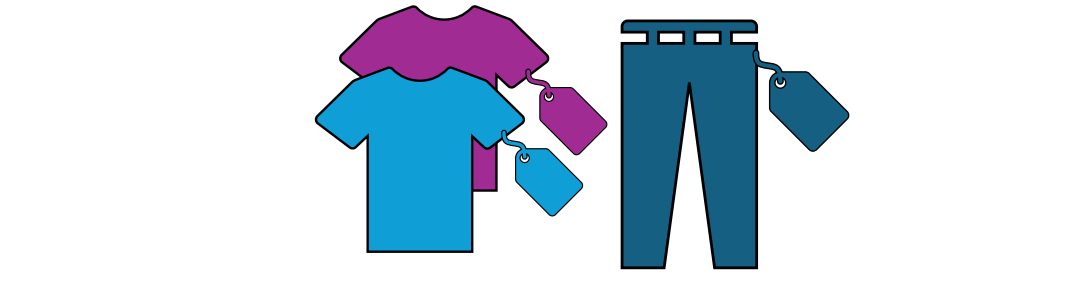
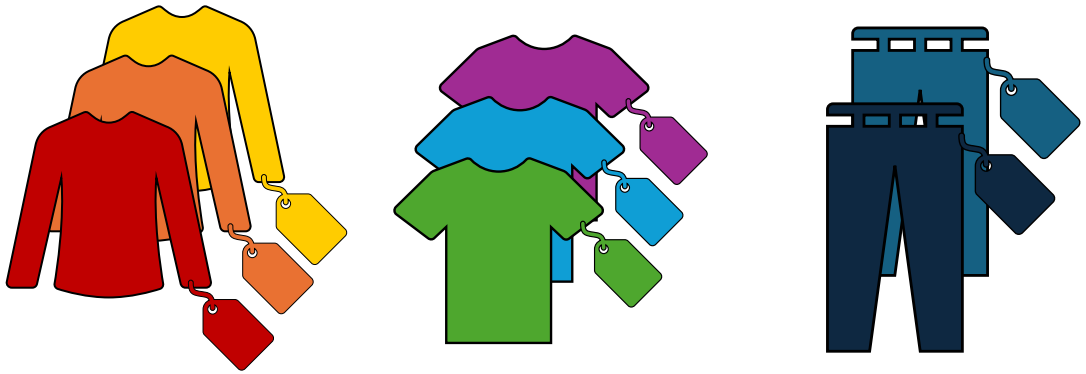


Target PFAS Analysis – An Analogy



What percentage of products were removed from the waste stream?

Target PFAS Analysis – An Analogy

$$= 1 - \frac{\text{  }}{\text{  }}$$

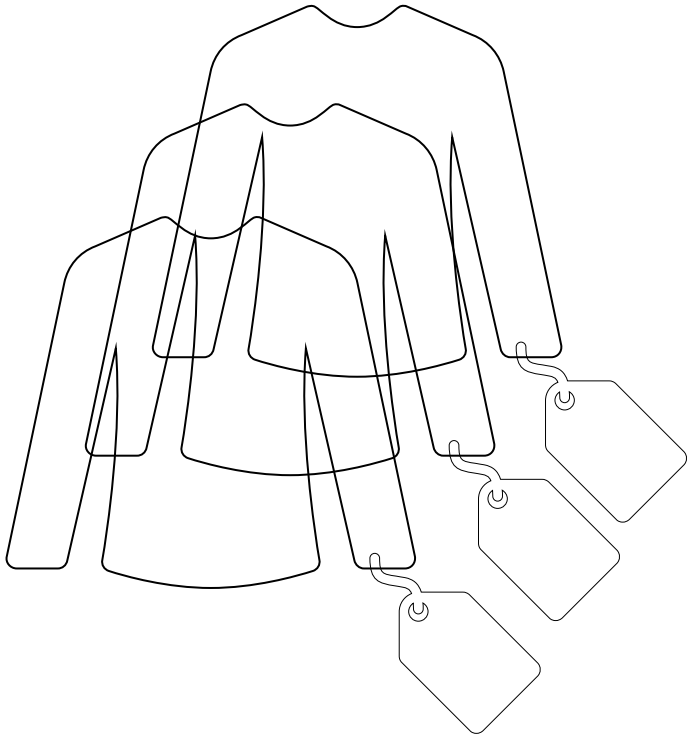
Target PFAS Analysis

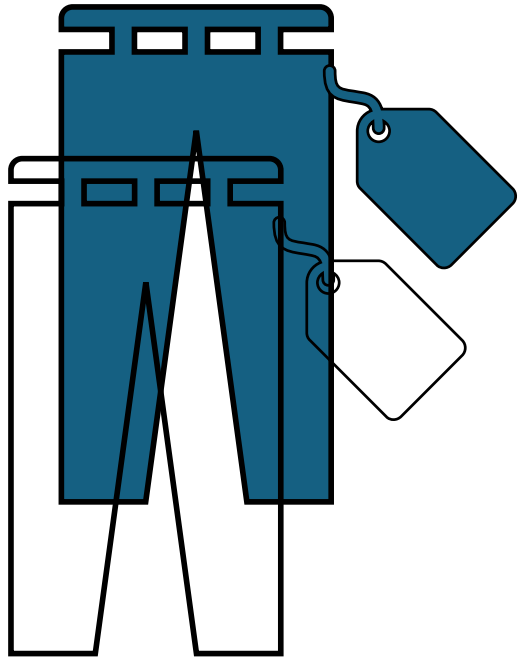
- List of target analytes with a unique “barcode” for each PFAS
- EPA methods include 537.1 and 533 for potable water, 1633 for non-potable water, leachate, solids, OTM-45 and OTM-50 for air
- Low (ng/L = ppt) detection limits
- Can calculate removal/ destruction efficiency as

$$1 - \frac{PFAS_{effluent}}{PFAS_{influent}}$$

Target PFAS Analysis Limitations

Based on absence from inventory





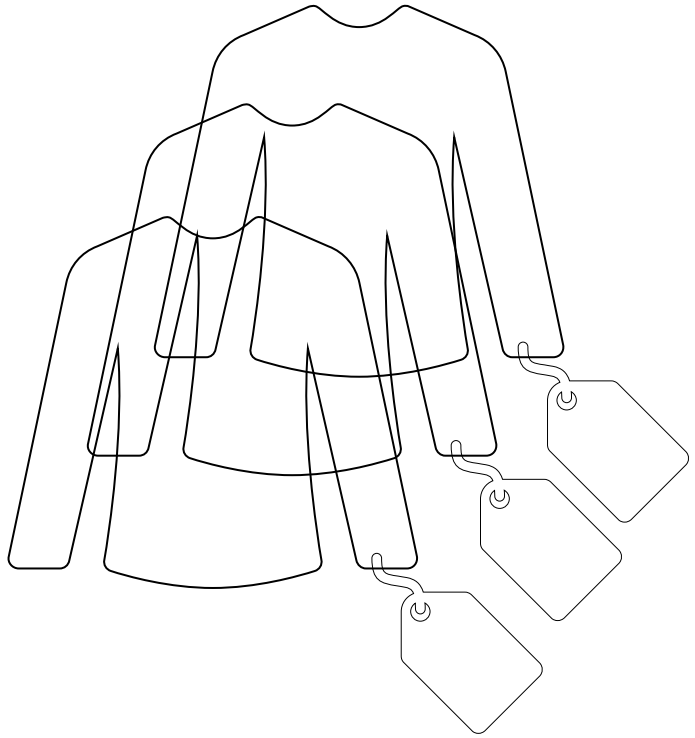
concluded that **5 products** were removed from the waste stream

