



2024 SW-846 Methods Updates

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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

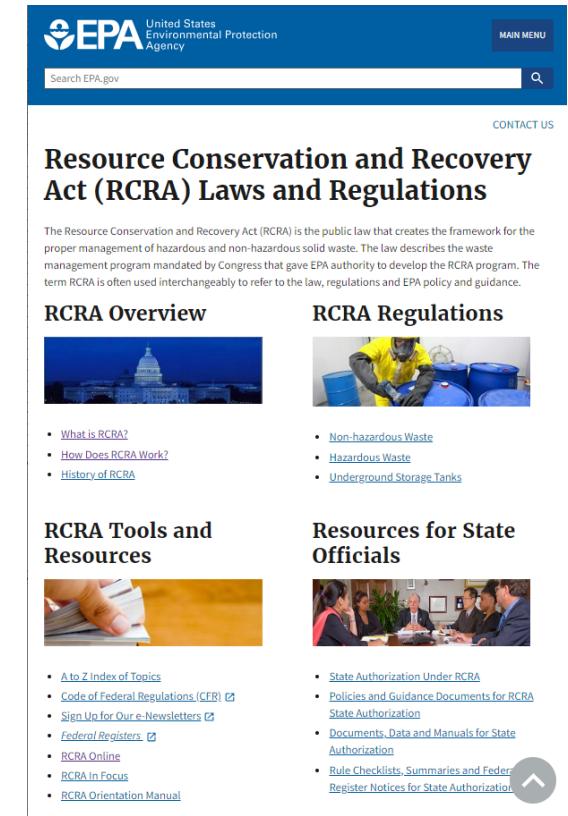
- RCRA, SW-846 background
- Recent OLEM PFAS rulemakings, plans for guidance updates
- Next SW-846 update: Method 3050C, technical corrections
- LEAF: Aqueous leaching methods
- Plans for SW-846 PFAS analytical methods, TOP assay
- Other planned updates:
 - Validated methods
 - Chapters, guidance
 -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



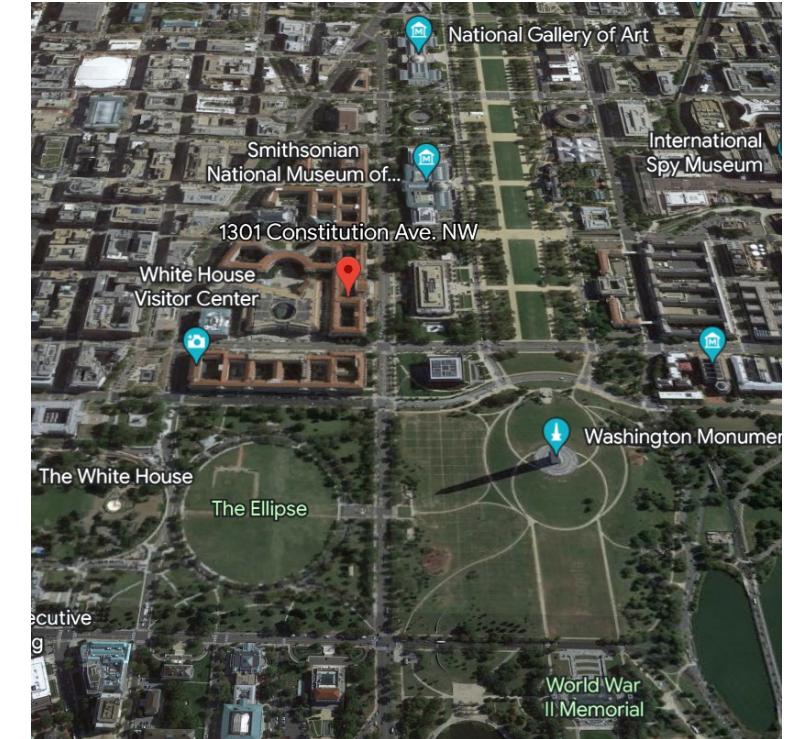
The screenshot shows the EPA website for RCRA laws and regulations. The header includes the EPA logo, a search bar, and links for 'MAIN MENU' and 'CONTACT US'. The main content area is titled 'Resource Conservation and Recovery Act (RCRA) Laws and Regulations'. It features a sub-section 'RCRA Overview' with a photo of the US Capitol and links to 'What is RCRA?', 'How Does RCRA Work?', and 'History of RCRA'. Another sub-section 'RCRA Regulations' shows a photo of a worker with drums and links to 'Non-hazardous Waste', 'Hazardous Waste', and 'Underground Storage Tanks'. A third sub-section 'RCRA Tools and Resources' shows a photo of a hand holding a document and links to various resources. A fourth sub-section 'Resources for State Officials' shows a photo of a group of people at a table and 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





