



# SW-846 Methods Program: Ongoing projects

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US EPA, Office of Resource Conservation and Recovery  
Presentation to the American Council of Independent Laboratories  
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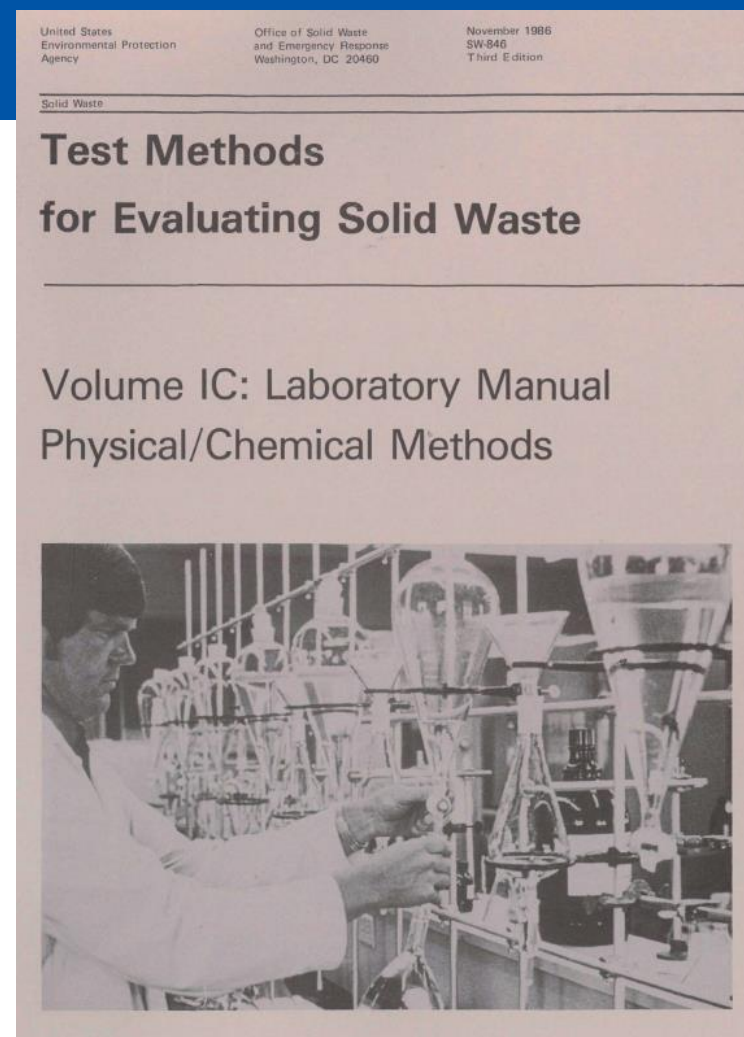
# Disclaimer

*The views expressed in this presentation are those of the author and do not necessarily represent the views or policies of the Agency. Any mention of trade names or commercial products does not constitute EPA endorsement or recommendation for use.*

# Outline



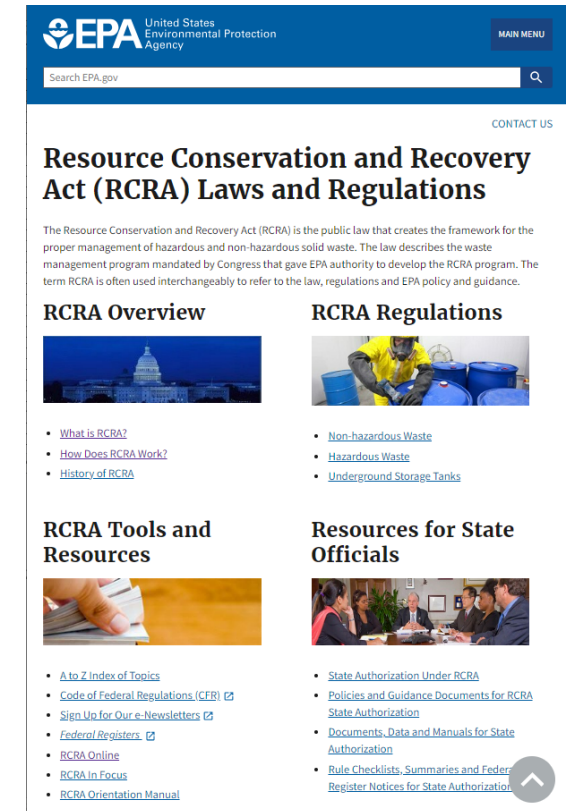
- Background about the Resource Conservation and Recovery Act (RCRA) and SW-846
- Collaboration with ASTM: interlaboratory studies for flash point methods incorporated by reference in RCRA
- SW-846 method development and validation
  - Aqueous leaching methods
  - Organic analytical methods, chapters
  - Inorganic analytical methods
- Other proposed, ongoing projects



# Resource Conservation and Recovery Act

National regulatory framework for waste management:

- Non-hazardous solid waste:
  - Subtitle D, 40 CFR Parts 239-258
  - Municipal, Industrial, Construction & Debris
  - State-led implementation
- Hazardous waste:
  - Subtitle C, 40 CFR Parts 260-273
  - Must be managed from cradle to grave
  - Must meet treatment standards prior to land disposal
  - Most states are authorized to implement RCRA Subtitle C regulations, and their regulations may be more stringent



The screenshot shows the EPA website's page for RCRA Laws and Regulations. The header includes the EPA logo, the text 'United States Environmental Protection Agency', a search bar, and a 'MAIN MENU' button. Below the header, there is a 'CONTACT US' link. The main content area is titled 'Resource Conservation and Recovery Act (RCRA) Laws and Regulations'. It includes a brief description of the RCRA and its purpose. The page is organized into four columns: 'RCRA Overview' with a link to 'What is RCRA?', 'RCRA Regulations' with links to 'Non-hazardous Waste', 'Hazardous Waste', and 'Underground Storage Tanks', 'RCRA Tools and Resources' with links to 'A to Z Index of Topics', 'Code of Federal Regulations (CFR)', 'Sign Up for Our e-Newsletters', 'Federal Registers', 'RCRA Online', 'RCRA in Focus', and 'RCRA Orientation Manual', and 'Resources for State Officials' with links to 'State Authorization Under RCRA', 'Policies and Guidance Documents for RCRA State Authorization', 'Documents, Data and Manuals for State Authorization', and 'Rule Checklists, Summaries and Federal Register Notices for State Authorization'. Each column has a representative image.

<https://www.epa.gov/rcra>

# The SW-846 Compendium

- Official compendium of test methods for compliance with RCRA regulations
- Published by EPA's Office of Resource Conservation and Recovery (ORCR) - 1<sup>st</sup> edition published in 1980
- Collection of 220+ methods and associated guidance
  - Methods organized in series
  - Most methods are organized around a technology
  - Many methods are modular, may be used in different combinations
- "Living document"
  - Updates incorporate new technologies, analytical techniques, target analytes, improved QA practices
- Uses:
  - Waste testing, verification of treatment effectiveness
  - Contaminated site assessment and cleanup
  - Monitoring
  - etc.



