SW-846 Methods Program Update and Path Forward

U.S. Environmental Protection Agency, Washington, D.C.

Office of Land and Emergency Management (OLEM)

Office of Resource Conservation and Recovery (ORCR)

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Topics to be Covered

- Streamlined SW-846 Methods Publication
- Update VI
- New PFAS Method(s)
- Proposed Rule for Ignitability Characteristic
- Future Projects and Collaboration
- Contact Information

Hazardous Waste Test Methods / SW-846

The Resource Conservation and Recovery Act (RCRA) governs waste management and materials recovery and reuse, including the disposal of both hazardous and non-hazardous solid waste. In support of RCRA, EPA developed test methods for the analysis of various environmental media. These test methods can be found in the EPA publication, Test Methods for Evaluating Solid Waste: Physical/Chemical Methods, also known as SW-846.

Can't Find What You Are Looking For?

- Search the EPA Archive for older methods
- Read the SW-846 Frequent Questions
- Search the SW-846 Database for answers to technical questions
- Learn more about the Resource Conservation and Recovery Act

What's New with SW-846

- Update VI to SW-846 - Public Comment Period Open NEW
- Validated Methods (including LEAF Methods)
- SW-846 Database of Technical Questions & Answers

What is SW-846 and How Is It Organized?

- SW-846 Basics
- Which Method(s) Should I Use?
- Chapters and Methods in the SW-846 Publication

Technical Guidance

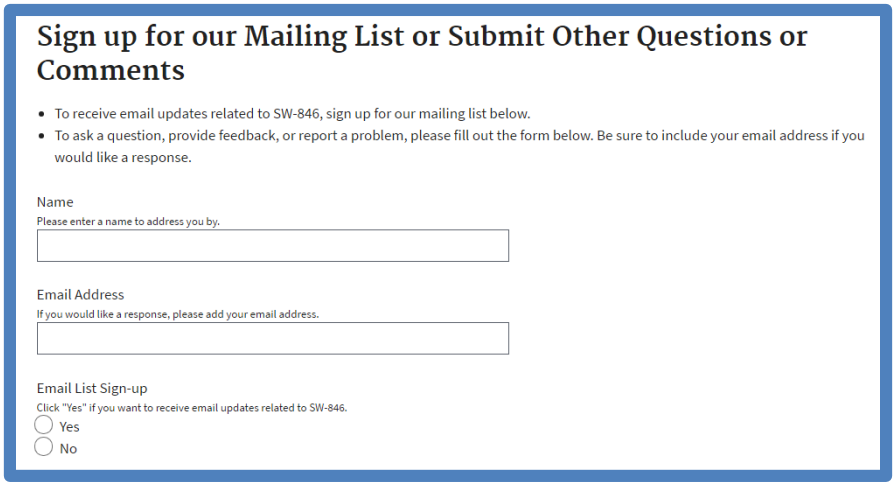
- Waste Sampling Guidance
- Test Method Development Process

Regulations, Rules and Policies

- Federal Register Notices Related to SW-846
- The Methods Innovation Rule and Method

Streamlined SW-846 Methods Publication

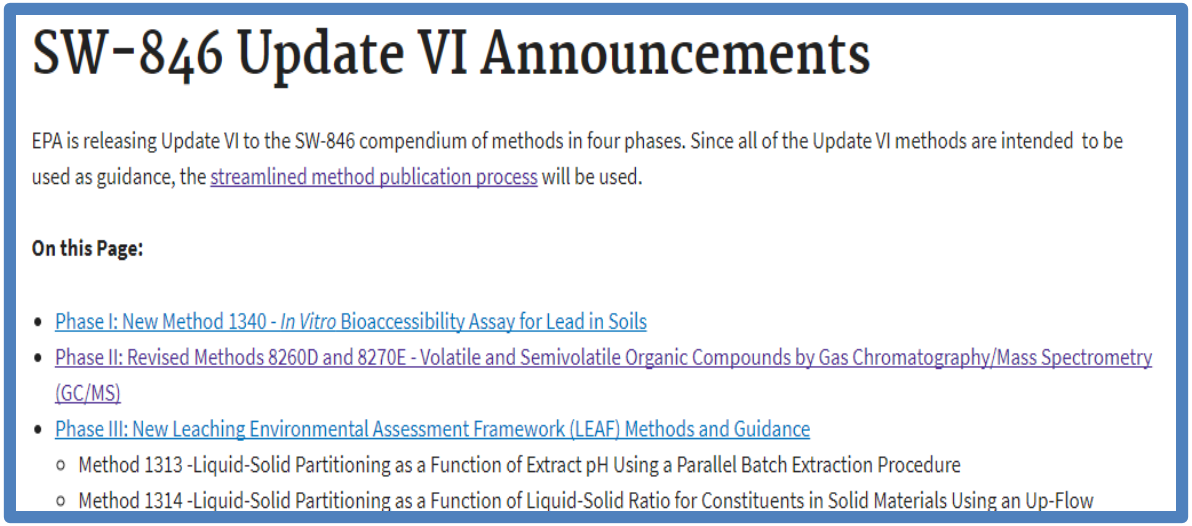
- Streamlined Method Publication Process Approved September 2016
  - ❑ Previous procedure: 2-3 year process, new procedure: 14-18 month process
  - ❑ Methods posted for public comment on SW-846 website (via EPA Docket)
  - ❑ Method users are notified via mailing list (improved communication)
    - *Contact orcrSW846@epa.gov to sign up for mailing list*