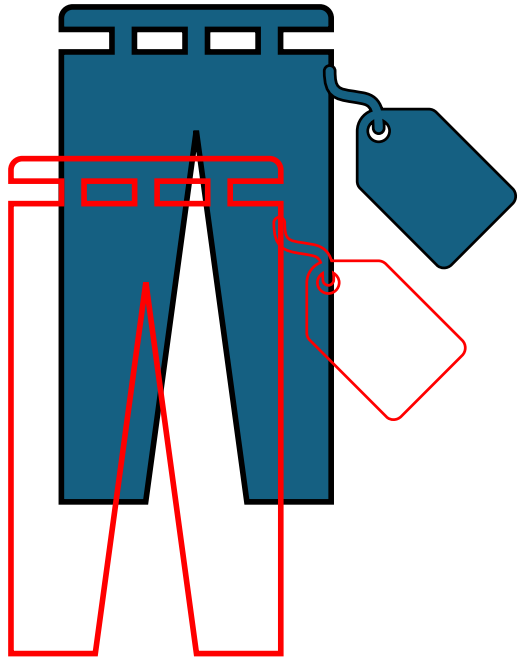
Target PFAS Analysis Limitations: Uncharacterized Waste Streams

However, **1 of the 5 products <u>wasn't removed</u>**, just relocated to a different waste stream

Target PFAS Analysis Limitations: Uncharacterized Waste Streams

A more thorough inventory of waste streams revealed





1 product wasn’t actually removed.

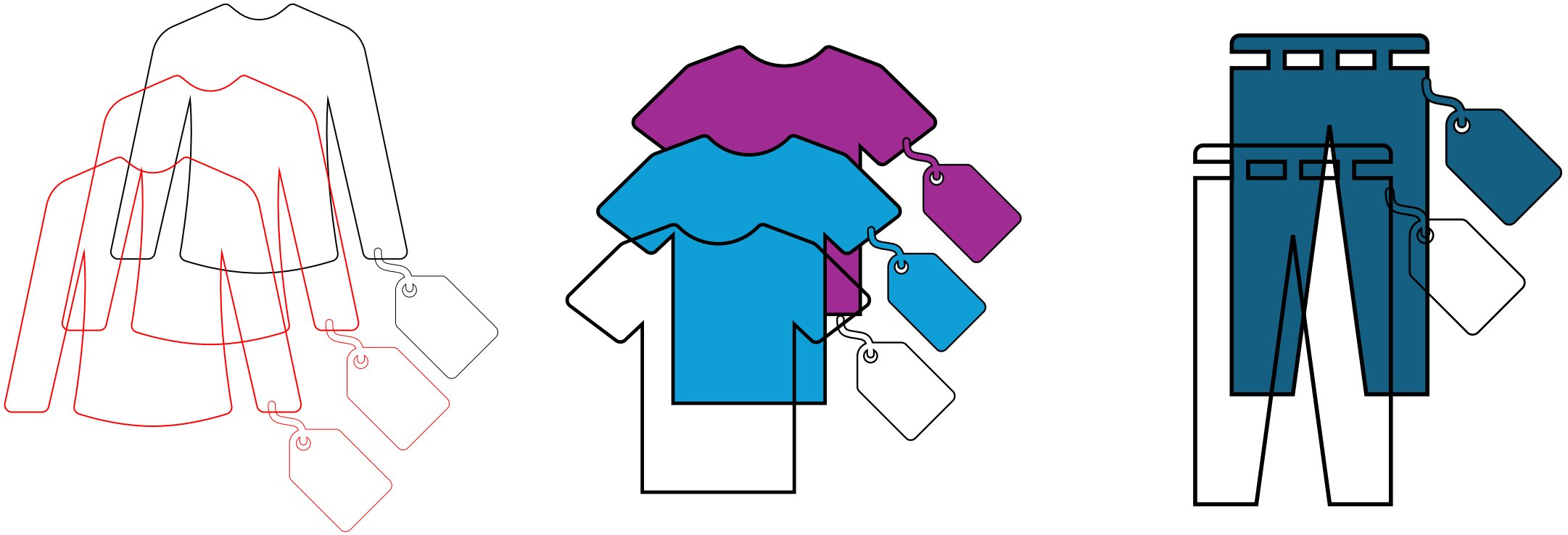
Target PFAS Analysis Limitations: PFAS Transformation

2 of the 5 products <u>weren't removed</u>

They just lost their barcodes

Target PFAS Analysis Limitations: PFAS Transformation

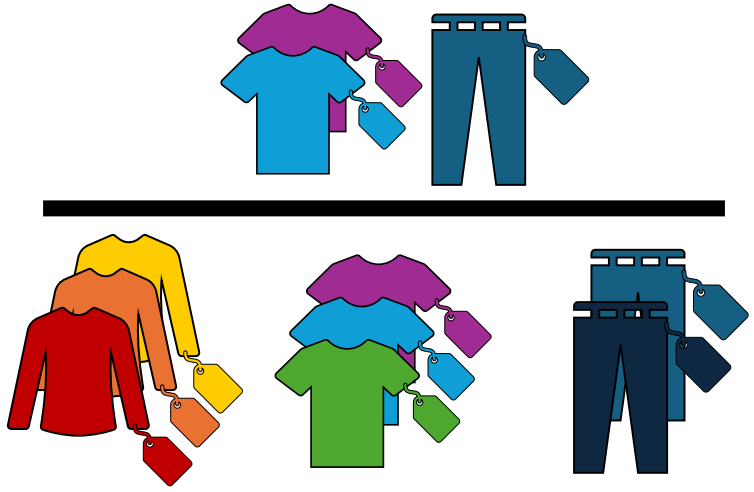
An expansion of analysis revealed



2 products weren’t removed but rather transformed

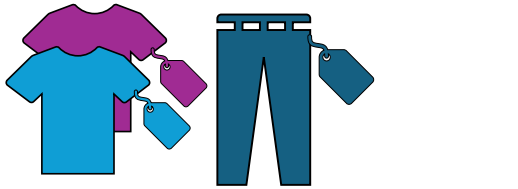
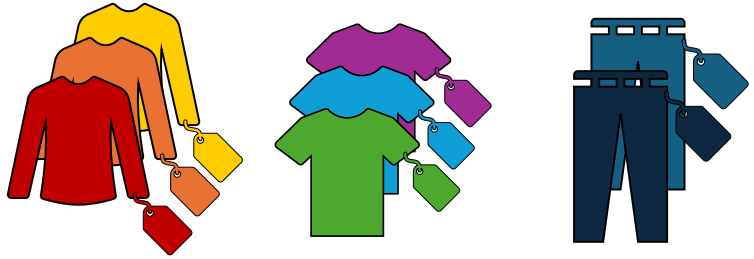
Target PFAS Analysis Limitations