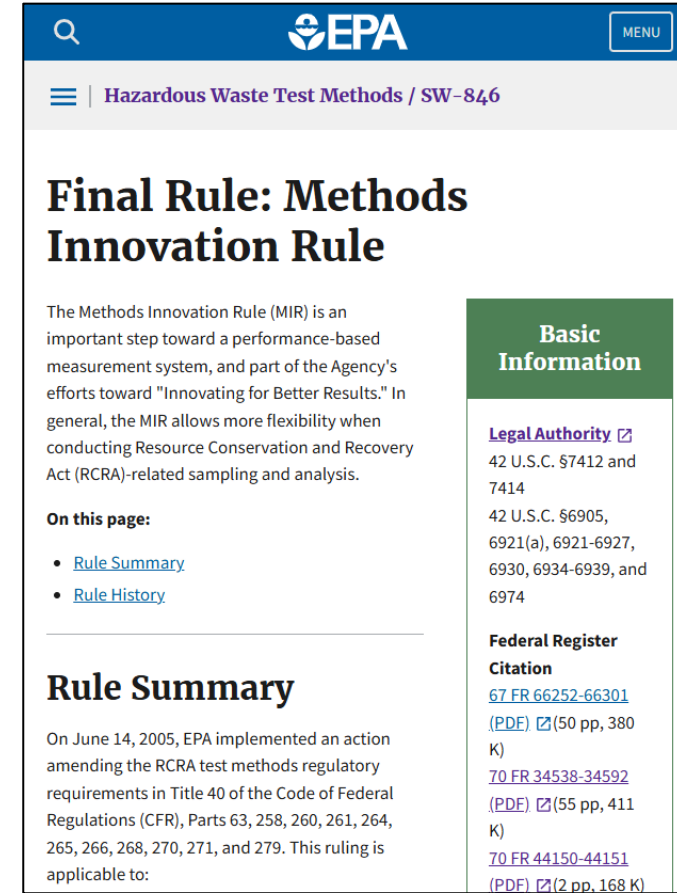
## Hazardous Waste Test Methods / SW-846



<https://www.epa.gov/hw-sw846>

# The Methods Innovation Rule (2005)

- Formally implemented EPA's performance-based measurement approach for the RCRA program
- Provided flexibility in selection of most analytical methods
- The regulated facility is ultimately responsible for ensuring results are reliable, decisions are accurate
- Two categories:
  - **Method Defined Parameters (MDPs)**
    - Prescriptive – modifications are not permitted
    - Incorporated by reference in RCRA regulations (40 CFR Part 260.11)
    - Some are for hazardous waste characteristics
    - Others are stationary source sampling methods for hazardous waste incinerators
  - **“Non-regulatory” methods – Large majority of methods**
    - Performance-based, appropriate modifications are permitted
    - Other reliable, published methods may be used for RCRA compliance



The screenshot shows the EPA website page for the "Final Rule: Methods Innovation Rule". The page header includes the EPA logo and a search bar. The main content area is titled "Final Rule: Methods Innovation Rule" and includes a brief description of the rule. To the right, there is a "Basic Information" sidebar with links to "Legal Authority" and "Federal Register Citation". Below the main text, there is a "Rule Summary" section with a brief overview of the rule's implementation. The page also includes a "MENU" button in the top right corner.

**Final Rule: Methods Innovation Rule**

The Methods Innovation Rule (MIR) is an important step toward a performance-based measurement system, and part of the Agency's efforts toward "Innovating for Better Results." In general, the MIR allows more flexibility when conducting Resource Conservation and Recovery Act (RCRA)-related sampling and analysis.

**On this page:**

- [Rule Summary](#)
- [Rule History](#)

**Rule Summary**

On June 14, 2005, EPA implemented an action amending the RCRA test methods regulatory requirements in Title 40 of the Code of Federal Regulations (CFR), Parts 63, 258, 260, 261, 264, 265, 266, 268, 270, 271, and 279. This ruling is applicable to:

**Basic Information**

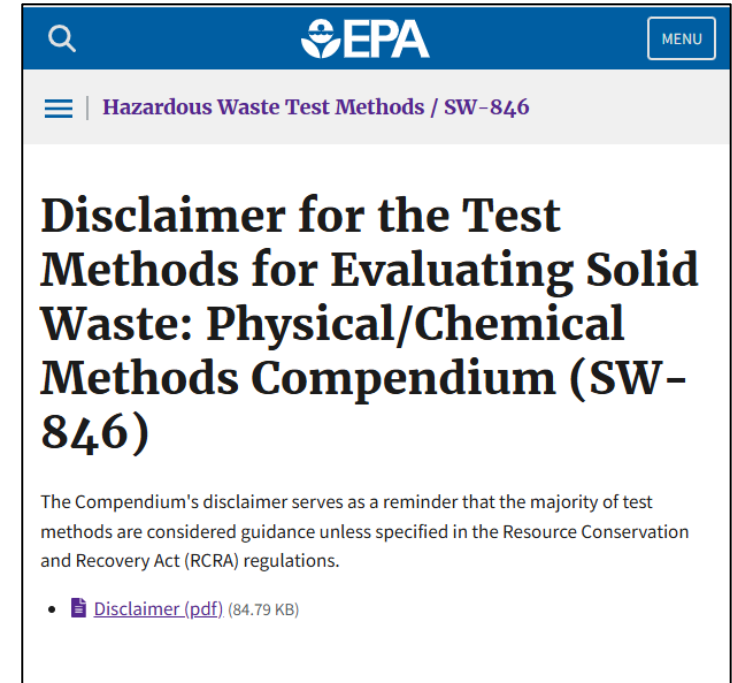
**Legal Authority** [Legal Authority](#) [42 U.S.C. §7412 and 7414](#)  
[42 U.S.C. §6905, 6921\(a\), 6921-6927, 6930, 6934-6939, and 6974](#)

**Federal Register Citation**  
[67 FR 66252-66301 \(PDF\)](#) (50 pp, 380 K)  
[70 FR 34538-34592 \(PDF\)](#) (55 pp, 411 K)  
[70 FR 44150-44151 \(PDF\)](#) (2 pp, 168 K)

<https://www.epa.gov/hw-sw846/final-rule-methods-innovation-rule>

# SW-846 Disclaimer

- [T]he methods included here provide guidance to the analyst and the regulated community in making judgments necessary to generate data that meet the data quality objectives for the intended use of the results.
- The Agency does not intend to restrict the use of new analytical techniques.
- Advances in technologies applicable to the sampling and analysis of environmental media and hazardous wastes outpace the ability of the Agency to promulgate revisions to this manual.
- EPA generally does not intend these methods to be overly prescriptive.
- [M]embers of the regulated community are advised to refer to the information in Chapter Two and to consult with knowledgeable laboratory personnel when choosing the most appropriate suite of analytical methods.

A screenshot of the EPA website's "Hazardous Waste Test Methods / SW-846" page. The page features the EPA logo in the top right corner and a search icon in the top left. The main heading is "Disclaimer for the Test Methods for Evaluating Solid Waste: Physical/Chemical Methods Compendium (SW-846)". Below the heading, a paragraph states: "The Compendium's disclaimer serves as a reminder that the majority of test methods are considered guidance unless specified in the Resource Conservation and Recovery Act (RCRA) regulations." At the bottom of the page, there is a link to a PDF file: "Disclaimer (pdf) (84.79 KB)".

**Disclaimer for the Test Methods for Evaluating Solid Waste: Physical/Chemical Methods Compendium (SW-846)**

The Compendium's disclaimer serves as a reminder that the majority of test methods are considered guidance unless specified in the Resource Conservation and Recovery Act (RCRA) regulations.