- Will Still Notify the Public via FR for Publication of Methods That Are Required by Regulations (i.e., MDPs)

Update VI

Phased Release for Public Comment



SW-846 Update VI Announcements

EPA is releasing Update VI to the SW-846 compendium of methods in four phases. Since all of the Update VI methods are intended to be used as guidance, the streamlined method publication process will be used.

On this Page:

- Phase I: New Method 1340 - *In Vitro* Bioaccessibility Assay for Lead in Soils
- Phase II: Revised Methods 8260D and 8270E - Volatile and Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)
- Phase III: New Leaching Environmental Assessment Framework (LEAF) Methods and Guidance
  - Method 1313 -Liquid-Solid Partitioning as a Function of Extract pH Using a Parallel Batch Extraction Procedure
  - Method 1314 -Liquid-Solid Partitioning as a Function of Liquid-Solid Ratio for Constituents in Solid Materials Using an Up-Flow

- Phase I – Method 1340: In Vitro Bioaccessibility Assay for Lead in Soil
- Phase II – Methods 8260D and 8270E: Volatile and Semivolatile Organic Compounds by GC/MS
- Phase III – 4 Inorganic LEAF Methods (1313, 1314, 1315, 1316) and the User Guide
- Phase IV – Method 3050C

Update VI Phase I – Method 1340

- Method 1340 – In-Vitro Bioaccessibility Assay (IVBA) for Lead in Soil
  - Public Comment Period: March 31 – May 1, 2017
    - *Received 1 relevant comment*
  - Characterization of lead in soil under 50,000 mg/kg in concentration
    - *Only validated for lead-contaminated soil under field conditions (not other matrices)*
    - *Uses a leaching procedure in a rotary extractor to extract lead from soil at a known temperature and time of exposure*
    - *Supernatant liquid is separated from the sample by filtration and can be analyzed for lead by an appropriate analytical method (e.g., Method 6010 or Method 6020)*

Update VI Phase II - Organic Methods

Methods 8260D and 8270E - Volatile and Semivolatile Organic Compounds by GC/MS

- Public Comment Period: April 28 – June 28, 2017
- Revised to include:
  - *Analytes frequently found in Superfund sites*
  - *Performance data for method users to better select sample preparation procedures*
  - *Optional use of hydrogen as carrier gas to address helium supply shortage*
  - *Advanced measurement technologies (SIM, CI, GC-MS/MS)*
  - *Clarified language for LLOQ and method blanks*
  - *Updated tuning requirements*
- Efforts made to ensure consistency and possible harmonization among EPA methods

Update VI Phase III - LEAF Inorganic Leaching Tests

Public Comment Period: August-September 2017

- **Equilibrium-based leaching tests – Methods 1313 and 1316**
  - Batch tests on size reduced material
  - Measure contaminant release related to pH & liquid/solid (LS) ratio
  - Method 1313 – pH dependence & titration curve
  - Method 1316 – LS dependence
- **Percolation (column) leaching test – Method 1314**
  - May be equilibrium or mass transfer rate
  - Method 1314 – upflow column, local equilibrium (LS ratio)
- **Mass transport rate-based leaching test – Method 1315**
  - Monolithic material or compacted granular material
  - Determine contaminant release rates by accounting for physical & chemical properties
  - Method 1315 – monolith & compacted granular options
- **LEAF User Guide**

Update VI Phase IV – Method 3050C

- Method 3050C – Acid Digestion of Sediments, Sludges, and Soils
  - Strong acid digestion to dissolve almost all elements that could become "environmentally available"
  - Two procedures
    - *Preparation for analysis by FLAA or ICP-OES*
    - *Preparation for analysis by GFAA or ICP-MS – no HCl*
  - New Appendix B – added to address Incremental Sampling
  - Regional Validation Study: Fall of 2017
  - Public Comment Period: Winter of 2017/2018

New Method(s) for PFAS in Environmental Media

Background

- PFAS are a large group of manufactured compounds used in a variety of industries to provide:
  - *stain-, grease-, and water- resistant property for food packaging and textile industries*
  - *friction reducing property for the aerospace, automotive, construction and electronics industries*
  - *fire suppressant property for aqueous film forming foam (AFFF) fire fighting agents*
- The most commonly studied PFAS compounds (perfluorinated octanoic acid (PFOA) and perfluorooctane sulfonate (PFOS)) are extremely persistent in human body and the environment
- PFAS are resistant to many common wastewater treatment processes and are highly toxic to mammals

