

INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT  
OFFICE OF LAND QUALITY, CHEMISTRY SERVICES SECTION



**SOLID & HAZARDOUS WASTE PROGRAMS  
ANALYTICAL DATA DELIVERABLE REQUIREMENTS:  
SUPPLEMENTAL GUIDANCE**

*Eric J. Holcomb*  
Governor

*Bruno L. Pigott*  
Commissioner

(317) 232-8603 • (800) 451-6027

[www.idem.IN.gov](http://www.idem.IN.gov) 100 N. Senate Ave., Indianapolis, IN 46204

Guidance Updated: *May 2019*

### **RELATED GUIDANCE**

This is a supplemental guidance to “Test Methods for Evaluating Solid Waste, Physical/Chemical Methods” (SW-846) Third Edition and its updates; “Remediation Closure Guide;” and other documents listed under “References”.

### **PURPOSE**

The purpose of this document is to provide guidance to facilities submitting analytical data in support of applying for RCRA Part B and Solid Waste Permits. Specifically, this document describes the analytical data needed to meet the requirements of the RCRA Part B Permit Application Guidance described in 329 IAC 3.1 and the Solid Waste Program as defined by 329 IAC 10, 11, and 13. Analytical data is necessary in the permit applications to document the characterization of wastes stored, treated, disposed or generated at RCRA and solid waste facilities. This waste characterization can then be used to verify the facility's waste code list and/or waste classification to assure proper management of the wastes.

### **METHODS and PROCEDURES**

Facilities must determine the sampling methods, analytical methods, and quality control measures needed to meet the requirements established in this document. Commonly, the analytical method indicates the quality control required to validate the results of that method. 40 CFR 261 Appendix III lists chemical analysis test methods. This Appendix also references Chapter One and Chapter Two of “Test Methods for Evaluating Solid Waste, Physical/Chemical Methods” (SW-846), which provide guidance on quality assurance/quality control (QA/QC) procedures and the selection of proper analytical methods.

Several of the hazardous waste and solid waste regulations under subtitles C and D of RCRA (and associated Indiana regulations) require that specific testing methods described in SW-846 be employed for particular applications. The following regulations and applications require the use of SW-846 methods:

I. 40 CFR:

- (1) Section 261.22(a)(1) and (2) - Evaluation of waste against the corrosivity characteristic
- (2) Section 261.24(a) - Leaching procedure for evaluation of a waste against the toxicity characteristic
- (3) Sections 264.190(a), 264.314(c), 265.190(a), and 265.314(d) - Evaluation of a waste to determine if free liquid is a component of the waste
- (4) Section 268.32(i) - Evaluation of a waste to determine if it is a liquid for purposes of certain land disposal prohibitions
- (5) Sections 268.40(a), (b) and (f), 268.41(a), and 268.43(a) - Leaching procedure for evaluation of waste extract to determine compliance with Land Disposal treatment standards
- (6) Section 268.7(a) - Leaching procedure for evaluation of a waste to determine if the waste is restricted from land disposal
- (7) Sections 270.19(c)(1)(iii) and (iv), and 270.62(b)(2)(i) (C) and (D) - Analysis and approximate quantification of the hazardous constituents identified in the waste prior to conducting a trial burn in support of an application for a hazardous waste incineration permit
- (8) Section 260.22 - Waste delisting.

II. 329 IAC 10-9: Waste Classifications

III. 329 IAC 10-7.2: Generator Responsibilities for Waste Information

IV. 329 IAC 10: Liquid Waste Determination Requirement using Method 9095A

V. 329 IAC 10-20-14.1: Alternative Daily Cover Requirement for pH Test Method 9045C

In other situations, SW-846 functions as a guidance document setting forth acceptable, although not required, methods to be implemented by the user, as appropriate, in satisfying RCRA and Solid Waste related sampling and analysis requirements.

**DATA VALIDATION**

The Indiana Department of Environmental Management (IDEM), Office of Land Quality (OLQ) must confirm that analytical data is valid by reviewing the QA/QC data generated during the sampling and analysis procedures in order to be assured that scientifically sound decisions are made which will be protective of human health and the environment. Thus, full QA/QC documentation necessary for validation is requested in analytical data packages. Sampling and analytical documentation is a required element of data packages

in order to validate data quality. Reporting and deliverable requirements for data packages are listed below. **OLQ reserves the option to require that all raw data and any other project specific relevant information be submitted if data validity concerns arise during the review of the data packages upon request. Chromatograms, recorder outputs, mass spectrum reports, computer printouts, charts, graphs, bench sheets or any other hard copy data generated during sampling and analysis are components of the raw data.**

## **SAMPLING DOCUMENTATION**

The procedures describing how the sampling operations were actually performed should be provided. A simple reference to standard methods is not sufficient unless a procedure was performed exactly as described in the published method. Methods from source documents published by the EPA, American Society for Testing and Materials (ASTM), U.S. Department of the Interior, National Ground Water Association, American Petroleum Institute (API), or other recognized organizations with appropriate expertise should be used, if possible. The procedures for sample collection should be documented by including at least the following:

- Completed chain-of-custody with sample date, time and identification
- Map or diagram indicating sample locations and corresponding sample ID numbers
- Field measurements made (and results)
- Sample field sheets that document sample identifiers, locations, date and time, sampling methods and equipment, samplers, calibration methods, and any notable observations (color, clarity, texture, reactions with preservatives, etc.)
- Blanks – trip, field, or equipment rinsate blanks, as appropriate
- Identity of field duplicates - typically at least one per twenty samples per matrix for each method
- Adequate sample volume
- Detailed description of sampling equipment decontamination procedures (if applicable).