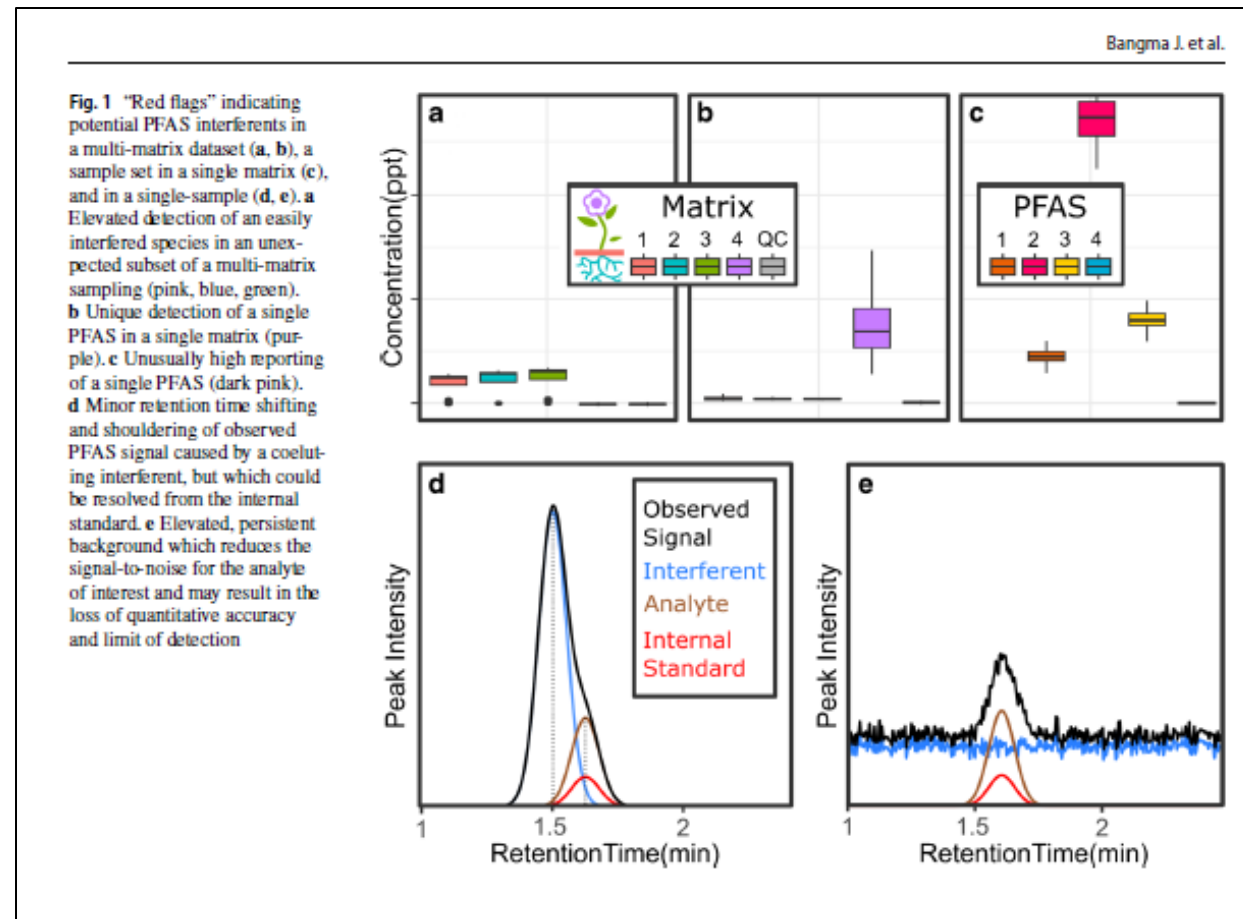
• [Disclaimer \(pdf\)](#) (84.79 KB)

<https://www.epa.gov/hw-sw846/disclaimer-test-methods-evaluating-solid-waste-physicalchemical-methods-compedium-sw-846>



# PFAS Analytical Interferent Database

- NIST, EPA, FDA collaboration
- Featured Article in Analytical and Bioanalytical Chemistry 2024, "PFAS ghosts: how to identify, evaluate, and exercise new and existing analytical interference": <https://doi.org/10.1007/s00216-024-05125-y>
- In addition to the paper, the data is freely available and updated by NIST: <https://datapub.nist.gov/od/id/mds2-3040>
- Accepting new interferents in multiple matrices
  - ID is not required

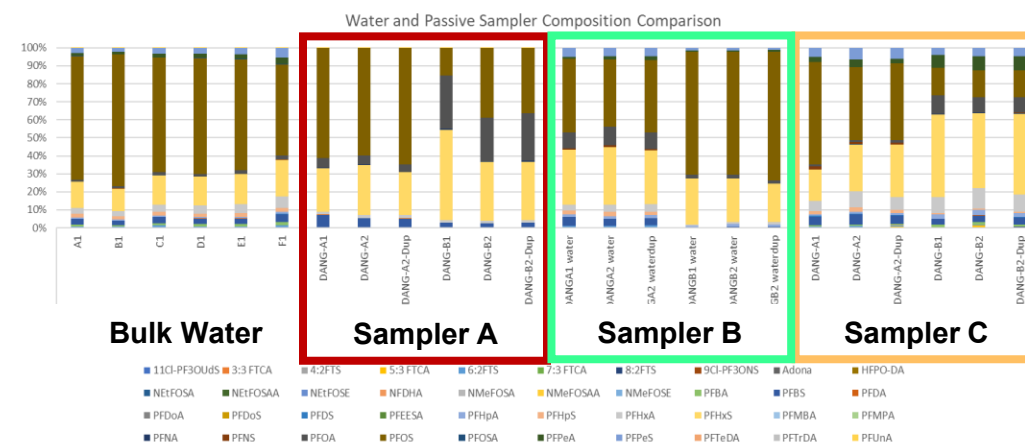
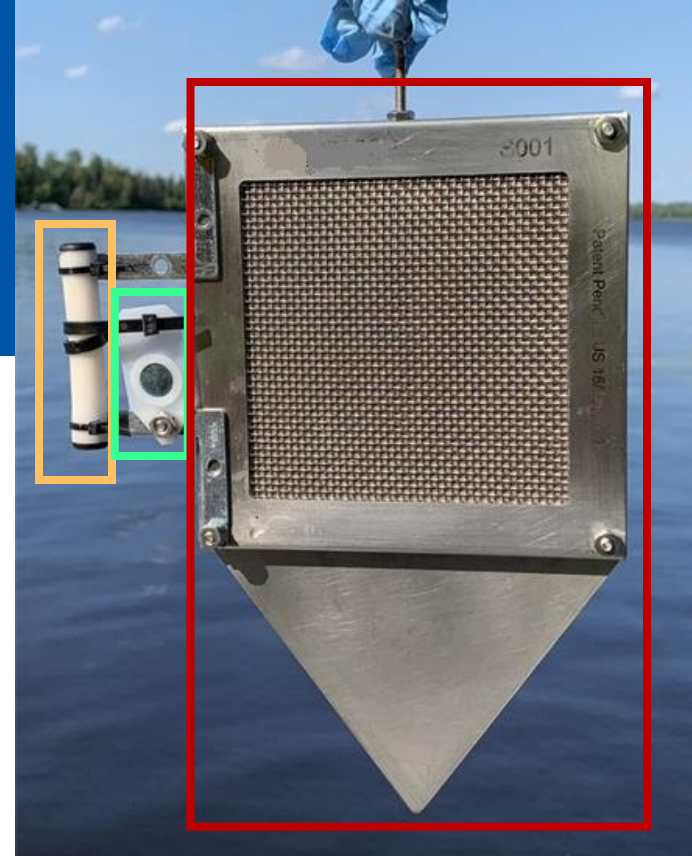




# Passive samplers for PFAS in waters and porewaters

- Ongoing collaboration between EPA, DoD, Academia, and Industry
- Evaluate existing and developing passive samplers in side-by-side field deployments to measure PFAS
- Goals are to characterize performance of various samplers not to declare a “winner”.
- Will be evaluating samplers using appropriate statistical analyses and provide performance/practical application from field investigations
- Final products from this work will be guidance, best practices, and field and laboratory SOPs.