New Method(s) for PFAS in Environmental Media

PFAS Analysis

- EPA developed Method 537 for drinking water in 2009
  - *14 PFAS compounds using solid-phase extraction (SPE) followed by LC/MS/MS*
- A Sep 27, 2016 Technical Advisory describes how labs should quantitate PFOA using Method 537 to account for linear and branched isomers
- In May 2016, EPA issued drinking water health advisories for PFOA and PFOS (70ppt)
- Currently no validated EPA method for the analysis of PFAS in other environmental media
- A cross-agency workgroup (OLEM, OW, ORD, and Regions) was charged with the development of:
  - *multi-lab validated method(s) for the analysis of PFAS in various environmental media (groundwater, surface water, wastewater treatment influent and effluent, soils, sediments, biosolids)*
  - *sampling, handling and storage protocols*
  - *data management*
  - *internal and external lab capacity assessment*

New Method(s) for PFAS in Environmental Media

EPA PFAS Methods

- Three method options: all use LC/MS/MS
  - *Method A (R5) – direct injection and external standard method*
    - Uses isotopically labeled compounds as surrogates
  - *Method B (ORD NERL) – SPE and isotope dilution method*
    - Addition of isotopically labeled internal standards (IS) prior to SPE
    - Extracted calibration/extracted IS calibration
    - PFAS results will be corrected based on the isotopically labeled IS
  - *Method C (ORD NRMRL) – SPE and internal standard method*
    - Quantification based on isotopically labeled IS (typical IS calibration)

New Method(s) for PFAS in Environmental Media

Multi-laboratory validation study

- *Phase I – Initial Assessment of Methods*
  - April - September 2017, 6 EPA labs validate Method A (Direct Inject Method) at 10 ppt for 24 compounds for non-potable waters (GW, SW, WW)
  - Assessment of SPE method to use for lower QL, challenging matrices (Methods B or C)
  - Draft SW-846 Method(s) for non-potable waters by winter 2017

- *Phase II – External Validation*
  - External validation of Method A (Direct Inject Method) at 10ppt for 24 compounds by fall 2017
  - External validation on SPE method for waters and/or solids

The RCRA Ignitability Characteristic

The Agency has been reviewing the need to revise the RCRA ignitability characteristic for hazardous waste, 40 CFR 261.21

RCRA ignitability includes:

- 261.21(a) – Ignitable liquids
- 261.21(b) – Non-liquids causing fire through friction, moisture absorption or spontaneous...
- 261.21(c) – Ignitable compressed gases
- 261.21(d) – Ignitable oxidizers

Currently developing a proposed rule to address:

- Revising flash point methods for ignitable liquids
  - Pensky Martens – EPA Method 1010A
  - Setaflash – EPA Method 1020B
- Possible clarification of alcohol exclusion for ignitable liquids
- Removing requirements for mercury thermometers
- Public comment on the proposed rule anticipated August 2018

Rulemaking workgroup includes flashpoint users from Regional labs and NEIC

Future Projects and Collaboration

- Inorganic Update VII Methods
  - Method 1340A – In Vitro Bioaccessibility Assay for Lead and Arsenic in Soil
    - *Add arsenic*
  - Method 6200A – Field Portable X-Ray Fluorescence Spectrometry for the Determination of Elemental Concentrations in Soil and Sediment
    - *Remove confirmation requirement, replace with optional comparability study*
    - *Method will have two modes of operation*
      - In-situ: screening
      - Ex-situ: quantitative
  - Method 3060B – Alkaline Digestion for Hexavalent Chromium (collaboration with USGS)
  - Method 3110 – Extraction of Seafood for Arsenic Species (Region 10)
  - Method 6870 – Arsenic Speciation Analysis in Seafood Using IC/ICP-MS (Region 10)

Future Projects and Collaboration

- Organic Update VII Methods
  - *Method 5030D - Purge-and-Trap for Aqueous Samples*
  - *Method 5035B - Closed-System Purge-and-Trap and Extraction for Volatile Organics in Soil and Waste Samples*
  - *Method 8261B - Volatile Organic Compounds by Vacuum Distillation in Combination with Gas Chromatography/Mass Spectrometry (VD/GC/MS)*
  - *Method 6850A - Perchlorate in Water, Soils, and Solid Wastes Using High Performance Liquid Chromatography/Electrospray Ionization/Mass Spectrometry (HPLC/ESI/MS)*
  - *Method 6860A - Perchlorate in Water, Soils, and Solid Wastes Using Ion Chromatography/Electrospray Ionization/Mass Spectrometry (IC/ESI/MS)*

Resources and Contact Information

- Methods Home Page: https://www.epa.gov/hw-sw846
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