What Regulations Came Out of RCRA?

Federal Hazardous Waste Regulations promulgated by the US Environmental Protection Agency (EPA) under 40 CFR

Who's Regulated under State & Federal RCRA Regulations?

- Generators
- Transporters
- Treatment, Storage and Disposal Facilities (TSDF)
Violations

Civil Penalties-

The Administrator is also authorized to issue penalties up to $32,500 for each day of noncompliance for each violation of a RCRA requirement.

Major Compliance Issues

- hazardous waste identification and profiling;
- manifesting;
- land disposal restriction notification (federal rule);
- short term storage and satellite accumulation;
- inventory and inspection;
- preparedness and prevention;
- contingency planning;
- training;
- recordkeeping;
- use & management of containers;
- marking and labeling; and
- shipping.

Waste Identification
Hazardous Waste Identification & Profiling

It is the responsibility of the generator to determine if a material is considered hazardous waste.

To do it properly, the generator must have detailed information about the constituents and properties of the waste, as well as information about the process that generated the waste.

Generator Knowledge vs. Analysis?

The generator may have adequate knowledge of the waste, including all its constituents, properties, and possible contaminants in order to properly characterize it, however, if he or she does not, or if there is uncertainty, then the waste must be sampled and analyzed.

*Lab analysis results must be kept on file by the generator.

What’s a Hazardous Waste?

“Hazardous waste” is an EPA term used to describe a waste, other than a nuclear waste, that is considered by EPA or a state environmental authority to either:

1) Cause or contribute to an increase in mortality or an increase in irreversible or incapacitating reversible illness; or
2) Pose a threat to human health or the environment when improperly treated, stored, transported, disposed of or otherwise mismanaged.
Based on this criteria, EPA has listed hundreds of hazardous wastes, including:

- by-products from specific processes
- spent solvents;
- wastes contaminated with specific compounds;
- wastes exhibiting certain characteristics; and
- specifically-listed unused chemicals

Waste Information Profile

For each waste stream, the generator documents and certifies the accuracy of the waste characterization on a profile form.

Waste Information Profile

Profiles along with analysis reports and other documentation (MSDS, process descriptions, etc.) should be kept on-file by the generator as documentation of the waste characterization.
Waste Codes

All such hazardous wastes are identified in the regulations by EPA or state waste code. Each waste code has a specific definition. It is required that the generator of a waste review these waste codes and determine if his waste meets the definition of one or more of the codes (a.k.a., waste numbers).

Waste Codes are Organized into Lists

- Characteristic Wastes (D-List)  
- Listed Wastes from Non-Specific Sources (F-List)  
- Listed Wastes from Specific Sources (K-List)  
- Specifically-Listed Unused Chemicals (U-List)  
- Acutely Hazardous Unused Chemicals (P-List)  
- State-Listed Hazardous Wastes (State Code-List)

Characteristic Wastes (D-List)

D001 Ignitability

Includes:
- Flammable liquids (with flash points < 140 F)
- Solids capable of causing fire through friction, absorption, moisture or spontaneous chemical change
- Flammable gases as defined by DOT
- Oxidizers as defined by DOT
Characteristic Wastes (D-List)

**D002 Corrosivity**

- Includes:
  - Acids with pH \(<2\);
  - Bases with pH >12.5; or
  - Materials Otherwise Capable of Steel Corrosion (> ¼ inch per year)

Characteristic Wastes (D-List)

**D003 Reactivity**

- Includes:
  - Unstable Compounds Capable of Violent Chemical Change, Dangerous When Wet Materials, Explosives, and Certain Cyanide or Sulfide-Bearing Wastes Capable of Liberating Toxic Gases When Subject to High or Low pH Conditions

Characteristic Wastes (D-List)

**D004 - D043 TCLP Toxicity**

- 40 specific contaminants known to be toxic to aquifers supplying drinking water. These contaminants are considered hazardous waste when they leach concentrations above a particular concentration threshold. The test that determines these concentrations is known as the Toxic Characteristic Leaching Procedure (TCLP)
Characteristic Wastes (D-List)

**Eight Heavy Metals D004- D011**
- Arsenic > 5.0 ppm: D004
- Barium > 100 ppm: D005
- Cadmium > 1.0 ppm: D006
- Chromium > 5.0 ppm: D007
- Lead > 5.0 ppm: D008
- Mercury > 0.2 ppm: D009
- Selenium > 1.0 ppm: D010
- Silver > 5.0 ppm: D011

