



INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

## Understanding the Hazardous Waste Determination Process

Office of Land Quality

(317) 232-8603 • (800) 451-6027

[www.idem.IN.gov](http://www.idem.IN.gov)

100 N. Senate Ave., Indianapolis, IN 46204

### Why is a Waste Determination Needed?

The Resource Conservation and Recovery Act (RCRA) of 1976 was the first federal law to address hazardous waste. It was designed to ensure that the generation, transportation, treatment, storage and disposal of hazardous wastes are conducted in a manner that protects human health and the environment. This guidance document has been developed to assist you in properly identifying all wastes that you generate, treat, store or send off-site for recycling, energy recovery or disposal. You, the generator, must conduct a proper waste analysis to determine whether your waste is defined as a hazardous waste under RCRA and to ensure that it is managed properly.

**Waste analysis involves identifying or verifying the chemical and physical characteristics of a waste by performing a detailed chemical and physical analysis of a representative sample of the waste or, in certain cases, by applying acceptable knowledge of the waste.**

### How is the Waste Determination Process Started?

The **first step** in the hazardous waste identification process is deciding whether an item is considered to be a solid waste. Note that the term “solid” does not refer to the physical state of the waste. Solid waste can be a solid, liquid, or a contained gas. Under RCRA, a solid waste is any material that you will no longer be using for its originally intended purpose or a material that must be reclaimed before reuse. In order for any material to be a hazardous waste, it must first be a solid waste.

Not all RCRA solid wastes are considered hazardous wastes. U.S. EPA exempted or excluded certain wastes, such as household wastes or used oil destined for recycling, from the hazardous waste definition and regulation. Deciding whether or not a waste is excluded or exempted from hazardous waste regulation is the **second step** in the hazardous waste identification process. Only after determining that a solid waste is not somehow excluded from hazardous waste regulation should the analysis proceed to evaluate the actual chemical or physical hazard that a waste poses.

The **third step** in the hazardous waste identification process is determining whether a waste actually poses a sufficient chemical or physical hazard to merit regulation.

This step involves evaluating the waste in light of the regulatory definition of hazardous waste and is accomplished by doing one or more of the following:

- Identifying the process that generated the waste (Is it a “listed” waste?)
- Applying knowledge of typical waste composition and/or
- Conducting waste testing or analysis

Thus, the RCRA hazardous waste identification process involves three primary steps, in this order:

1. Determining whether the material in question is a solid waste
2. Determining whether that solid waste is excluded from regulation
3. Determining whether that solid waste is a hazardous waste

The remainder of this document will focus on the third step in the process, hazardous waste determination.

**NOTE: Even if you have determined that your waste is excluded from hazardous waste regulation, you need to re-evaluate your status periodically to verify that conditions affecting the composition of your waste have not changed.**

## **Hazardous Waste Listing Determination**

If you find that your waste is not excluded, then you must determine if the waste meets one or more of the hazardous waste **listing** descriptions found in 40 CFR 261.31, 261.32 and 261.33. The lists include wastes from non-specific sources (termed “F-listed wastes,” after the F prefix in the hazardous waste codes). An example would include F002 wastes, spent halogenated solvents (i.e., perchloroethylene, trichloroethylene, methylene chloride). The hazardous waste listings also include wastes from specific sources, K-listed wastes, such as K062 waste, spent pickle liquor from the steel finishing industries. The third group of hazardous waste listings includes discarded unused commercial chemical products, off-specification products and spill residues of such products (i.e., P- and U-listed wastes).

## **Hazardous Waste Characteristic Determination**

If the waste is not listed, you must determine if it exhibits any of the four **characteristics** of a hazardous waste: **ignitability**, **corrosivity**, **reactivity**, and **toxicity**. This evaluation involves testing the waste or using knowledge of the process or materials used to produce the waste.

A waste is **ignitable** if it is a liquid and its flash point is less than 140<sup>o</sup> F (60<sup>o</sup> C). A waste also may be defined as ignitable if it is an oxidizer or an ignitable compressed gas as defined by the U.S. Department of Transportation (DOT) regulations in 49 CFR Part 173, or if it has the potential to ignite under standard temperature and pressure and burn persistently and vigorously once ignited. Wastes that are ignitable are classified as U.S. EPA Hazardous Waste Code D001. Examples of ignitable wastes include certain spent solvents such as mineral spirits.

A waste is **corrosive** if it is aqueous and its pH is less than or equal to 2 or greater than or equal to 12.5. A waste also is corrosive if it is a liquid and it corrodes steel at a rate of more than 0.25 inches per year under conditions specified in EPA Test Method 1110. Corrosive wastes are designated as U.S. EPA Hazardous Waste Code D002. Examples of corrosive wastes include spent sulfuric acid and concentrated waste sodium hydroxide solutions that have not been neutralized.