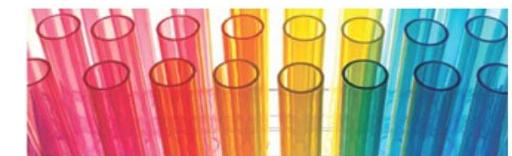
The SW-846 Compendium

- 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



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>

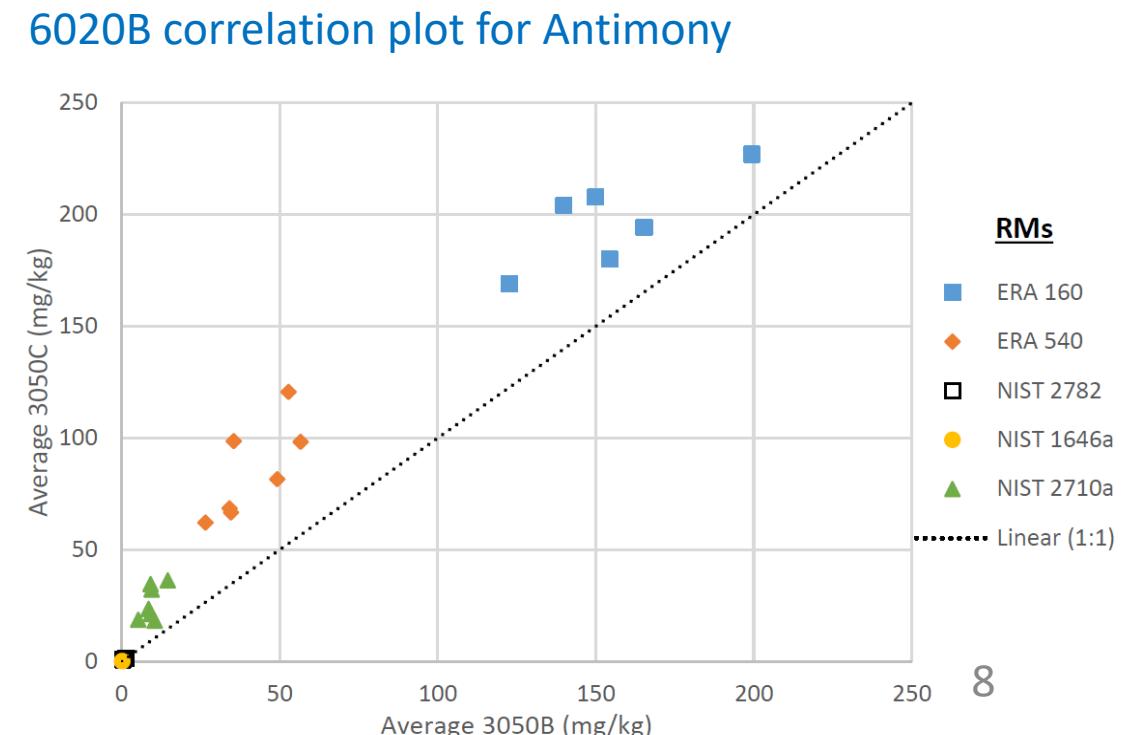
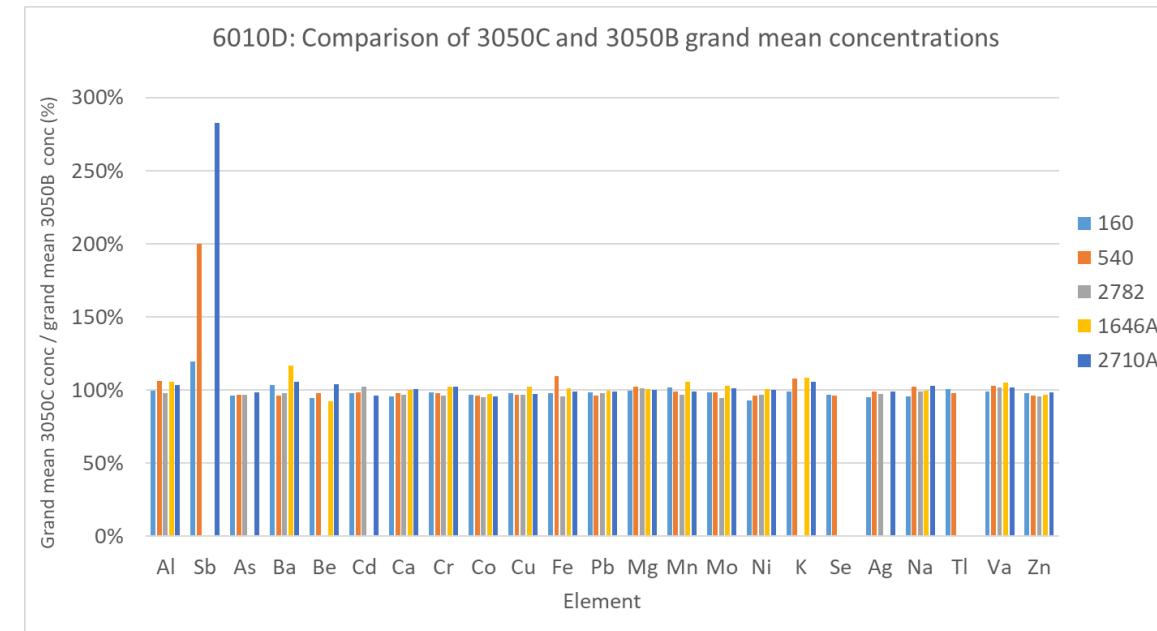