Calculated
removal efficiency

$$1 - \frac{\text{  }}{\text{}} = 62\%$$

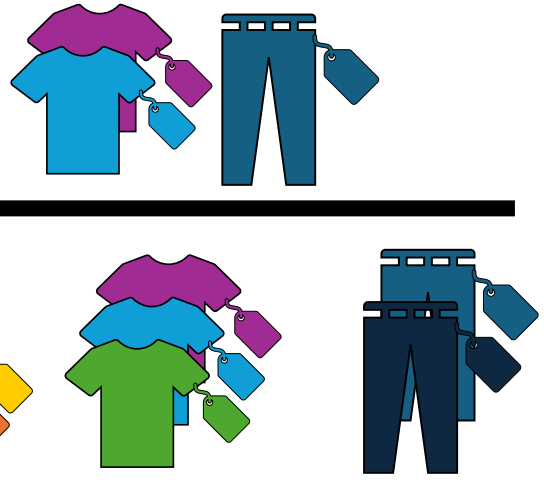
Target PFAS Analysis Limitations

Calculated
removal efficiency

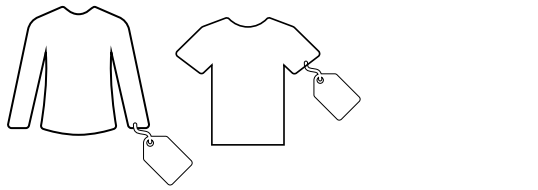
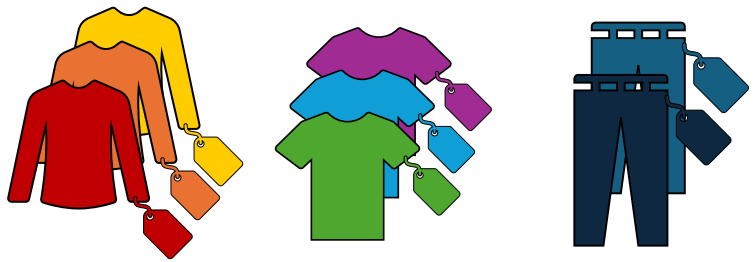
$$1 - \frac{\text{  }}{\text{  }} = 62\%$$

Target PFAS Analysis Limitations

Calculated
removal efficiency

$$1 - \frac{\text{  }}{\text{}} = 62\%$$

Actual
removal efficiency

$$\frac{\text{  }}{\text{  }} = 25\%$$

Target PFAS Analysis Limitations

Measuring destruction/removal efficiency based on the absence of target PFAS has inherent limitations

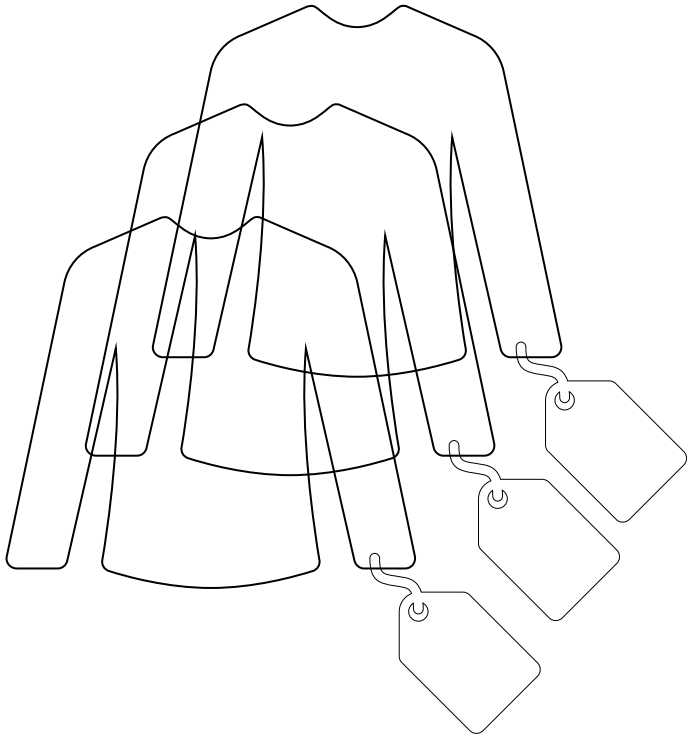
PFAS may be emitted in uncharacterized waste streams

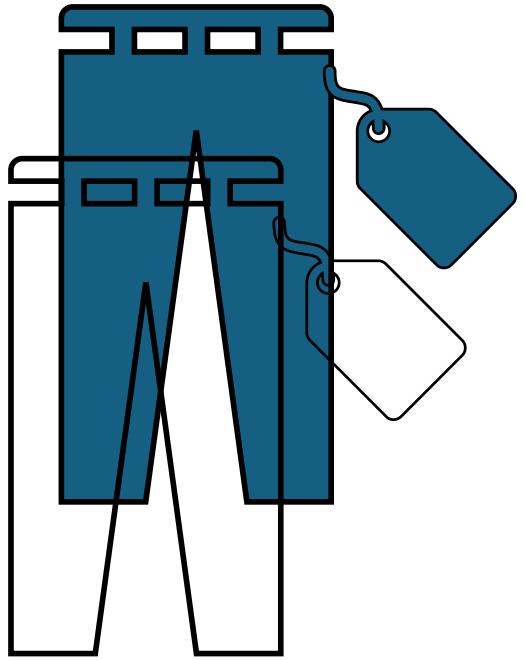
PFAS could transform into PIDs that aren't on analyte list

- Transformed PFAS may be even more challenging to remove/destroy

Alternative Evaluations

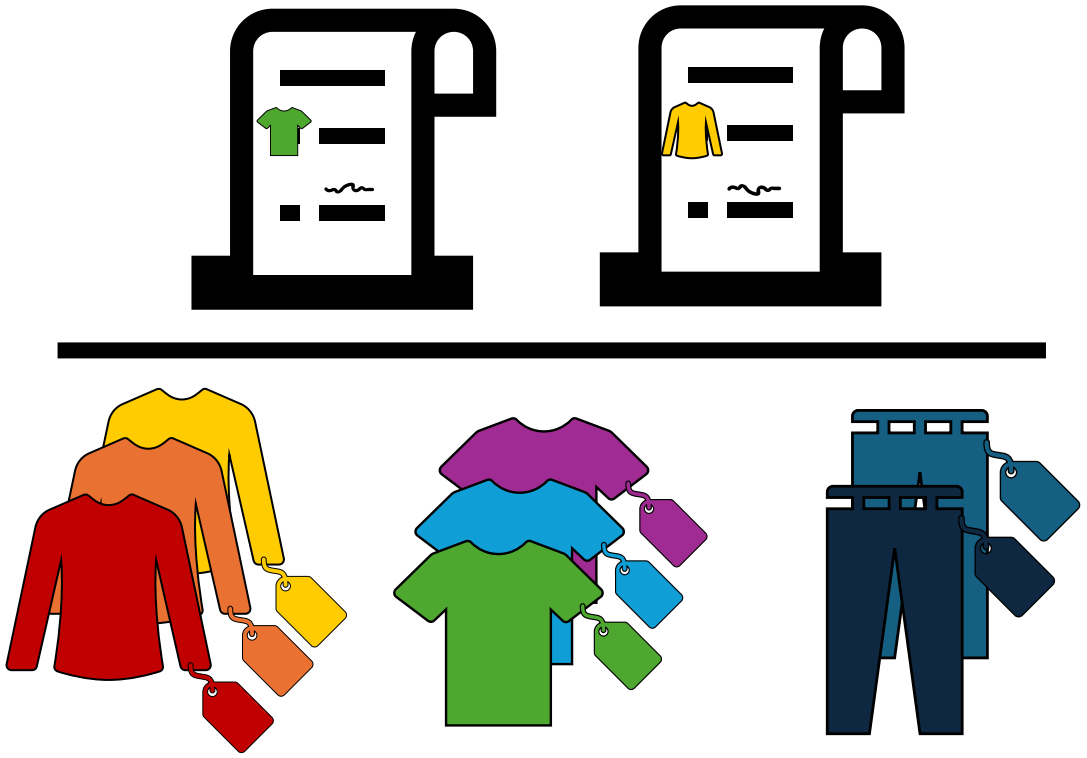
Used absence of inventory to estimate product removal.