## **ANALYTICAL DATA DELIVERABLE REQUIREMENTS**

It is important to choose sample analysis methods that can meet the project's data quality objectives (DQOs). The Quality Assurance Project Plan (QAPP), Sampling and Analysis Plan (SAP), Waste Analysis Plan (WAP), or other relevant project-specific sampling document should list analysis methods and any variations from these methods. Reference to standard published methods is typically acceptable as long as the laboratory performs the analysis exactly as stated in the method.

Some key considerations regarding sample analysis include:

- Analytical methods must be capable of delivering reporting limits at least as low as the relevant project objectives.
- The laboratory must demonstrate the ability to provide data that meet project DQOs.
- When analyzing solid samples (e.g., soils, sediments, and solid waste) for VOCs, IDEM recommends collecting and extracting them using U.S. EPA SW-846 Method 5035A. See IDEM 2012b in “References”.
- All soil analytical results should be reported on a dry weight basis. Dry weight results are necessary because dry weight is an integral part of the soil-groundwater partitioning model, which is utilized in the calculation of closure levels. Since dry soil bulk density is part of the partitioning equation, all soil sample results need to be reported on a dry weight basis. The laboratory should run EPA water method 1684 to determine the Percent Moisture of each sample. The lab will then recalculate the sample result based on the dry weight by using the Percent Moisture result.

Analytical documentation necessary to evaluate data will depend on the intended use(s) of the data. In general, reporting limits and detection limits, along with actual sample results and associated qualifiers, are essential to data interpretation. The following laboratory-related items should support every sampling project:

- Completed chain of custody with date and time of receipt
- Condition of samples on receipt
- Sample identification – site identification and lab identification
- Sample preparation logs with extraction, cleanup or digestion details
- Certificates of analysis with method, analysis date, results, method detection limits, reporting limits, and any dilution factors
- Case narrative detailing any deviations, problems, and corrective actions

The following table contains the elements that IDEM has determined are necessary to document a data package containing full QA/QC.

## Elements for Full QA/QC Documentation

<b>Element</b>	<b>Method Type</b>
Sample introduction method (e.g., direct injection, purge & trap)	Specific gas chromatography (GC) detector method
Tuning criteria and results	Gas chromatography/mass spectroscopy (GC/MS)
Initial calibration (IC) and IC verification	All
Continuing calibration(s)	All
Blank results (e.g., field, prep, method)	All
Laboratory control sample	All
Internal standard summary	GC/MS, GC
Surrogate recoveries	GC/MS, GC
Matrix spike/matrix spike duplicate recoveries	All
Interference check samples	Inductively coupled plasma (ICP) Methods
Serial dilutions	ICP methods
Method of standard additions (if applicable)	ICP methods
Raw data (instrument printouts, chromatograms and/or mass spectra, as applicable)	All
Confirmation on 2 <sup>nd</sup> column (or GC/MS)	Pesticides, polychlorinated biphenyls (PCBs), benzene, toluene, ethylbenzene and xylenes (BTEX) & other VOCs by GC
Sample preparation records, extraction records, pH of the neutral leach, determinative analysis	Toxicity Characteristic Leaching Procedure (TCLP) and Neutral Leaching Method

## **REFERENCES**

American Public Health Association (APHA), American Water Works Association (AWWA), and Water Environment Federation (WEF). 2012. *Standard Methods for the Examination of Water and Wastewater*, 22nd Edition. Available for purchase at: <http://www.standardmethods.org/>.

IDEM. 2012a. *Remediation Closure Guide*, with corrections through July 9, 2012. Available at: [https://www.in.gov/idem/cleanups/files/remediation\\_closure\\_guide.pdf](https://www.in.gov/idem/cleanups/files/remediation_closure_guide.pdf).

IDEM. 2012b. *Sampling Soil and Waste for Volatile Organic Compounds (VOCs)*. IDEM technical guidance document, available at: [https://www.in.gov/idem/cleanups/files/guidance\\_soil\\_sampling\\_vocs.pdf](https://www.in.gov/idem/cleanups/files/guidance_soil_sampling_vocs.pdf).

U.S. EPA. 1983. *Methods for Chemical Analysis of Water and Wastes*. EPA 600/4-79-020. (Alternatively see *Guidelines Establishing Test Procedures for the Analysis of Pollutants*, 40 CFR 136, available at: <https://www.epa.gov/nscep>).

U.S. EPA. 2015. *Waste Analysis at Facilities That Generate, Treat, Store, and Dispose of Hazardous Wastes: A Guidance Manual*. EPA 530-R-12-001. Available at: <https://www.epa.gov/hwgenerators/guidance-manual-waste-analysis-facilities-generate-treat-store-and-dispose-hazardous>.

U.S. EPA. 2006. *Guidance on Systematic Planning Using the Data Quality Objectives Process*. EPA 240-B-06-001. Available at: <https://www.epa.gov/quality/guidance-systematic-planning-using-data-quality-objectives-process-epa-qag-4>.

U.S. EPA. 2009. *Test Methods for Evaluating Solid Waste: Physical/Chemical Methods*, (SW-846) Third Edition (September 1986) and its updates. Available at: <https://www.epa.gov/hw-sw846/sw-846-compendium>