



# 2024 SW-846 Methods Updates

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SW-846 Methods Program

EPA Office of Resource Conservation and Recovery  
Materials Recovery and Waste Management Division  
Waste Characterization Branch

American Council of Independent Laboratories Annual Meeting

Environmental Sciences Section

2/14/2024



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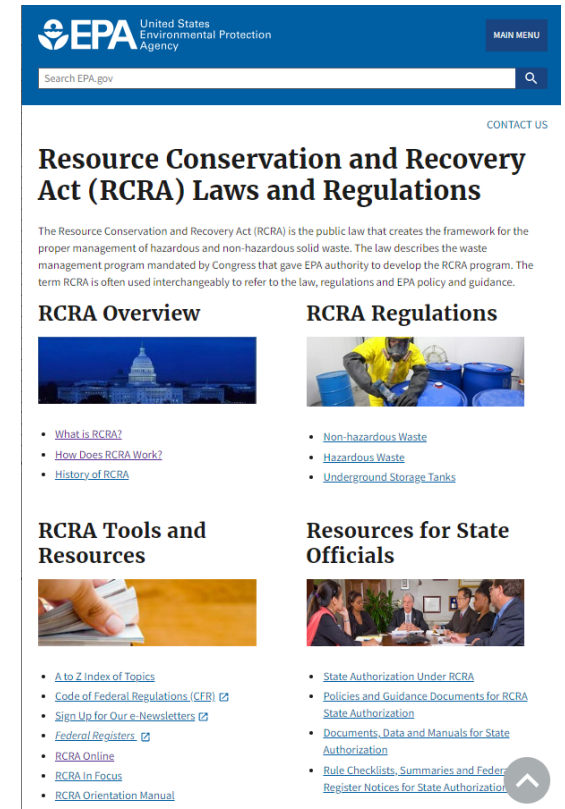
# Overview

- RCRA, SW-846 background
- Recent OLEM PFAS rulemakings, plans for guidance updates
- Next SW-846 update: Method 3050C, technical corrections
- LEAF: Aqueous leaching methods
- Plans for SW-846 PFAS analytical methods, TOP assay
- Other planned updates:
  - Validated methods
  - Chapters, guidance
  - Voluntary consensus standards

# 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, and their regulations may be more stringent



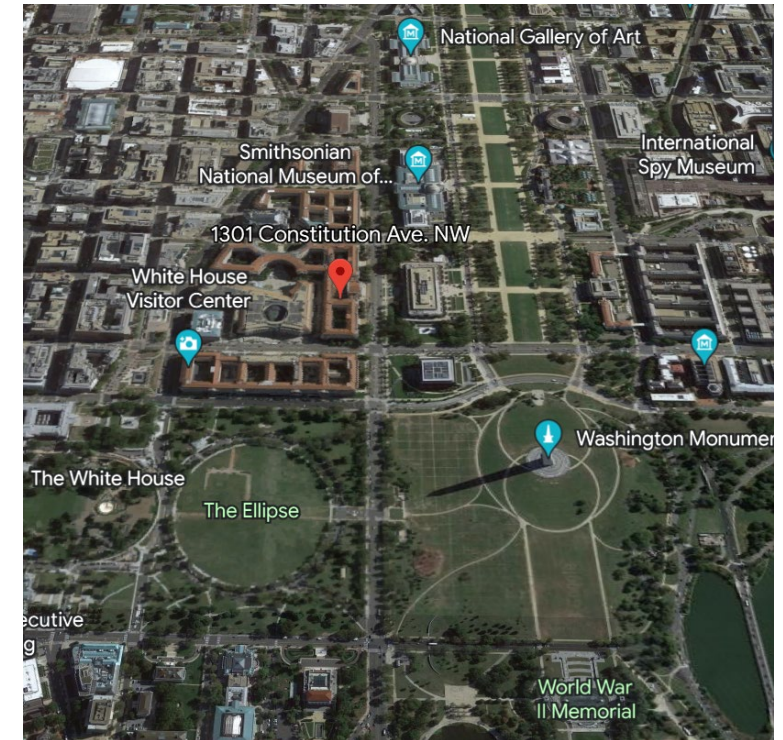
The screenshot shows the EPA website's page for RCRA. The header includes the EPA logo, "United States Environmental Protection Agency", a search bar, and a "MAIN MENU" button. Below the header, the page title is "Resource Conservation and Recovery Act (RCRA) Laws and Regulations". A brief description of RCRA is provided. 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".