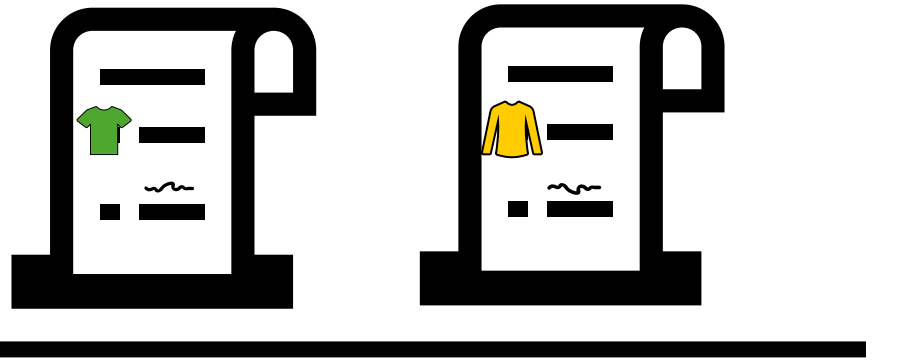


What are alternative ways to track products?

Concentration Technologies: Check the “receipts”

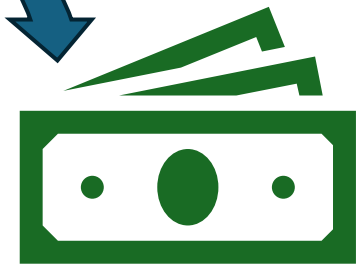


Concentration Technologies: Check the “receipts”

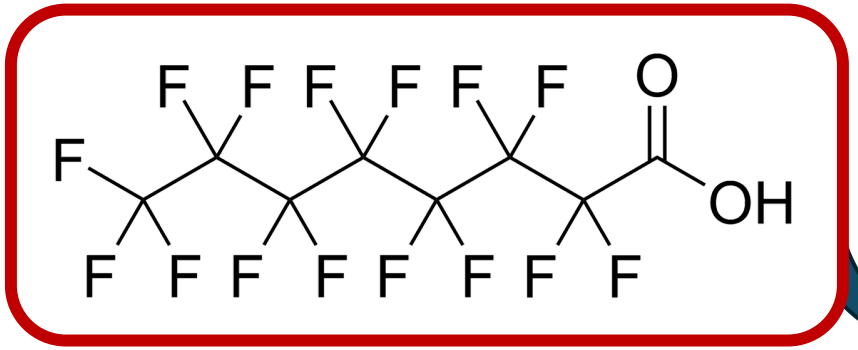
$$\%_{capture} = \frac{\text{  }}{\text{  }} = \frac{PFAS_{concentrate}}{PFAS_{influent}}$$

Sample adsorbent beds, foamate, etc. to evaluate % capture

Destruction Technologies: Check the “cash register”

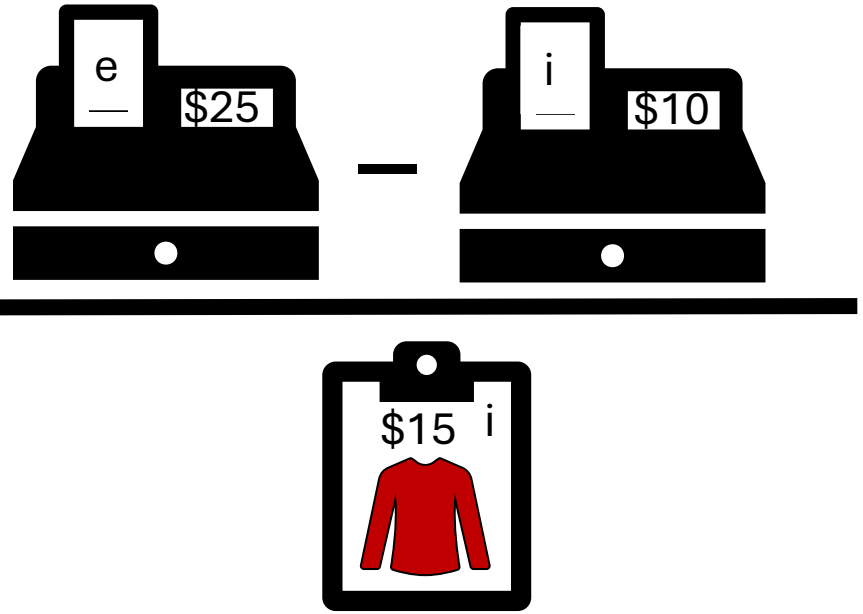


Successful PFAS destruction converts C-F bonds to F^-



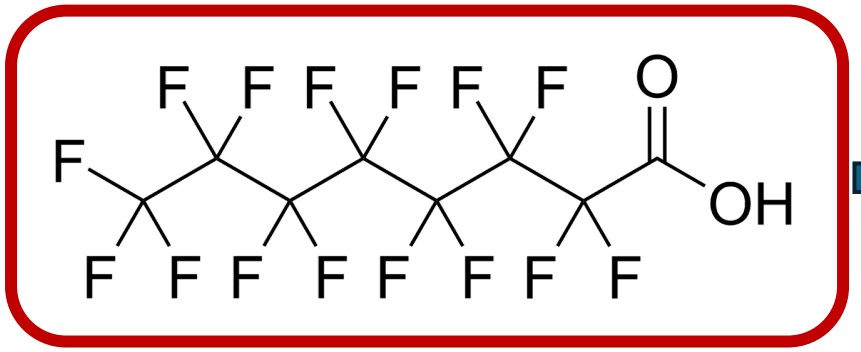
Destruction Technologies: Check the “cash register”

$$\%_{defluorination} = \frac{\text{e } \$25 - \text{i } \$10}{\$15 \text{ i}} = \frac{\bar{F}_{effluent} - \bar{F}_{influent}}{F_{influent}^{PFAS}}$$



Destruction Technologies: Check the “cash register”

$$\%_{defluorination} = \frac{\text{e } \$25 - \text{i } \$10}{\$15 \text{ i}} = \frac{F^-_{effluent} - F^-_{influent}}{F^{PFAS}_{influent}}$$