EPA PFAS Passive sampler contacts:  
 Brian Crone, Marc Mills  
[Crone.brian@epa.gov](mailto:Crone.brian@epa.gov), [Mills.marc@epa.gov](mailto:Mills.marc@epa.gov)



# EPA Non-Targeted Analysis Toolkit for PFAS

- Collection of the guidance, best practices, and workflows
- Developed by EPA-ORD and applied by stakeholders in their investigations of PFAS in drinking water resources
- Guidance provided on study design, sample collection and preparation, and data acquisition
- Includes discussion of appropriate statistical and visual analyses, provides examples from previous PFAS investigations
- Available at: <https://whitehead-heather.github.io/ENTAiLSToolkit/>

EPA NTA toolkit contacts:

James McCord, [mccord.james@epa.gov](mailto:mccord.james@epa.gov)

Mark Strynar, [strynar.mark@epa.gov](mailto:strynar.mark@epa.gov)

## ENTAiLS Toolkit: Enabling Non-Targeted Analysis for Per- and Polyfluoroalkyl Substances

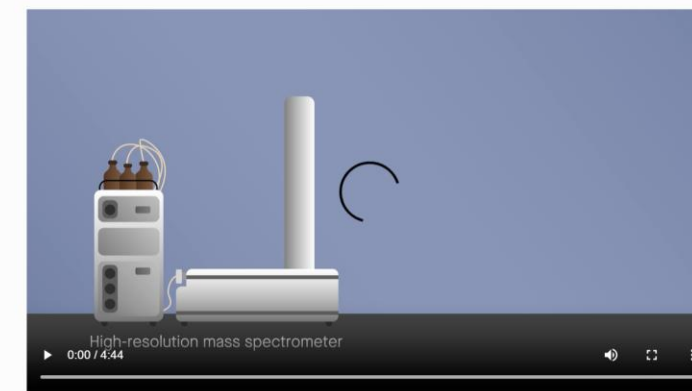
- Introduction
  - Background
  - Objectives
- PFAS NTA Study Guidance and Best Practices
  - Study Design
    - Defining Study Goals
    - Setting Expectations: Data Generated
    - Setting Expectations: Chemical Space
    - Setting Expectations: Complimentary Tools
    - Setting Expectations: Resources
    - Setting Expectations: QA/QC
  - Sample Collection
    - Positive Bias
    - Negative Bias
    - Preservation
    - Holding Times and Storage Conditions
  - Sample Preparation
    - Organic solvent extractions
    - Solid phase extraction
    - QuEChERS
    - QA/QC Considerations
  - Data Acquisition
    - Sample Separation
    - Ionization
    - Mass Analysis
      - Mass Spectra
      - Data Dependent Acquisition (DDA)
      - Data independent acquisition (DIA)
    - QA/QC Considerations
    - Analytical Sequence and Run Order
  - NTA Data Processing Workflow
    - Data Conversion (MSConvert)

## ENTAiLS Toolkit: Enabling Non-Targeted Analysis for Per- and Polyfluoroalkyl Substances

### Introduction

In public health laboratories targeted analysis methods are the gold-standard techniques for performing both qualitative and quantitative analysis of chemicals due to their accuracy, precision, and reproducibility. The development and application of targeted analysis methods is reliant on access to analytical standards and to reference data to perform measurements on individual chemicals. Though, for emerging contaminants, access to analytical standards and the availability of reference data is limited. Additional monitoring techniques that can identify contaminants of emerging concern is necessary for public health laboratories to better describe the presence of emerging contaminants in environmental media.

**Non-targeted analysis (NTA)** methods utilize high-resolution mass spectrometry (HRMS) to measure emerging contaminations without *a priori* knowledge. These methods are not reliant on analytical standards or reference data to perform measurements and instead use generalized approaches to measure thousands of chemicals across a vast chemical space. The use of NTA by the U.S. Environmental Protection Agency's Office of Research and Development (EPA-ORD) is summarized in the video below.



For more information on NTA methods and applications in the environment, see the following resources.  
<https://www.epa.gov/chemical-research/non-targeted-analysis-research>  
<https://nontargetedanalysis.org/>

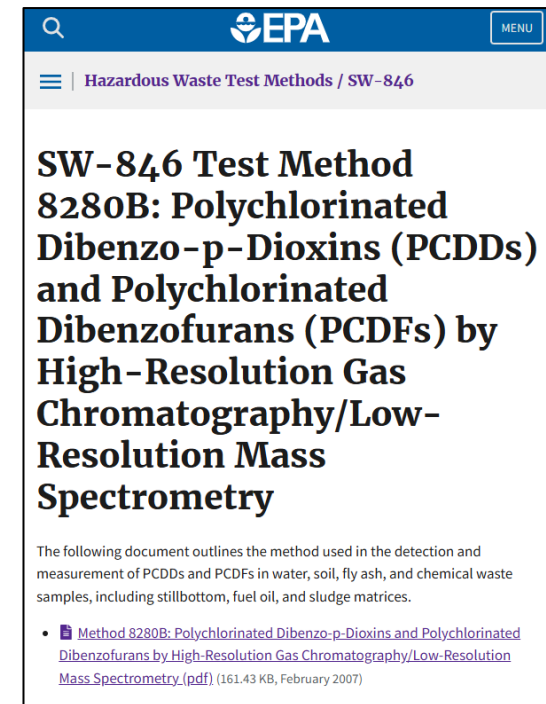
# Recent SW-846 methods inquiry: Can triple quad GC/MS be used for dioxins and furans?

Response: Yes, provided that:

- The laboratory demonstrates it can generate data of appropriate quality for the intended application, i.e., meets all project-specified data quality objectives
- Methods used and any modifications thereto are clearly identified
- Recommend consulting with the end data user (regulatory authority; for RCRA permits, typically in a state government agency) during project planning, following DQO process

Considerations:

- Clean Air Act Method 23 or SW-846 Method 0023A:
  - Required for sample collection from hazardous waste incinerators under 40 CFR Part 266.104(e)
  - 0023A is used in conjunction with 8280B (unit mass resolution mass spectrometry) or 8290A (high resolution mass spectrometry)
- Method 8280B:
  - Does not provide tandem MS precursor/product ions, conditions
- Additional QA activities: Analyze appropriately certified reference materials, participate in proficiency testing studies, split samples between multiple laboratories



The screenshot shows the EPA website's 'Hazardous Waste Test Methods / SW-846' page. The main heading is 'SW-846 Test Method 8280B: Polychlorinated Dibenzo-p-Dioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by High-Resolution Gas Chromatography/Low-Resolution Mass Spectrometry'. Below the heading, a paragraph states: 'The following document outlines the method used in the detection and measurement of PCDDs and PCDFs in water, soil, fly ash, and chemical waste samples, including stillbottom, fuel oil, and sludge matrices.' A link is provided: 'Method 8280B: Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by High-Resolution Gas Chromatography/Low-Resolution Mass Spectrometry (pdf) (161.43 KB, February 2007)'.

<https://www.epa.gov/hw-sw846/sw-846-test-method-8280b-polychlorinated-dibenzo-p-dioxins-pcdds-and-polychlorinated>

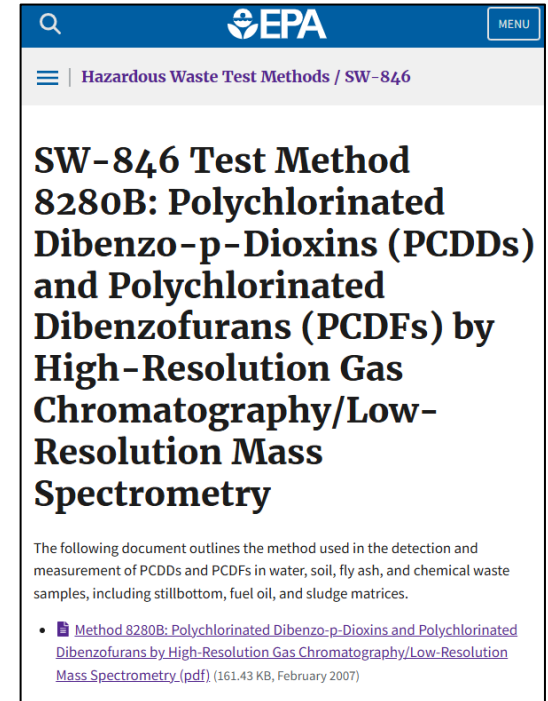
# Recent methods-related inquiry: Can 3511 and triple quad GC/MS be used for TCLP testing?