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



# Waste Characterization Branch, Office of Resource Conservation and Recovery

Hazardous waste listings, §261	Narendra Chaudhari
Hazardous waste characteristics, §261	Dan Lowrey
Land disposal restrictions, §268	Sharon Oxendine, Bethany Russell
Homeland security, disaster debris	Melissa Kaps
SW-846 Compendium	Troy Strock
Branch Manager	Jocelyn Hospital





# The SW-846 Compendium

- Official compendium of 220+ test methods, guidance to support compliance with RCRA regulations
- A few methods are incorporated by reference in RCRA regulations – Method Defined Parameters (MDPs)
- Remaining methods are performance-based, “non-regulatory”
  - Appropriate modifications are permitted
  - Other reliable, published methods may be used
  - Regulated entity is responsible for ensuring results are appropriate, decisions are accurate

epa.gov/hw-sw846

EPA United States Environmental Protection Agency

Menu

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## Hazardous Waste Test Methods / SW-846

### What's New with SW-846

- [Update VII to SW-846](#)
- [Update VI to SW-846](#)
- [Validated Methods](#)
- [SW-846 FAQs](#)

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



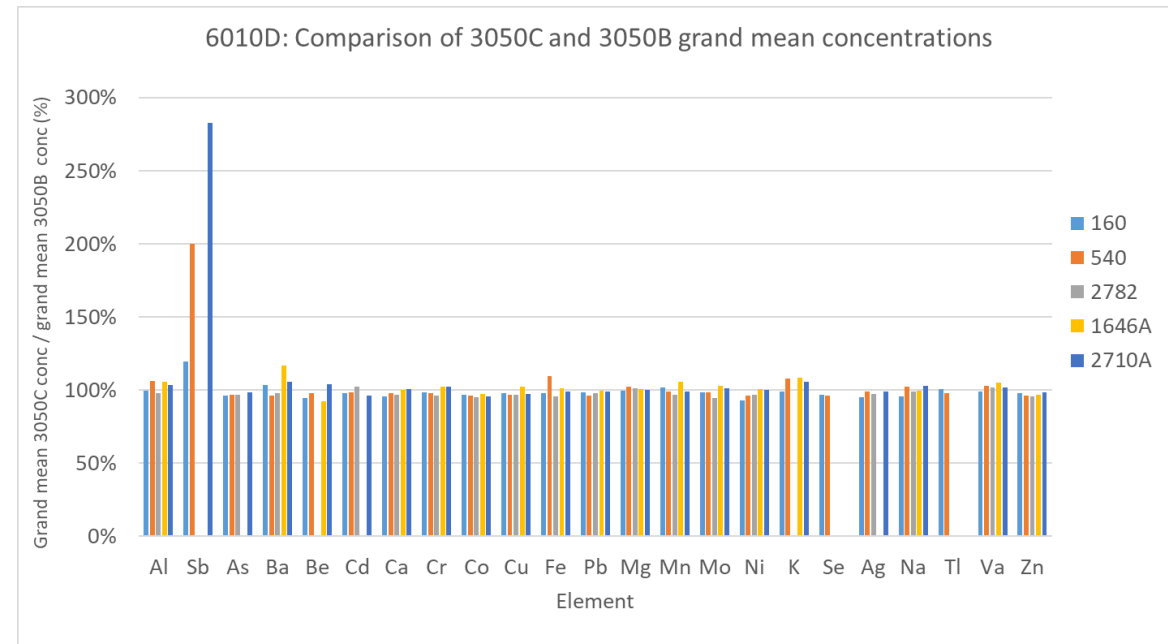


# Recent OLEM PFAS Rulemakings, Guidance Updates:

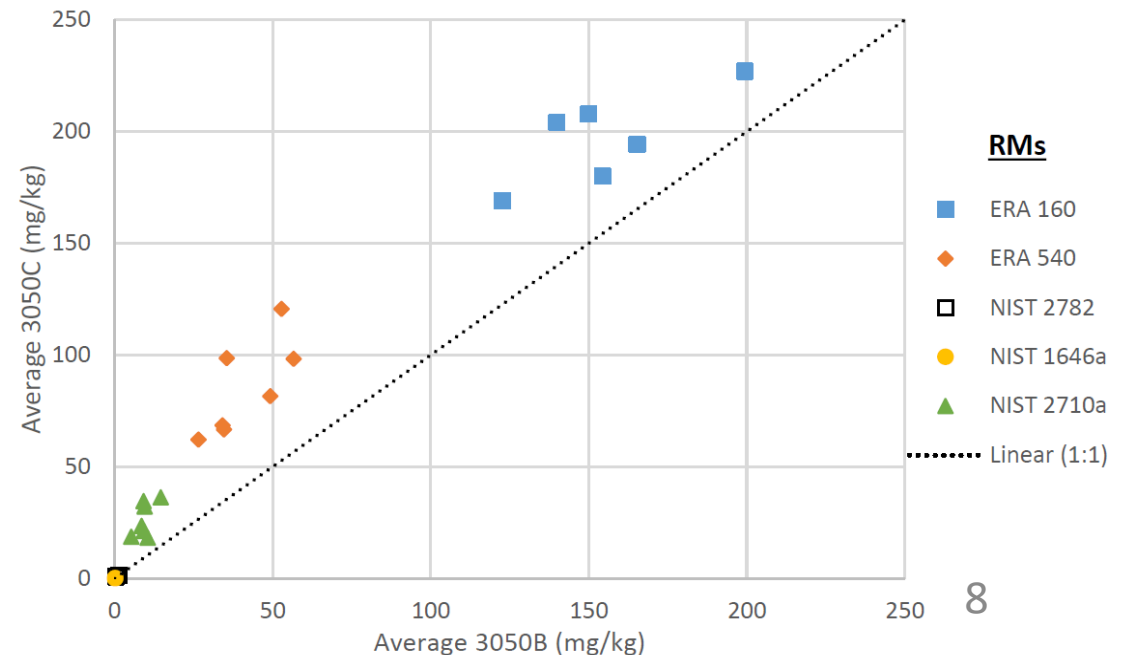
- CERCLA:
  - Notice of Proposed rulemaking (NPRM) designating PFOA and PFOS as CERCLA Hazardous *Substances* (released 09/2022)
  - Advance notice of proposed rulemaking (ANPRM) seeking public input in several areas regarding PFAS (released 04/2023)
  - Updates to PFAS Destruction and Disposal Interim Guidance (Anticipated early 2024)
- RCRA:
  - NPRM to list specific PFAS as RCRA Hazardous *Constituents* (released 02/2024)