→ 15 F^-

$$\frac{25-10}{15} = 100\%$$

Alternative Evaluations

- For concentration technologies, evaluate PFAS in both effluent and concentrate

For an ideal system, $\%_{capture} = \%_{removal} = 100\%$

$$\frac{PFAS_{concentrate}}{PFAS_{influent}} = \left(1 - \frac{PFAS_{effluent}}{PFAS_{influent}}\right)$$

- For destruction technologies, evaluate efficacy via production of inorganic fluorine

For an ideal system, $\%_{defluorination} = 100\%$

$$\left(F^-_{effluent} - F^-_{influent}\right) = \left(F^{PFAS}_{influent} - F^{PFAS}_{effluent}\right)$$

- For systems with changes in volume, evaluate moles rather than concentrations

Bulk Organofluorine Analysis

alibaba.com

Bulk Organofluorine Analysis

alibaba.com

99 lbs/bale x **660** bales/container x **150** containers/month =

<u>9.8 million lbs/month</u>

Method Comparison

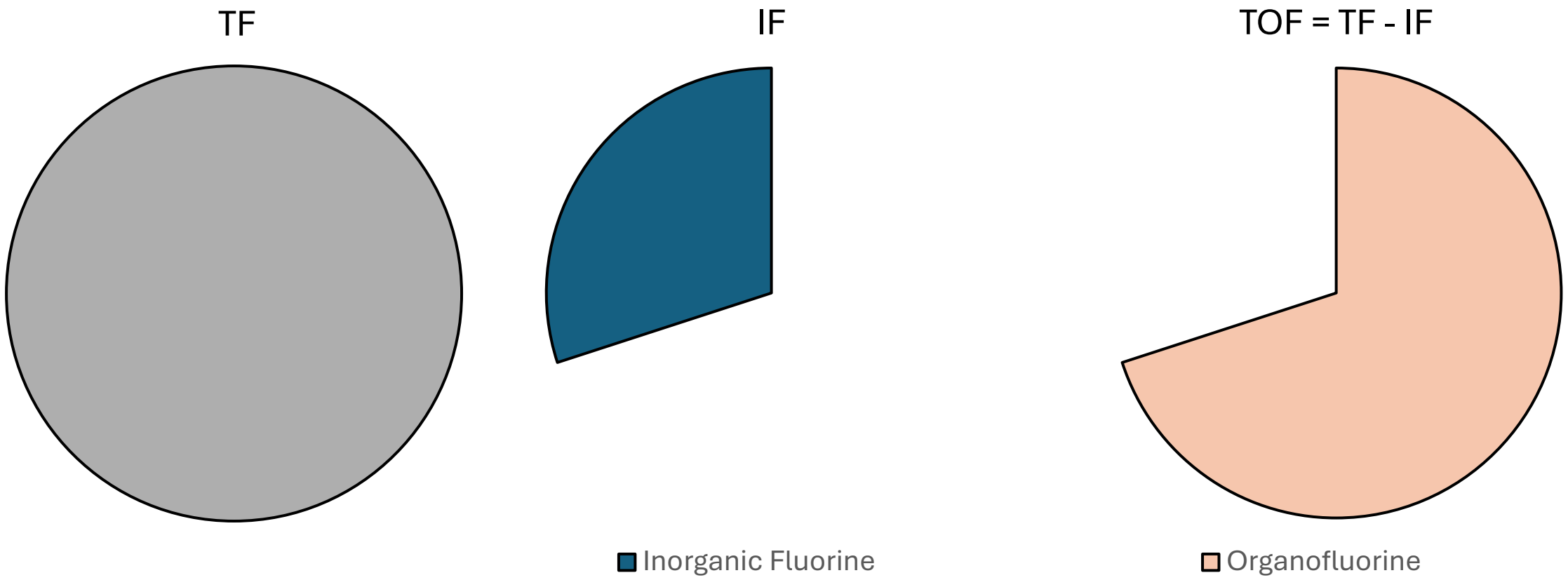
Target Analysis

- evaluate concentrations of individual PFAS analytes
- ng/L = ppt detection limits

Bulk Organofluorine Analysis

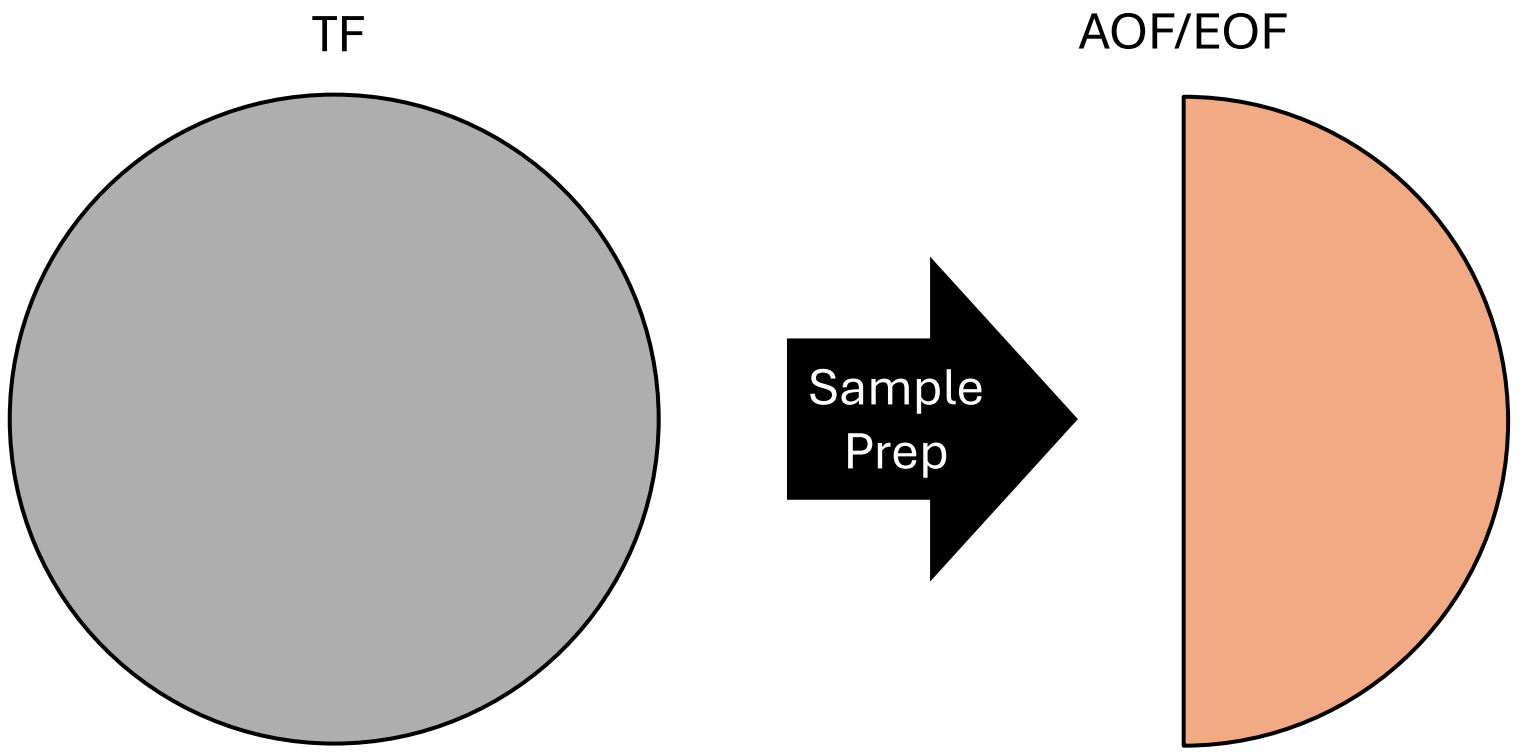
- evaluate overall concentration of organofluorine
- µg/L = ppb to mg/L = ppm detection limits