Recent OLEM PFAS Rulemakings, Guidance Updates:

- 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

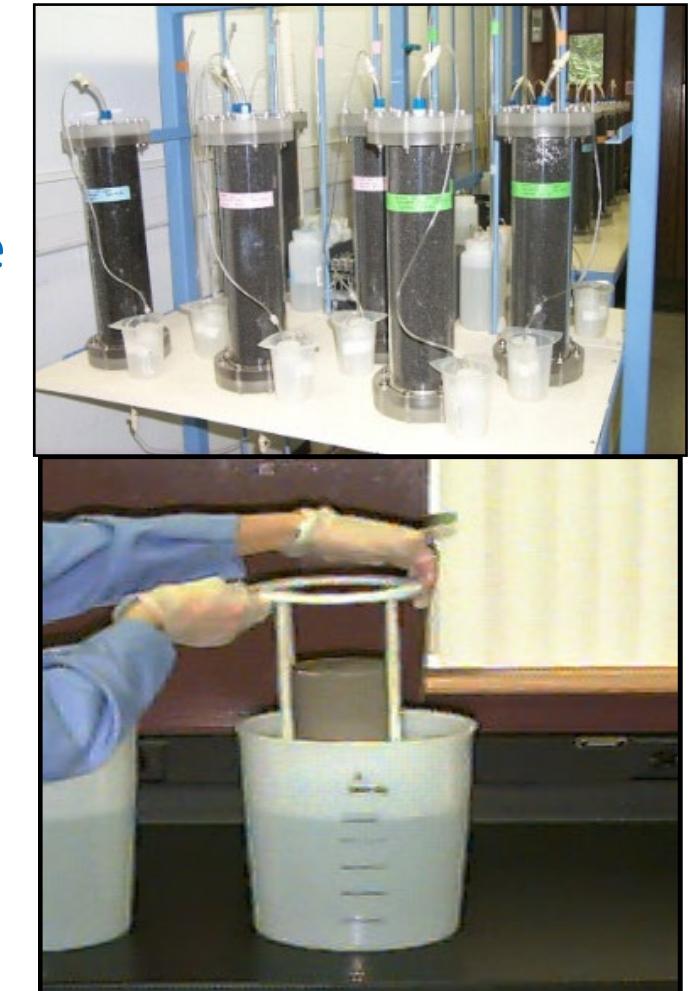
- 3050C, “Acid Digestion of Sediments, Sludges and Soils”
 - Updated digestion process: Initial reflux with HNO_3 and HCl , followed by treatment with hydrogen peroxide, and final reflux with HCl
 - Same digestion for ICP-OES and ICP-MS
 - Improved recovery of antimony, potentially a few other elements
 - 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