    - Appendix VIII hazardous constituents are subject to corrective action at hazardous waste treatment, storage, and disposal facilities (TSDFs)
    - Would **not** make PFAS a RCRA hazardous *waste* subject to treatment standards, land disposal restriction, and other cradle to grave requirements
  - NPRM to amend the Definition of Hazardous Waste Applicable to RCRA Corrective Action (released 02/2024)
    - Provides notice of EPA's longstanding interpretation that the statutory definition of hazardous waste applies in the context of TSDF corrective action authority

# Next SW-846 Methods Update: 3050C

- 3050C, “Acid Digestion of Sediments, Sludges and Soils”
  - Updated digestion process: Initial reflux with  $\text{HNO}_3$  and  $\text{HCl}$ , followed by treatment with hydrogen peroxide, and final reflux with  $\text{HCl}$
  - Same digestion for ICP-OES and ICP-MS
  - Improved recovery of antimony, potentially a few other elements
  - Validation study: 10 labs, 5 solid reference materials
- Include technical corrections to 3500-series organic extraction methods, 8000D
- Goal: Post for public comment in early 2024



6020B correlation plot for Antimony







# Adapting SW-846 LEAF Methods to Organics

- **LEAF:** Leaching Environmental Assessment Framework
  - Collection of four aqueous leaching methods, “How To” guide, case studies
  - Methods used to better model fate and transport, evaluate immobilization strategies prior to field deployment
- **Current status:**
  - Multi-laboratory validation studies for first two methods started in January 2024 for SVOCs, PFAS
  - Goal: Publish updated versions of LEAF methods by end of 2025
- **Other LEAF projects:**
  - PFAS leaching from aqueous film forming foam (AFFF)-contaminated soils (SERDP grant)
  - PFAS leaching from biosolids