Total Organofluorine (TOF)



- Measure Total Fluorine (TF) and Inorganic Fluorine (IF)
- Calculate Total Organofluorine (TOF) as the difference between TF and IF

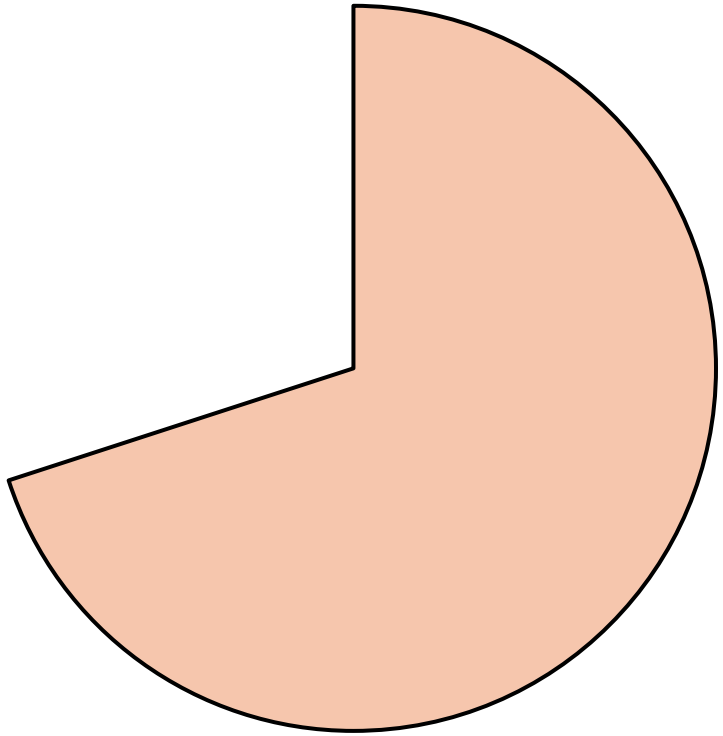
Adsorbable (AOF) and Extractable (EOF) Organofluorine



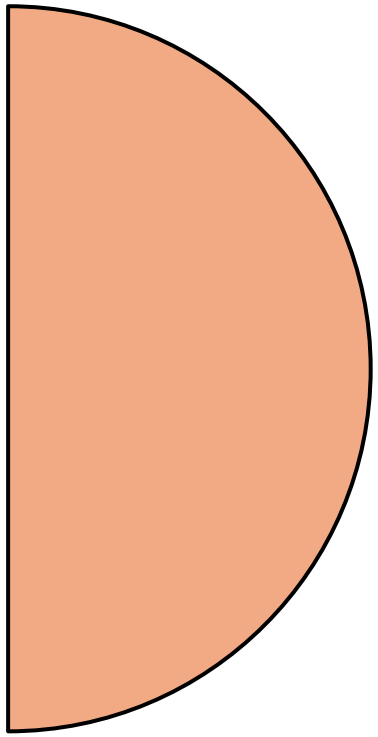
- Perform sample preparation (adsorption/extraction) to separate out organofluorine
- Measure organofluorine as the fluorine concentration of the extract

TOF vs. AOF/EOF

TOF

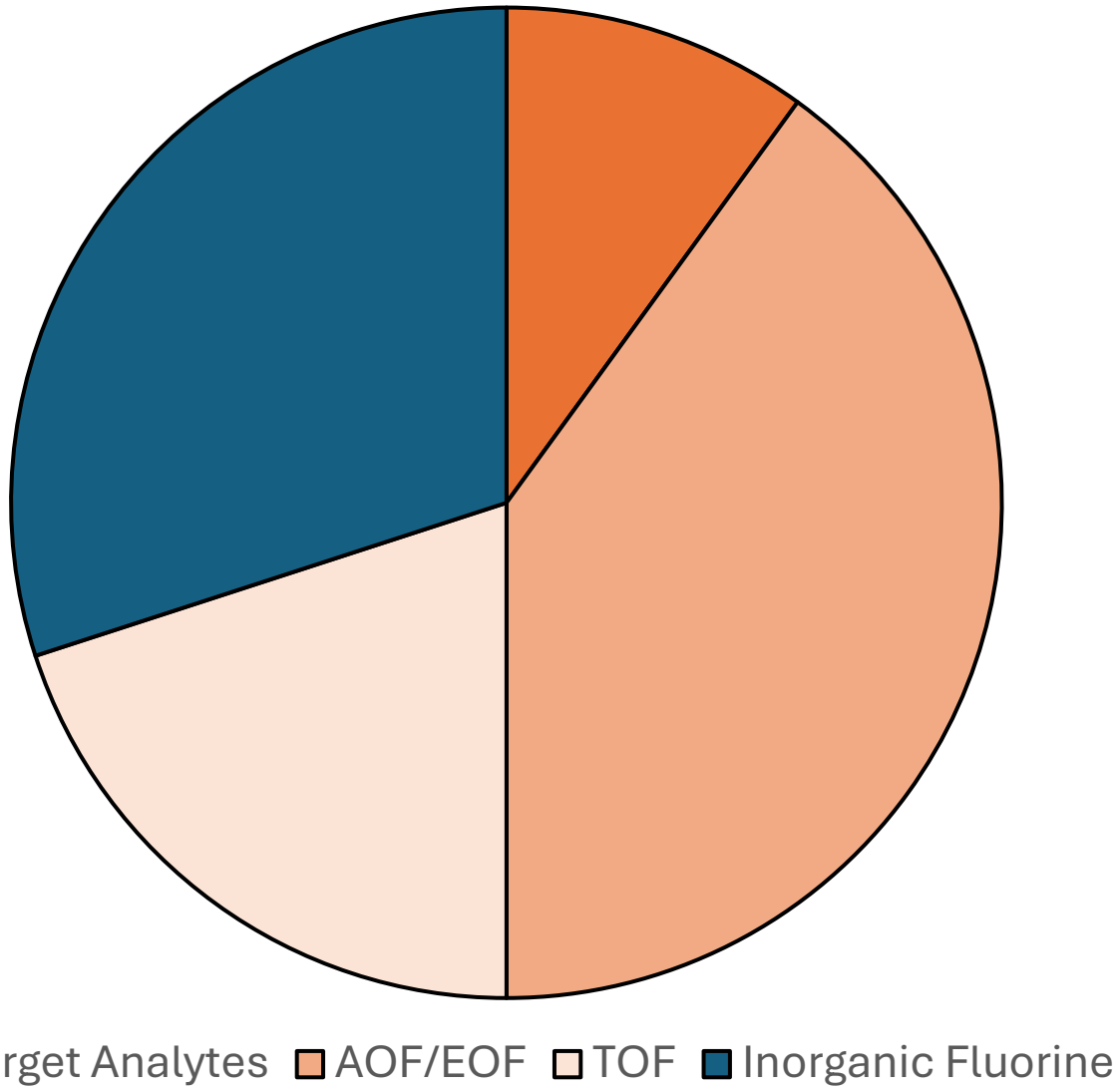


AOF/EOF



Pros	No Loss of Short-Chain PFAS	Lower Detection Limits
Cons	Higher Detection Limits	Loss of Short-Chain PFAS