Response: Yes, provided that:

- The laboratory demonstrates it can generate data of appropriate quality for the intended application, i.e., meets all project-specified data quality objectives
- Methods used and any modifications thereto are clearly identified
- Recommend consulting with the end data user (regulatory authority; for RCRA permits, typically in a state government agency) during project planning, following DQO process

Considerations:

- Method 1311, TCLP:
  - Must be followed without deviation, has different procedures for volatiles and non-volatiles
- Method 3511, equilibrium liquid-liquid micro-extraction:
  - Written for and validated for neutrals - modifications needed to recover acids, bases
- Method 8270E, semivolatile organics by GC/MS:
  - Identifies pyridine as potentially needing special treatment to obtain adequate performance by Method 3510 (separatory funnel extraction)
  - Does not provide tandem MS precursor/product ions, conditions
- Method 8151A, acid herbicides by GC/ECD:
  - Includes basic hydrolysis step for esters, includes esterification step to make free acids amenable to GC



The screenshot shows the EPA website's 'Hazardous Waste Test Methods / SW-846' page. The main heading is 'SW-846 Test Method 8280B: Polychlorinated Dibenzo-p-Dioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by High-Resolution Gas Chromatography/Low-Resolution Mass Spectrometry'. Below the heading, a paragraph states: 'The following document outlines the method used in the detection and measurement of PCDDs and PCDFs in water, soil, fly ash, and chemical waste samples, including stillbottom, fuel oil, and sludge matrices.' A link is provided: 'Method 8280B: Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by High-Resolution Gas Chromatography/Low-Resolution Mass Spectrometry (pdf) (161.43 KB, February 2007)'.

<https://www.epa.gov/hw-sw846/sw-846-test-method-8280b-polychlorinated-dibenzo-p-dioxins-pcdds-and-polychlorinated>

# ASTM Flash Point Methods: Interlaboratory studies

- ORCR published final [Modernizing Ignitable Liquids Determinations](#) rule in June 2020, incorporated ASTM **D8174-18** and **D8175-18** by reference at 40 CFR Part 261.21(a)
  - **D8174-18**: Small scale closed cup
    - 2 mL sample size, Applicable flash point range: -20 to 70°C
  - **D8175-18**: Pensky-Martens
    - 75 mL sample size, Applicable flash point range: 20 to 70°C
  - Maintained method-defined aspects of ASTM **D93-79/D93-80**, **D3278-78**
    - State adoption of the rule was optional
- Next steps: Interlaboratory validation study
  - Identifying appropriate reference materials
  - Please contact me if your laboratory has experience, interest



# Aqueous leaching methods: Adapt SW-846 LEAF Methods to SVOCs, PFAS

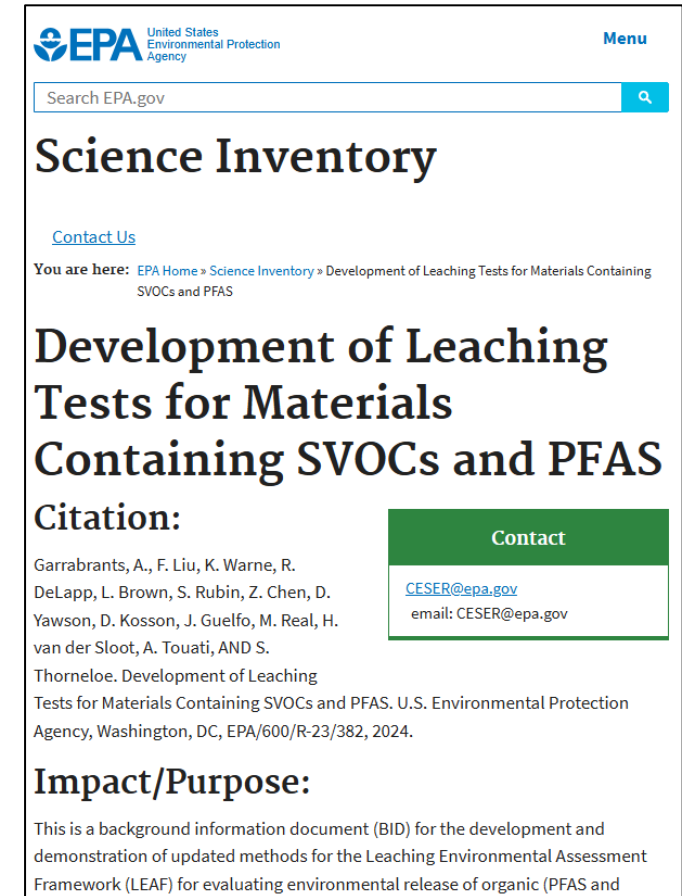


- Two batch equilibrium leaching methods
  - **1313** - varies pH
  - **1316** - varies liquid to solid ratio
- Two dynamic leaching methods
  - **1314** - upflow column percolation
  - **1315** - tank leaching (monolithic, compacted granular materials)
- Used to:
  - Better model leaching behavior
  - Conduct screening-level or scenario-specific assessments
  - Optimize in situ stabilization prior to deploying in the field
- Multi-laboratory validation study:
  - Four field-contaminated soils, two with SVOCs and two with PFAS
  - Four participating laboratories (commercial, government), with Vanderbilt as the reference lab; leachates shipped to commercial laboratory for testing
  - Data acquisition is nearly complete for **1313A** and **1316A**
  - Validation study for **1314A** is underway
- To be followed by method **1315A** development and validation, if resources are available



# Recent publication: New LEAF organics background document, draft methods

- Includes:
  - Summaries of research and development experiments for **1313A**, **1314A**, and **1316A**
    - Evaluated materials compatibility with semivolatile organics, PFAS
  - Draft methods (appendices)
    - Utilize centrifugation to aid in liquid-solid separation for organics
    - Uses hydrochloric acid instead of nitric acid to acidify samples to avoid oxidation of labile organics
    - Recommends using 1 mM  $\text{CaCl}_2$  instead of deionized water to reduce colloid formation