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





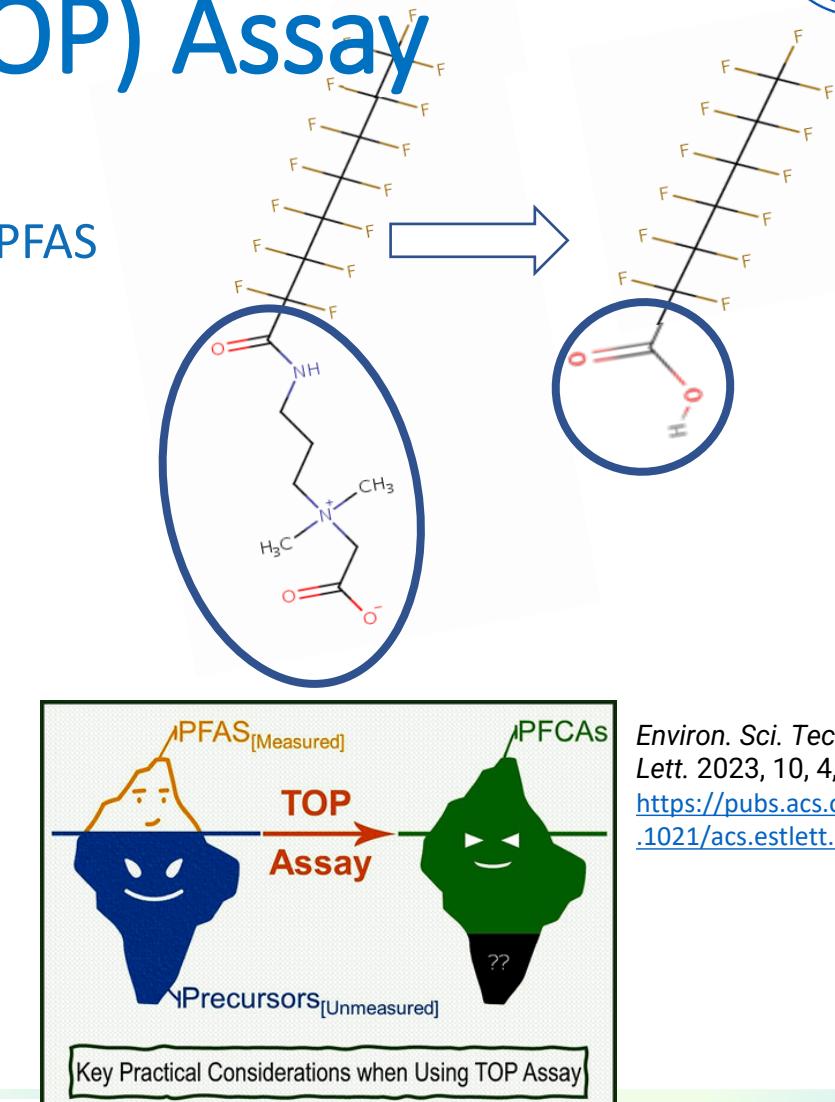
Plans for SW-846 PFAS analytical methods

- 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 µm) 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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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>