Accounting for Fluorine Mass



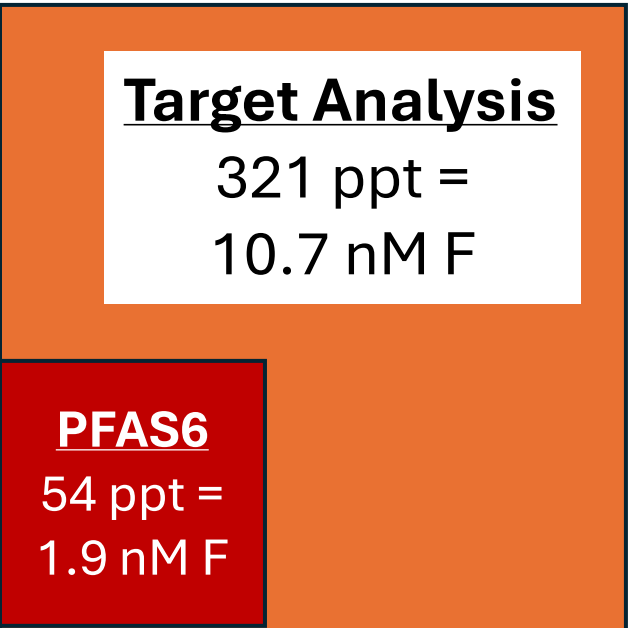
WWTP Effluent

Data from Ruyle et al. 2025

PFAS6
54 ppt =
1.9 nM F

WWTP Effluent

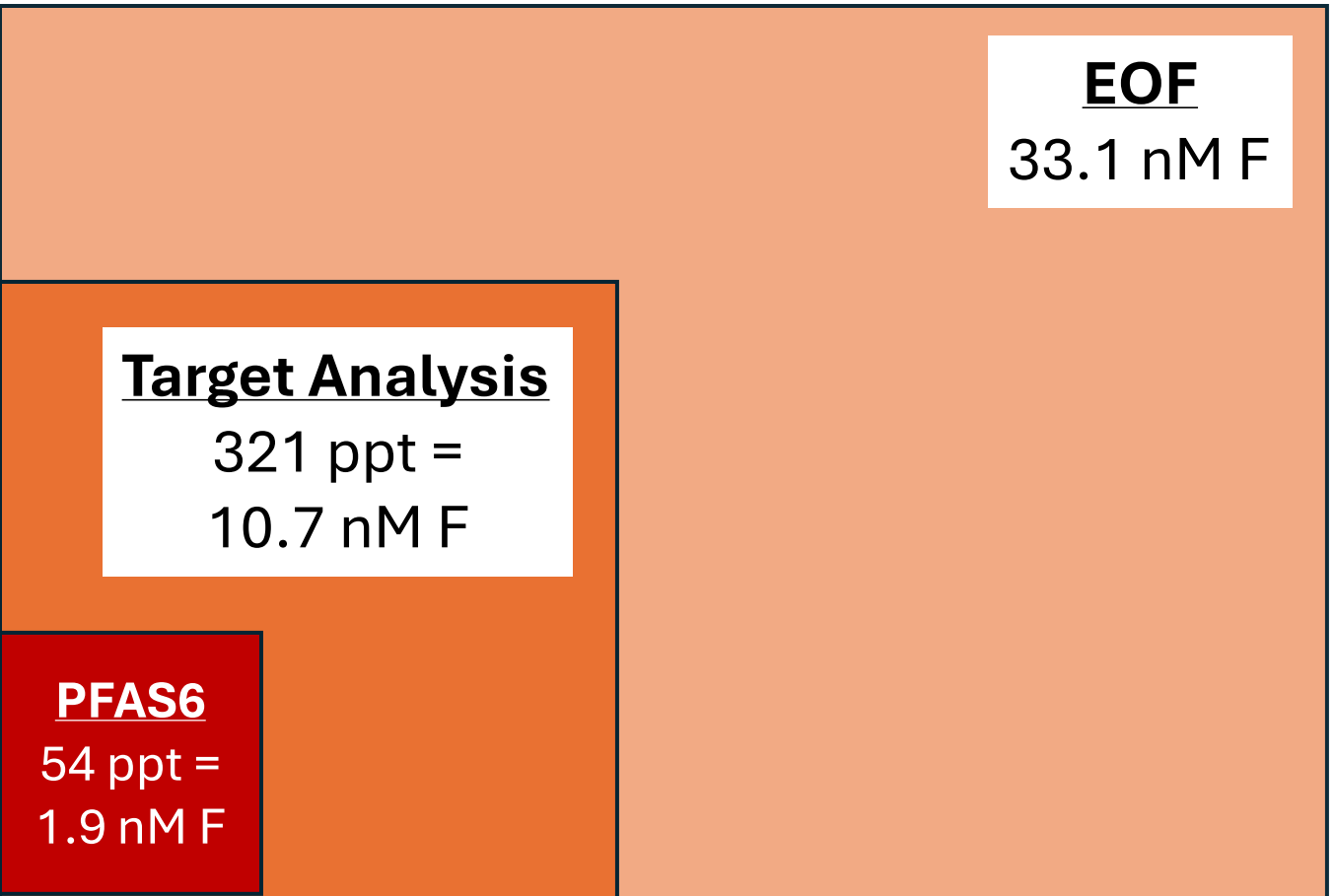
Data from Ruyle et al. 2025



- OF from **PFAS6 only 18%** of total OF from target analytes

WWTP Effluent

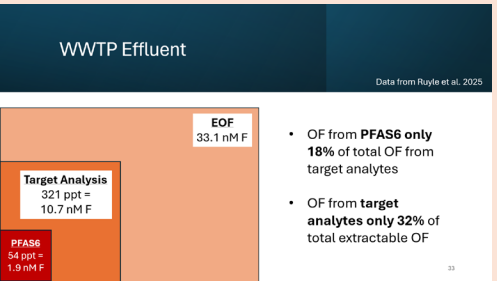
Data from Ruyle et al. 2025



- OF from **PFAS6 only 18%** of total OF from target analytes
- OF from **target analytes only 32%** of total extractable OF

TOF
2,900nM F

OF from **EOF only 1%** of TOF (TF – IF)



Verifying PFAS Destruction

Is the PFAS below the regulatory limit?

Is the PFAS removed or destroyed?

Acknowledgements

Thank you to everyone who provided helpful comment and review!

- Office of Research and Standards, Bureau of Policy and Evaluation
  - Temitayo Akinbola
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  - Emma Spady
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  - Jennifer Wood
  - Kaley Gibbs
  - Whitney Fenwick

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Any questions?