A waste exhibits **reactivity** if it is unstable and explodes or produces fumes, gases, and vapors when mixed with water or under other conditions such as heat or pressure. A waste also may be defined as reactive if it is a forbidden explosive or a Class A or Class B explosive as defined in 49 CFR Part 173. Wastes that exhibit the characteristic of reactivity are classified as U.S. EPA Hazardous Waste Code D003. Examples of reactive wastes include certain cyanide or sulfide-bearing wastes.

The **toxicity characteristic** of a waste is determined by having a laboratory analyze an extract of the waste using the Toxicity Characteristic Leaching Procedure. The results of the analysis are compared to the regulatory thresholds of 40 constituents, primarily heavy metals, organic compounds, and pesticide/herbicides. If the extract from the TCLP procedure contains levels of any of the 40 constituents at or above regulatory thresholds, the waste is considered a hazardous waste. Wastes that exhibit the toxicity characteristic are classified as U.S. EPA Hazardous Waste Codes D004 through D043. Examples of toxic wastes may include wastewater treatment sludges, wastes from organic chemical manufacturing and pesticide/herbicide wastes.

## **Sampling and Analysis Basics**

You can meet general waste analysis requirements using several methods or combinations of methods. The preferred method is to conduct sampling and analysis of the waste as this method is more accurate and defensible than other options. The procedures and equipment for both obtaining and analyzing samples are described in Appendices I and II of 40 CFR Part 261. Full-scale analysis (e.g., methods from EPAs "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods" SW-846, 3rd Edition or equivalent) may be necessary when:

- You begin a new process or change an existing one;
- You have not provided appropriate laboratory information to an off-site treatment, storage and disposal facility (TSDf);
- An off-site TSDf has reason to believe the wastes you shipped were not identified accurately;
- EPA amends RCRA waste identification/classification rules; and/or
- A facility receives waste for the first time.

It is recommended that you prepare a sampling and analysis plan prior to sample collection and testing. Chapters 1 and 9 of "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods" SW-846, 3rd Edition, are excellent sources of information on sampling and analysis.

To properly characterize a waste, analysis of a **representative** sample from each waste stream is required. **A representative sample is defined as a sample of a universe or whole that can be expected to exhibit the average properties of the universe or whole.**

Methods for statistical determination of a valid number of samples, recommended sampling methods, sampling strategies and applicable sampling equipment are found in Chapter 9 of “Test Methods for Evaluating Solid Waste, Physical/Chemical Methods” SW-846, 3rd Edition.

## **How to Use Generator Knowledge**

Generators also can meet waste analysis requirements by applying ***knowledge*** of the waste. Generator knowledge can be used to meet all or part of the waste analysis requirements and can be defined broadly to include “process knowledge”. Process knowledge may be information on the wastes obtained from existing published or documented waste analysis data or studies conducted on hazardous wastes generated by processes similar to that which generated your waste. For example, listed wastes are identified by comparing the specific process that generated your waste to those processes described in the listings rather than conducting a chemical/physical analysis of the waste. Therefore, with many listed wastes generator knowledge is appropriate because the physical/chemical makeup of the waste is generally well- known and consistent from facility to facility.

**Note: The use of existing or historical records of analysis seems attractive, as opposed to sampling and analysis, because of the potential savings associated with using such information. However, you must ensure that this information reflects the current processes and materials being used and that no differences exist between the process in the documented data and your own.**

If you use generator knowledge alone or in conjunction with sampling and analysis, detailed documentation must be maintained that clearly demonstrates the information is sufficient to identify the waste. Documenting both the generator knowledge and any analytical data is essential. Documentation used to support generator knowledge may include, but is not limited to:

- Material Safety Data Sheets (MSDS) or similar documents,
- A thorough process description, including data on all raw materials used in the process, and/or
- Other forms of detailed documentation.

**Note: Concerning MSDSs, manufacturers/suppliers are only required to list constituents that comprise 1% or more of the material it addresses. This level of reporting may not be adequate to ascertain the constituent levels in the wastes to be characterized. Therefore, MSDSs should be viewed in a supporting fashion and not as the sole means of providing generator knowledge.**

## **Summary**

Although IDEM recognizes that sampling and analysis are not as economical or convenient as using generator knowledge, they usually provide advantages. Because an accurate waste determination is such a critical factor for demonstrating compliance with RCRA, misidentification can render your facility liable for enforcement actions with respect to permit conditions, Land Disposal Restriction requirements, annual reporting, and other RCRA requirements. In addition, accurate waste analysis is critical for meeting some of the requirements of other regulatory programs such as effluent discharges under the Clean Water Act, transportation requirements administered by the Department of Transportation, and waste classification procedures under Solid Waste. Be sure to re-evaluate your wastes frequently using current analytical methods and/or process knowledge, particularly any time a rule affecting RCRA waste identification is finalized.

If you have any further questions concerning waste determination responsibilities, please contact staff of IDEM's Office of Land Quality, Compliance and Response Branch at 317-234-6923 or visit [www.idem.IN.gov/4110.htm](http://www.idem.IN.gov/4110.htm).