Characteristic Wastes (D-List)

**Six Discontinued Pesticides D012- D017**
- Endrin > 0.02 ppm: D012
- Lindane > 0.4 ppm: D013
- Methoxychlor > 10 ppm: D014
- Toxaphene > 0.5 ppm: D015
- 2,4-D > 10 ppm: D016
- Silvex > 1.0 ppm: D017

Characteristic Wastes (D-List)

**Twenty Six Organic Chemicals D018- D043**
- Benzene > 0.5 ppm: D018
- Carbon Tetrachloride >0.5 ppm: D019
- Chlordane >0.05 ppm: D020
- Chlorobenzene > 100 ppm: D021
- Chloroform > 6 ppm: D022
- o-Cresol > 200 ppm: D023
- m-Cresol > 200 ppm: D024
- p-Cresol > 200 ppm: D025
- Cresol > 200 ppm: D026
### Characteristic Wastes (D-List)

#### Twenty Six Organic Chemicals D018- D043

<table>
<thead>
<tr>
<th>Chemical</th>
<th>Concentration</th>
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<tbody>
<tr>
<td>1,4-Dichlorobenzene</td>
<td>&gt; 7.5 ppm</td>
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<td>&gt; 0.5 ppm</td>
<td>D028</td>
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<td>D029</td>
</tr>
<tr>
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<td>&gt; 0.13 ppm</td>
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</tr>
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<tr>
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</tr>
<tr>
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<td>D035</td>
</tr>
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<td>&gt; 2 ppm</td>
<td>D036</td>
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<tr>
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<td>&gt; 100 ppm</td>
<td>D037</td>
</tr>
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</tr>
<tr>
<td>2,4,5-Trichlorophenol</td>
<td>&gt; 400 ppm</td>
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</tr>
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<td>&gt; 2 ppm</td>
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### Listed Wastes (F-List)

#### F001-F039 Spent Wastes From Non-Specific Sources

Twenty seven specific spent waste streams that are regulated based on either concentration of particular solvents or are wastes that are generated from a specific process not specific to a particular industry.
Listed Wastes (F-List)

Spent Solvents

**F001** Six Specific Halogenated (Chlorinated) Solvents Used for Degreasing > 10%: methylene chloride, carbon tetrachloride, 1,1,1-trichloroethane, trichloroethylene, tetrachloroethylene, and CFCs

**F002** Nine Specific Halogenated (Chlorinated) Solvents > 10%: trichloroethane, methylene chloride, trichloroethane, tetrachloroethylene, chlorobenzene, 1,1,1,2-tetrafluoroethane, 1,1,2,2-tetrafluoroethane, 1,1,2-trichloroethane, trichlorofluoromethane, and 1,1,2-trichloroethane

**F003** Nine Specific Flammable Solvents > 10%: xylene, acetone, ethyl acetate, ethyl benzene, ethyl ether, methyl isobutyl ketone, n-butyl alcohol, cyclohexanone, and methanol

Listed Wastes (K-List)

**K001-K148**

Process Wastes from Specific Industry Sources

One hundred nine specific waste streams (mostly by-products and wastewater treatment sludges) generated from particular processes in specific industries.

Those industries include: wood preservation, the manufacture of inorganic pigments, organic chemicals, inorganic chemicals, pesticides, veterinary pharmaceuticals, and explosives; petroleum refining; primary metals refining; coking; and ink formulation.

Listed Wastes (U-List)

**U001-U411**

Unused Chemicals

A long list of individual unused chemicals, which if discarded are considered hazardous waste. Includes many common industrial chemicals that are either ignitable, corrosive, reactive, or toxic properties.

Defined as “discarded commercial chemical products, manufacturing chemical intermediates, or off-specification commercial chemical products- including container residues and spill residues, thereof”
Highly Hazardous Unused Chemicals

P023-P205

A long list of individual unused chemicals, which if discarded are considered hazardous waste. The P-listed chemicals are particularly hazardous, many of which are highly poisonous or reactive. P-wastes are referred to as “acute hazardous wastes”.

As with U-wastes, these are defined as “discarded commercial chemical products, manufacturing chemical intermediates, or off-specification commercial chemical products— including container residues and spill residues, thereof”.

Generator Status

The amount and type of hazardous waste generated in a given calendar month will determine your “generator status”.

The larger your generator status, the more regulated you become.