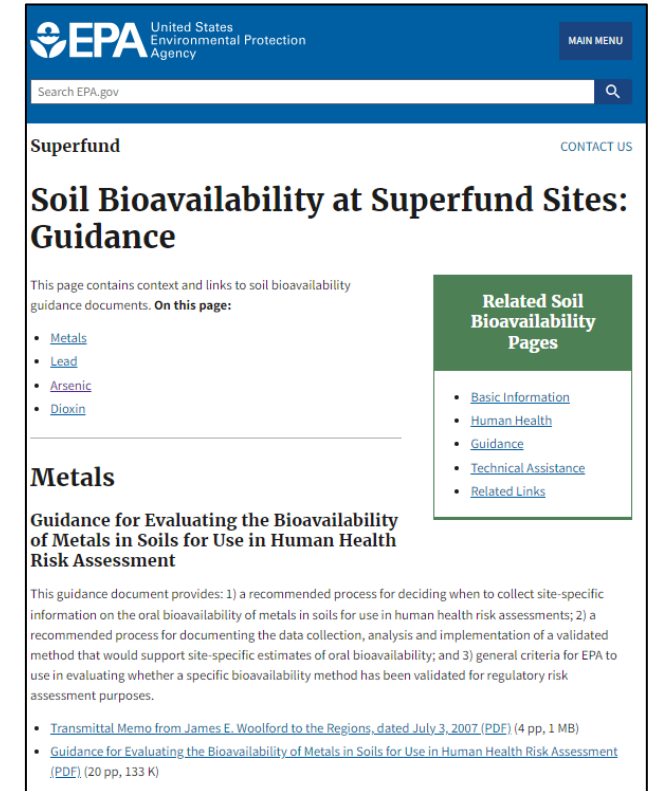
The screenshot shows the EPA Science Inventory page for the document "Development of Leaching Tests for Materials Containing SVOCs and PFAS". The page includes the EPA logo, a search bar, and a navigation menu. The title "Science Inventory" is prominently displayed. Below it, a "Contact Us" link is provided. The "You are here" breadcrumb trail shows the path from EPA Home to Science Inventory to the specific document. The title "Development of Leaching Tests for Materials Containing SVOCs and PFAS" is followed by a "Citation:" section. A green "Contact" button is visible, with the email address "CESER@epa.gov" and "email: CESER@epa.gov" listed below it. The "Impact/Purpose:" section describes the document as a background information document (BID) for the development and demonstration of updated methods for the Leaching Environmental Assessment Framework (LEAF) for evaluating environmental release of organic (PFAS and SVOCs).

[https://cfpub.epa.gov/si/si\\_public\\_record\\_report.cfm?dirEntryId=364384&Lab=CESER](https://cfpub.epa.gov/si/si_public_record_report.cfm?dirEntryId=364384&Lab=CESER)



# In Vitro Bioaccessibility Assay: Adding Arsenic to Method 1340A

- SW-846 Method **1340**, “In Vitro Bioaccessibility Assay for Lead in Soil” published in 2017
- Used to estimate relative bioavailability in ingested soil
- Validation study for lead and arsenic is complete, round-robin study report written
- Current status: ORD and OSRTI workgroup that led validation study are reviewing updated method
- Next steps:
  - SW-846 methods workgroup review, management review, propose for public comment



<https://www.epa.gov/superfund/soil-bioavailability-superfund-sites-guidance#arsenic>

# Organic methods updates: PFAS analytical methods



- Completed validation studies:
  - US Department of Defense collaborated with EPA Office of Water to validate Method **1633**
  - ASTM International collaborated with EPA on interlaboratory study for **D8421-22**
- Next steps: Incorporate data, references into SW-846 updates
  - **3512A, 8327A**: Add target analytes, include extracted internal standard/isotope dilution calibration
  - **3536, 3551, 3670**: New sample preparation and cleanup methods
- Benefits:
  - Updates will provide laboratories and project managers with options to streamline testing, reduce cost and shorten turnaround times

# Organic Method Development Project: TOP Assay



- Total Oxidizable Precursors (TOP) Assay
  - Alkaline persulfate oxidation to convert PFAS precursors to perfluoroalkyl acids
- Collaborators:
  - EPA, Commercial labs, universities, other federal agencies
- Goal: Complete method development for waters in 2025, followed by solids

Challenges	Potential Solutions
Maintain high redox potential	<ul style="list-style-type: none"><li>• Pretreatment for DOC, as needed</li><li>• Surrogate to monitor oxidation process</li></ul>
Improve fluorine mass balance	<ul style="list-style-type: none"><li>• Monitor for ultra-short chain transformation products</li></ul>
Minimize volatile loss	<ul style="list-style-type: none"><li>• Closed system</li></ul>
Processes for solids	<ul style="list-style-type: none"><li>• Heat-activated vs UV-activated</li><li>• Extraction followed by oxidation vs direct oxidation</li></ul>

*Environ. Sci. Technol. Lett.* 2023, 10, 4, 292–301  
<https://pubs.acs.org/doi/10.1021/acs.estlett.3c00061>

# SW-846 Organic Updates: VOC methods, Chapter 4 sample preservation and holding times



- Validated methods to propose for publication:
  - 5035A:** Closed-System Purge-and-Trap and Extraction for Volatile Organics in Soil and Waste Samples
    - Incorporate reference to frozen holding time study for sealable coring devices from ASTM D6418 research report
    - Move Appendix A into chapters, methods, as appropriate
  - 8015D:** Non-halogenated organics using gas chromatography/flame ionization detection (GC/FID)
    - Add light hydrocarbons
- Chapter 4:** Include  $\text{pH} \leq 2$  preservation option for acrolein and acrylonitrile in aqueous samples

 United States Environmental Protection Agency

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Related Topics: [Hazardous Waste Test Methods / SW-846](#) CONTACT US

## Validated Test Methods Recommended for Waste Testing

EPA and independent laboratories validated the following methods, which are recommended for use as the most up-to-date methods available. However, these methods have not been formally incorporated into [the SW-846 Compendium](#) through the [public comment process](#). While many of the following methods may be added to SW-846 in the future, authorized states may have regulatory restrictions regarding which version of a method can be used.

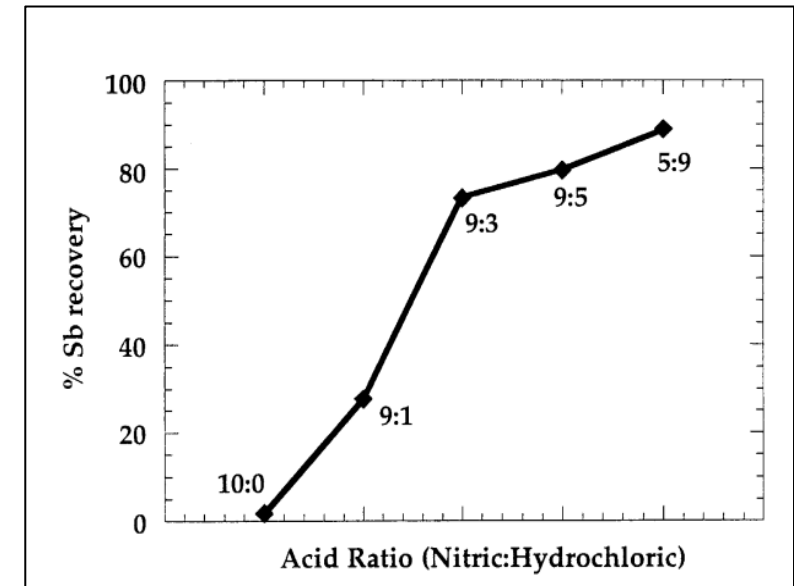
Therefore, EPA recommends [checking with your state](#) or [EPA regional office](#) before using the following methods.