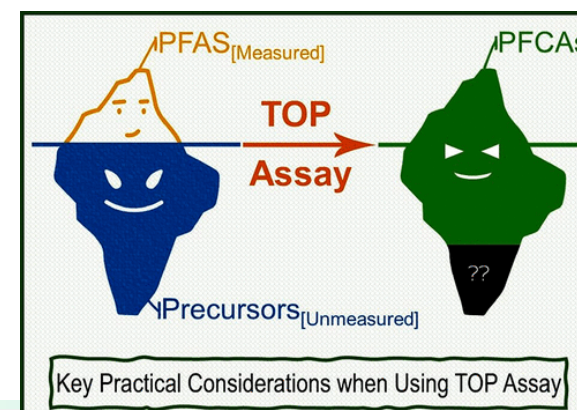
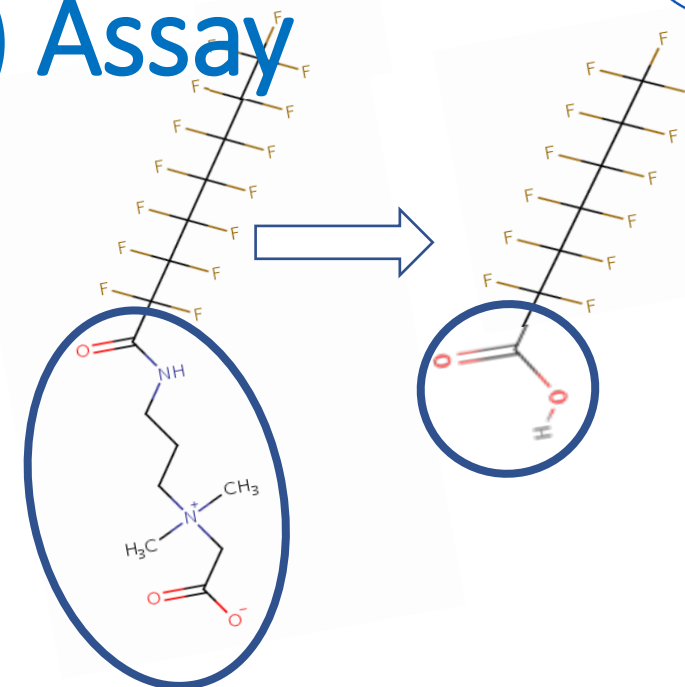


# Plans for SW-846 PFAS analytical methods

- SW-846 Methods 3512 and 8327
  - 3512: “Direct inject” sample preparation method for aqueous samples – dilute 1:1 with methanol, vortex, and filter
  - 8327: Liquid chromatography / tandem mass spectrometry determinative method
- Validation studies completed for Method 1633, ASTM D8421-22
- SW-846 analytical methods needs:
  - Extraction methods for solids
  - Expanded range of validated target analytes
  - Include extracted internal standard/isotope dilution calibration

# Plans for Class-based PFAS methods: Total Oxidizable Precursors (TOP) Assay

- Original paper published by Erika Houtz and David Sedlak
- Warm alkaline persulfate oxidation pretreatment to convert PFAS precursors to perfluoroalkyl acids
- Benefits:
  - Retains some structural information
  - Uses the same targeted analytical methods
- Some challenges to address:
  - Oxidation efficiency
  - Mole balance/fluoride mass balance
  - Volatile loss
  - Different approaches for aqueous, solid samples
- **Goal:** Complete development work in 2024
- Collaborators: EPA ORD, commercial labs, universities



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

# Other planned updates:

- Validated Methods:
  - 5030C, 5035A, purge and trap of VOCs in aqueous and solid samples
  - 8330B, nitroaromatics and nitramines by HPLC/UV – add insensitive munitions
  - 8015D, non-halogenated organics by GC-FID – add light hydrocarbons
- Chapter 4
  - pH 2 preservation of water samples for analysis of acrolein and acrylonitrile
- 1340A, “In Vitro Bioaccessibility Assay for Lead **and Arsenic** in Soil”
  - Dried, sieved soil (<150  $\mu\text{m}$ ) tumbled with pH 1.5 leaching solution at 37°C
- Update SW-846 method validation guidance, Frequently Asked Questions
- ASTM standards **D8174-18, D8175-18**
  - Incorporated by reference in RCRA
  - Need precision statements – Planning interlaboratory studies for early 2024

## SW-846 methods program contacts:

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### **Jocelyn Hospital, branch chief**

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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>