The EPA recognizes three sizes of generators:

- Large Quantity Generators (LQGs)
- Small Quantity Generators (SQGs)
- Conditionally-Exempt Small Quantity Generators (CESQGs)— known in Massachusetts as a Very Small Quantity Generator (VSQG)
Generator Status

SQG

Generates in a Calendar Month:
- Between 100 and 1,000 kg (2,200 lbs) of non-acutely hazardous waste monthly;
- Less than 1 kg (2.2 lbs) of acutely hazardous waste monthly; and
- Accumulates no more than 6,000 kg (13,200 lbs) of non-acutely hazardous waste at any one time.

Inspection Logs

The inspection at a minimum must include a review of:
- Containers (weekly): Malfunctions, deterioration, operator errors, and discharges which may lead to a release to the environment or threat to human health (§265.15(a));
- Monitoring equipment, safety and emergency equipment, security devices, and operating and structural equipment important to preventing, detecting, or responding to environmental or health hazards;
- Areas where containers are stored looking for leaks and for deterioration caused by corrosion or other factors (§265.174);
- Air emission controls used to comply with subpart CC container emission standards (§265.1089).

Past Inspection Logs Must be Retained for a Minimum of 3 Years
Inspection Logs

LQGs and SQGs must perform weekly inspections of containers and daily inspections of tanks storing hazardous waste in each main accumulation area.

Satellite Inspections

LQGs and SQGs must also perform weekly inspections of containers of hazardous waste in each satellite accumulation area, however the documentation requirements do not apply.

Satellite Accumulation

The purpose of the satellite storage provision is to provide a means by which generators may accumulate hazardous waste in containers without an accumulation time limit while those containers are being slowly filled.
The provision allows hazardous waste to accumulate while being filled at or near the point of generation without an accumulation time limit. One container per waste stream not to exceed 55-gallon capacity.

Once filled however, the container must be moved to the storage area within 72 hours and be shipped off-site within the storage time limit (90 or 180 days depending on the generator’s status).

Satellite Accumulation

Satellite Storage Provision

The satellite container must be under the control of a trained key staff individual who is directly responsible for the process that is generating the waste.

Like containers accumulating in the Main Storage Area, satellite containers must meet the same container standards, including using good condition, chemically-compatible containers that remain closed at all times.

The containers must be on an impermeable surface (often secondary containment tubs, skids, etc.), the labels are clearly visible, and there must be adequate clearance on the labeled side. Additionally, the containers must be inspected weekly.

Satellite Accumulation Labeling

1. The Words, “HAZARDOUS WASTE”;
2. Chemical-specific description of the contents (list all hazardous constituents);
3. The type of hazard(s) presented by the waste (ignitable, corrosive, reactive, or toxic)
Chemical Segregation

- Both virgin chemicals and waste streams.
- Keep acids away from bases
- Organic acids segregated from inorganic acids.
- Flammables
- Oxidizers

Empty Container Rule

RCRA-Empty Definitions

Containers with releasable residues are often considered hazardous waste because they either have a characteristic or they are U- or P- listed chemicals with waste definitions that include container residues.

To be considered exempt, residues of D, F, K, and U wastes must be non-releasable by normal emptying means and have a non-releasable residue of less than 3%. Residue containers of P wastes must be triple-rinsed* to be considered empty.

Container Standards

Closed and sealed at all times-

(Bung and vent caps screwed in, covers squarely on top and snapped shut/ring tightened)
Containers must always remain closed unless waste is being added or removed. Funnels must be removed or have closures. Covers should create a positive seal.

Good Condition
(No leaking, dents, pitting, rusting, or damaged closures or seams)
Container Standards

Chemically-Compatible

(Contents will not corrode, embrittle, prematurely age, or otherwise compromise the packaging)

Main Accumulation Area

Hazardous waste main accumulation areas are designed to provide protection during the time that the waste is stored on site prior to disposal.

Requirements Include:
- Displaying Proper Signage
- Impervious Surfaces
- Maintaining Aisle Space
- Not Exceeding Time Limits
- Providing Emergency Equipment (Part IV)
- Separating Incompatibles
- Performing Inspections (Part III)
Main Accumulation Area

A “NO SMOKING” sign must be displayed in all areas where ignitable or reactive wastes are stored (regardless of smoking policies).

The words, “Hazardous Waste” in 1 inch letters visible from 50 feet.