Method Number	Method Title	Publication Date
<a href="#">3542A</a>	Extraction of Semivolatile Analytes Collected using Method 0010 (Modified Method 5 Sampling Train)	2005-05
<a href="#">3570</a>	Microscale Solvent Extraction (MSE)	2002-11
<a href="#">3571</a>	Extraction of Solid and Aqueous Samples for Chemical Agents	2007-07
<a href="#">5030C</a>	Purge-and-Trap for Aqueous Samples	2003-05
<a href="#">5035A</a>	Closed-System Purge-and-Trap and Extraction for Volatile Organics in Soil and Waste Samples	2002-07

<https://www.epa.gov/hw-sw846/validated-test-methods-recommended-waste-testing>

# Inorganic Methods Update: 3050C

- **3050C**, “Acid Digestion of Sediments, Sludges and Soils”
- Motivation : **3050B** (1996) Used different digestion procedures for ICP-OES and ICP-MS
  - Only nitric acid for ICP-MS to minimize polyatomic interferences from chlorine
  - Modern ICP-MS instruments use polyatomic interference correction technologies (e.g., collision/reaction cell, triple quadrupole)
- Updated digestion process - same for ICP-OES and ICP-MS:
  - Initial reflux with  $\text{HNO}_3$  and  $\text{HCl}$
  - Treatment with hydrogen peroxide
  - Final reflux with  $\text{HCl}$
- Update will include technical corrections:
  - **3500**-series organic extraction methods (2010 spiking memo)
  - **8000D** (fix equation)



<https://www.epa.gov/hw-sw846/sw-846-test-method-3051a-microwave-assisted-acid-digestion-sediments-sludges-soils-and>

From SW-846 method 3051A, Figure 3

# Other proposed SW-846 methods, methods-related projects

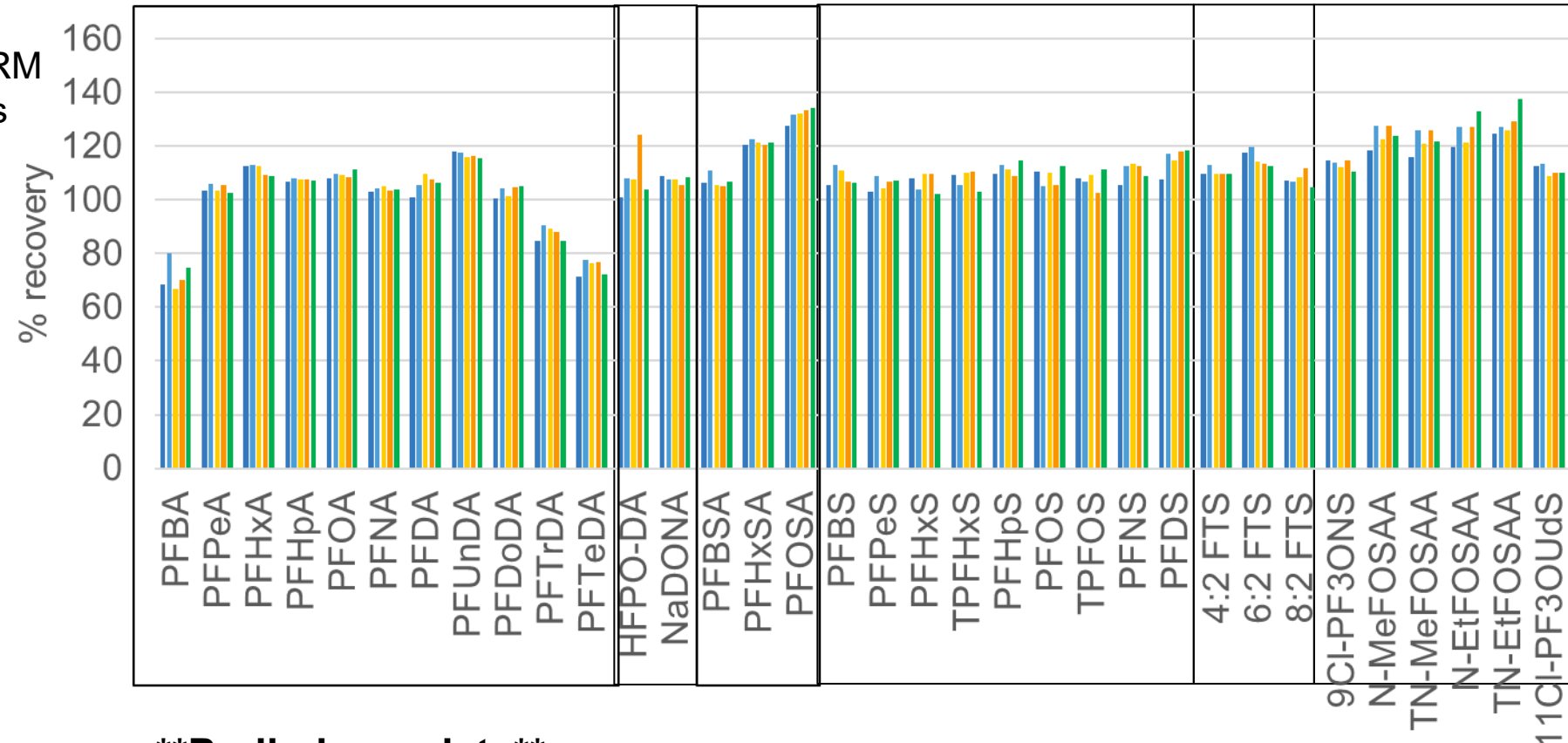


- Automated extractions of PFAS from solids
- Neutral, semivolatile PFAS (FTOHs, FTACs) in aqueous and solid samples
- Passive sampling for PAHs and PCBs in sediment porewater
- Representative sampling of different classes of chemicals in soils
- Alternative technologies for acid digestions of solid samples, e.g., infra-red
- Alternative analytical methods for petroleum hydrocarbons, e.g., UV fluorescence
- Alternatives to organofluorine testing, e.g., reductive dehalogenation/ion selective electrode
- etc.

# 3512/8327 R&D Experiments: Effect of particulates on recovery

- 5 mL replicate aqueous samples
- Added 125 mg NIST biosolids SRM
- Spiked with PFAS target analytes (PFBA had some background)
- Mixed end-over-end for 48h
- Refrigerated for 48 h
- Prepared by Method **3512**:
  - Spike with labeled analogs
  - Dilute 1:1 with methanol
  - Vortex, filter, analyze by LC/MS/MS

Recovery from aqueous samples equilibrated with 2.5% (m/v) biosolids



**\*\*Preliminary data\*\***



# Naphthalene recovery from solids with volatile and semivolatile sample preparations

Dried and crushed soils  
spiked and equilibrated overnight

Soil type	Water content	Average spike recovery (n=2)		
		3545A/8270D (SVOC)	5035A/8260D (VOC methanol extr)	5035A/8260D (VOC direct sparge)
Border Soil (loamy sand, 1.8% TOC)	0%	56%	101%	6%
	20%	63%	102%	7%
	40%	54%	101%	9%
Willamette Soil (clay loam, 2.9% TOC)	0%	71%	111%	3%
	20%	64%	103%	3%
	40%	40%	106%	12%
LCS	-	73%	99%	62%

NIST marine sediment SRM

Soil type	Water content	Average recovery of certified concentration (n=2)		
		3545A/8270D (SVOC)	5035A/8260D (VOC methanol extr)	5035A/8260D (VOC direct sparge)
SRM 1941B	0%	103%	21%	0.8%
	20%	86%	13%	0.9%
	40%	66%	8%	1.1%
LCS	-	93%	63%	63%