References

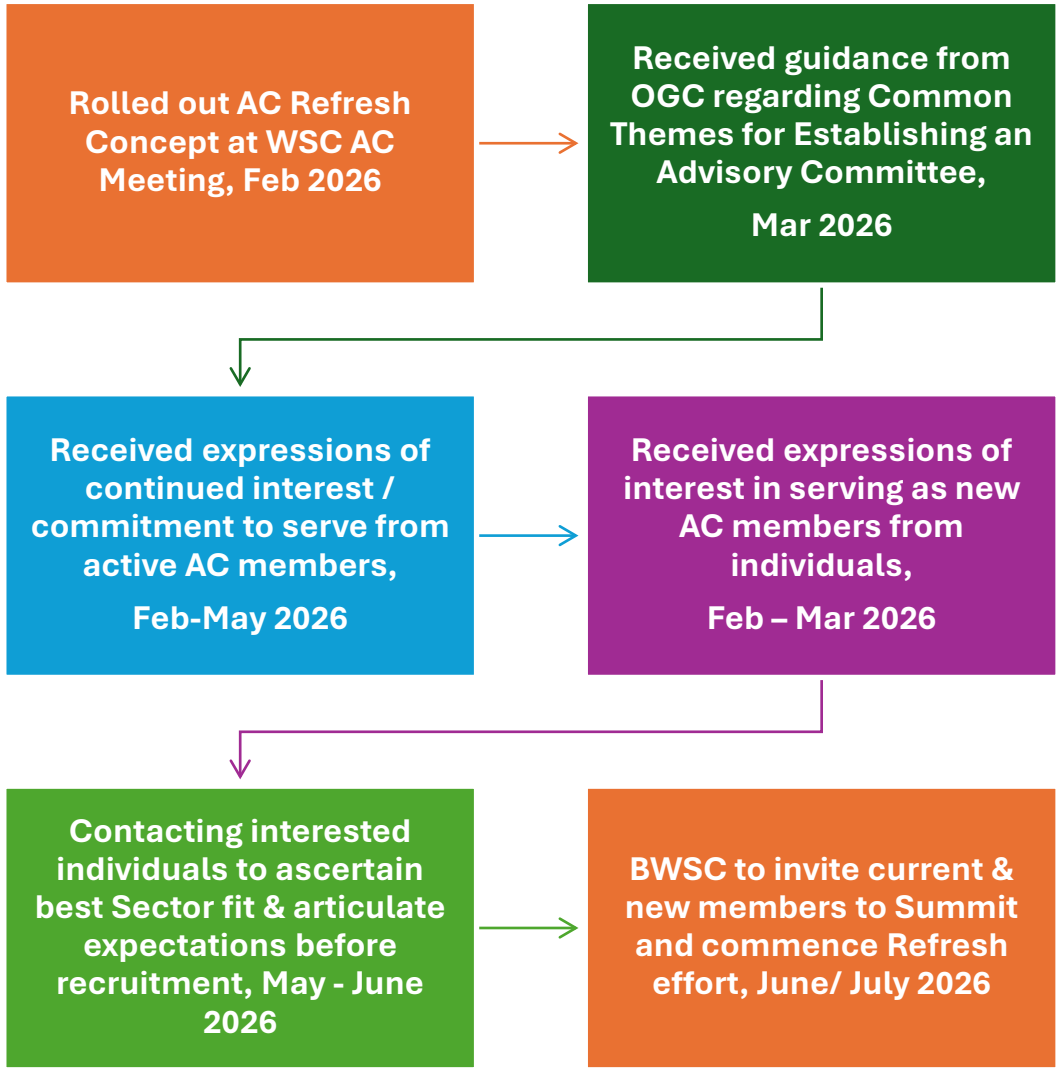
- Ruyle BJ, Pennoyer EH, Vojta S, Becanova J, Islam M, Webster TF, Heiger-Bernays W, Lohmann R, Westerhoff P, Schaefer CE, Sunderland EM. High organofluorine concentrations in municipal wastewater affect downstream drinking water supplies for millions of Americans. PNAS. 2025 Jan 21;122(3):e2417156122. doi: 10.1073/pnas.2417156122.
- PubChem: PFAS and Fluorinated Compounds in PubChem. https://pubchem.ncbi.nlm.nih.gov/classification/#hid=120. Accessed March 25, 2026

WSC Advisory Committee Refresh Update

MassDEP
Commonwealth of Massachusetts
Department of Environmental Protection

Millie Garcia-Serrano, MPH, Assistant Commissioner
MassDEP | Bureau of Waste Site Cleanup

WSC Advisory Committee Refresh – May 2026

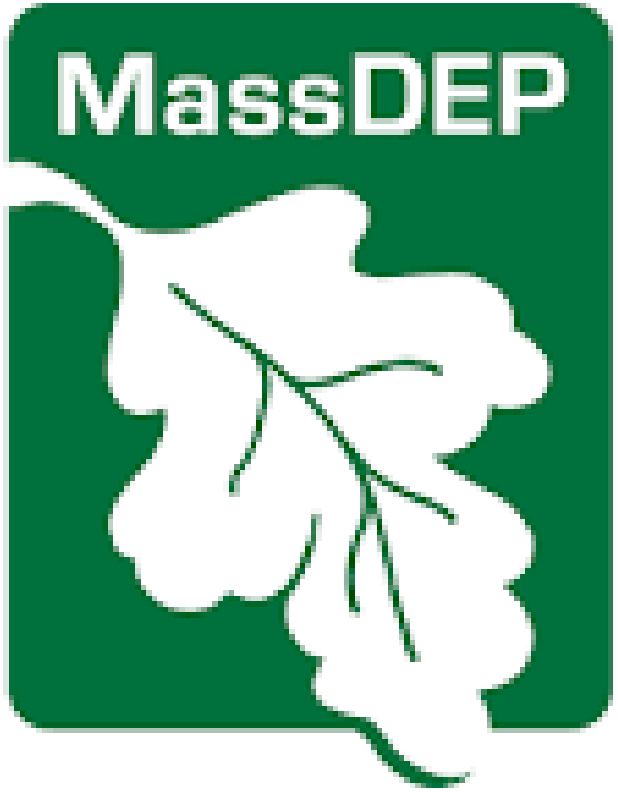


About MassDEP:

The Massachusetts Department of Environmental Protection's (MassDEP) mission is to protect and enhance the Commonwealth's natural resources - air, water, and land - to provide for the health, safety, and welfare of all people, and to ensure a clean and safe environment for future generations. In carrying out this mission MassDEP commits to address and advance environmental justice and equity for all people of the Commonwealth, provide meaningful, inclusive opportunities for people to participate in agency decisions that affect their lives; and ensure a diverse workforce that reflects the communities we serve.

Themes for Exploration, June 2026

- Purpose and Goals of the Committee are Clearly Defined
- Roles and Expectations of the Members are Clearly Defined
- Ground Rules for Meetings are Outlined
- Frequency of Meetings and Content are Specified
- Membership is balanced fairly, and contains diversity of perspectives and thought



Questions?...and Answers.

MassDEP
Commonwealth of Massachusetts
Department of Environmental Protection

Thank you!

See you at the next BWSC AC meeting on 8/20/26! (Virtual)