Main Accumulation Area

The boundaries of each accumulation area must be clearly defined, such as by means of floor tape, colored floor, fence, or other demarcation.

The generator should take measures to prevent unknowing entry and reduce as much as possible unauthorized entry into the hazardous waste storage area.

Main Accumulation Area

Impervious Surface

Hazardous waste must be stored on impervious surfaces. This may include concrete and asphalt unless cracks or holes are present. Earthen, wooden, or gravel surfaces are not considered to be impervious; and hazardous wastes must not be stored in areas with functional floor drains or manholes.

Secondary containment is required if this standard cannot be met.
Aisle Space

Adequate aisle space must be maintained around the containers to allow unobstructed movement of personnel and emergency response equipment. Additionally, containers must be so arranged so that the markings and labels are clearly visible and legible from the aisles.

Stacking

Stacking of hazardous waste containers must be done “...in a manner that allows the containers to be easily and safely inspected, and pallets shall be used to separate the containers”. Additionally, releases cannot occur if the top container were to fall, so therefore stacking height of greater than two would be prohibited.

Accumulation Time Limits

LQGs must ship the waste within 90 days from the date it began being stored in the hazardous waste storage area.

SQGs must ship within 180 days
Separating Incompatibles

Containers or tanks holding incompatible hazardous wastes must not be stored in the same enclosure, building or structure unless they are segregated in a manner that prevents the waste from coming into contact with one another under any circumstances (such as spillage or simultaneous leakage).

The use of berms, dikes, fire cabinets, and separate storage areas are examples of ways to keep these materials apart.

Main Accumulation Area

Labeling

While in the Hazardous Waste Storage Area, Containers and Tanks Must, at a Minimum, be Labeled with the Following:
Main Accumulation Area

Labeling
1. The Words, “HAZARDOUS WASTE”; and
2. Chemical-specific description of the contents (list all hazardous constituents)
3. The type of hazard(s) presented by the waste (ignitable, corrosive, reactive, or toxic)
4. The beginning accumulation date

Labeling Prior to Transport
Immediately Prior to Transport, Containers of Hazardous Waste Must, at a Minimum, Have the Following Labeling

HAZARDOUS WASTE
the Statement, “Federal Law Prohibits Improper Disposal. If found, contact the nearest police or public safety authority or the U.S. Environmental Protection Agency”;
the Generator’s Name and Address;
the Generator’s EPA Identification Number;
the DOT Shipping Name of the Hazardous Waste (if applicable);
The DOT Identification Number (UN/NA #)- if applicable;
All Applicable Waste Codes; and
The Manifest Number

Universal Waste
Universal wastes are common items such as fluorescent lamps and batteries that contain mercury and/or other toxic metals.

Universal wastes are hazardous wastes (or likely to be hazardous wastes if analyzed) that are managed under the Universal Waste Rule.

Historically, these wastes have been found in the solid waste stream and made their way to municipal incinerators and landfills where they have caused environmental contamination.

**Universal Waste**

1. **Mercury-containing lamps** (e.g., fluorescent, UV, metal halide, sodium);

2. **Dry cell and sealed batteries** (e.g., gel-cell lead acid, lithium, mercury, button batteries silver oxide, nickel-cadmium);

3. **Mercury-containing thermostats**; and

4. **Pesticides** collected as part of a pesticide collection program.

5. **Mercury-containing devices**
   (e.g., thermometers, barometers, sphygmomanometers, tilt switches, temperature gauges, and any other device that contains free mercury as a manufactured article component).
All universal wastes must be placed in closed containers designed to prevent releases.

Containers of universal wastes must be stored in a separate and distinct area that must be marked as Universal Waste Accumulation Area.

A universal waste item (individual lamp, battery, etc.) cannot accumulate on-site longer than 1 year after it became a waste.

The handler (generator) must be able to demonstrate compliance—labeling the containers or individual items with the beginning accumulation date is the most common method. Maintaining inventory and shipping logs is another.
Universal Waste

Universal wastes or universal waste containers must be labeled with the words:

“UNIVERSAL WASTE”

The type of Universal Waste, e.g., “Batteries”, “Mercury-Containing Lamps”, etc.

The accumulation start date (unless other documentation such as shipping logs can prove accumulation has not exceeded one year).

Triumvirate Environmental
www.triumvirate.com

THANK YOU!

Matt Teeter
(800) 966-9282 office
(617) 921-7665 cell
mteeter@triumvirate.com