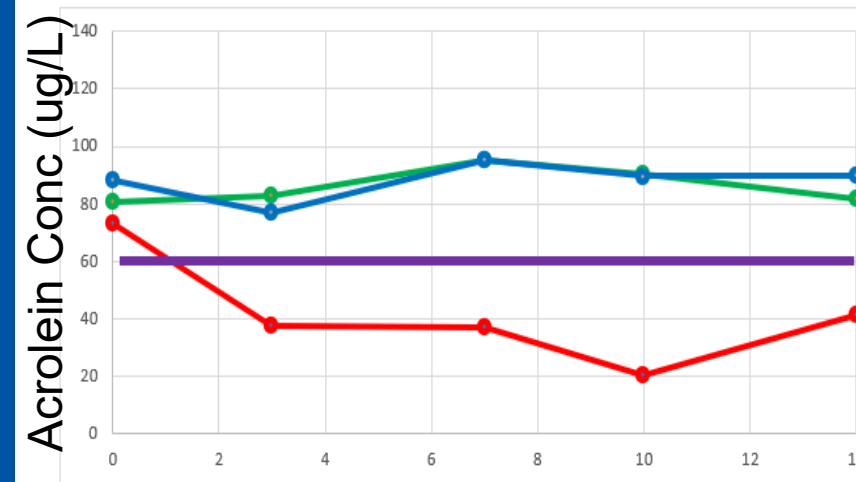
**\*\*Preliminary data\*\***

# Acrolein and Acrylonitrile aqueous stability study

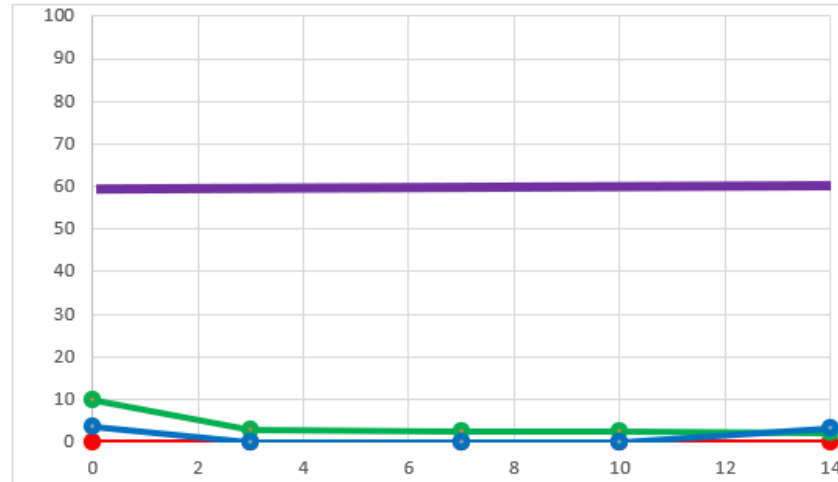
- Multiple commercial labs participated in a 14 day stability study
- Samples preserved at pH 2, pH 4-5, no pH adjustment
- Conclusions: pH 2 preservation worked as well or better than pH 4-5
- Acrolein was not as stable as acrylonitrile

pH 2; pH 4 – 5; No preservative Lower Control Limit

POTW effluent

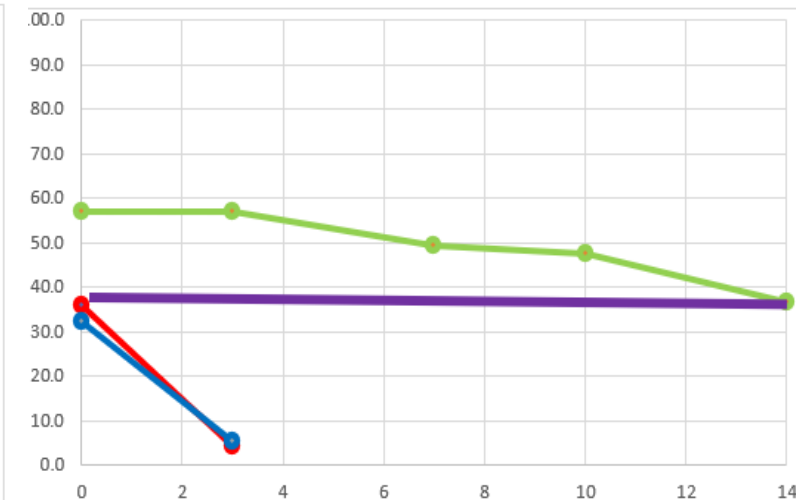


Industrial wastewater



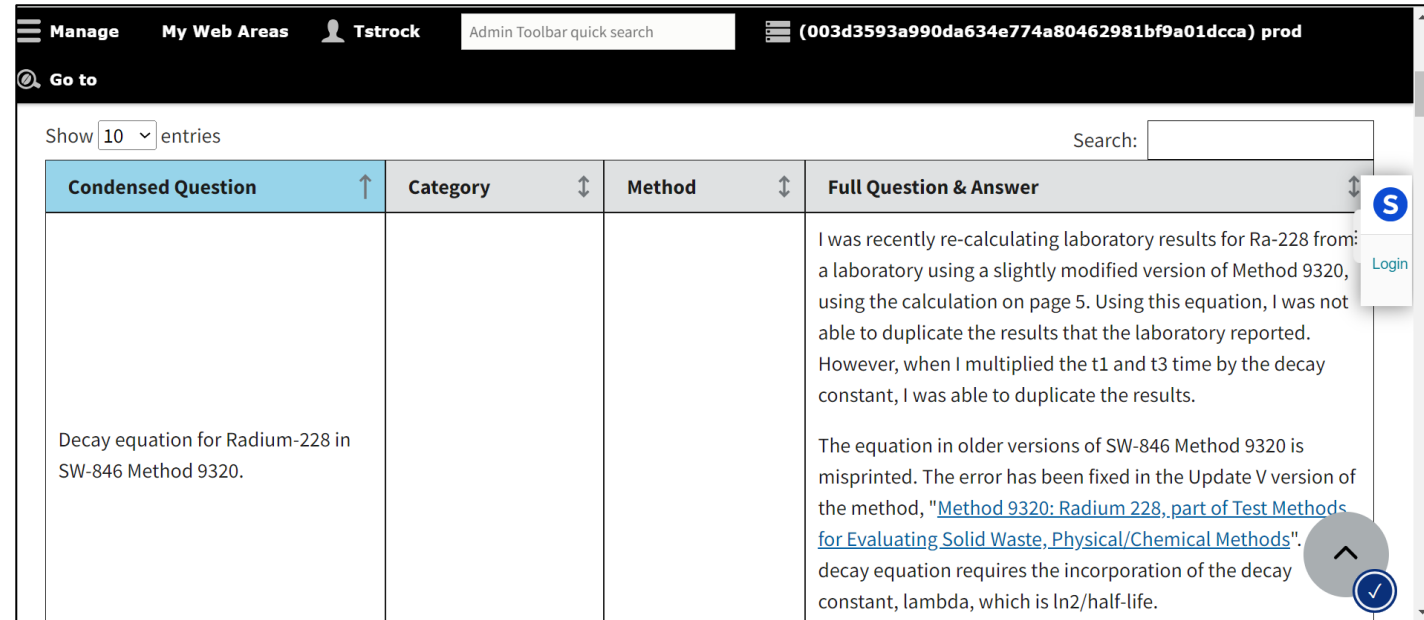
Days in refrigerated storage

Landfill leachate



# Web updates in progress: Revamp Frequently Asked Questions

- Move FAQs to searchable table, more user-friendly
- Revise some outdated FAQs
- Add more commonly asked questions from inquiries database



Condensed Question	Category	Method	Full Question & Answer
Decay equation for Radium-228 in SW-846 Method 9320.			<p>I was recently re-calculating laboratory results for Ra-228 from: a laboratory using a slightly modified version of Method 9320, using the calculation on page 5. Using this equation, I was not able to duplicate the results that the laboratory reported. However, when I multiplied the t1 and t3 time by the decay constant, I was able to duplicate the results.</p> <p>The equation in older versions of SW-846 Method 9320 is misprinted. The error has been fixed in the Update V version of the method, "<a href="#">Method 9320: Radium 228, part of Test Methods for Evaluating Solid Waste, Physical/Chemical Methods</a>". decay equation requires the incorporation of the decay constant, lambda, which is ln2/half-life.</p>

# Improving communications

- Recently moved communications to govdelivery
- Establish more regular, consistent communications with community of method users
- Provide notifications about current events, including more than just SW-846 updates
- Enable people to subscribe/unsubscribe to mailing list



# SW-846 methods program contacts:

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## **Opportunities for involvement:**

- Participate in an upcoming validation study
- Sign-up for SW-846 mailing list, submit a technical question about SW-846 methods: <https://www.epa.gov/hw-sw846/forms/contact-us-about-hazardous-waste-test-methods>