

APPENDIX A.7: WHAT IS A RCRA HAZARDOUS WASTE?

Definition of a Solid Waste

- A solid waste is any material that is discarded or disposed; a solid waste does not need to be solid; it may be semi-solid, liquid, or even a contained gaseous material.
- A material is discarded when it is
 - Abandoned (e.g., disposed of, burned or incinerated, or treated before or in lieu of being abandoned).
 - Recycled (in a manner constituting disposal, burned for energy recovery, reclaimed, or accumulated speculatively).
 - Considered inherently waste-like (like F020-F023, F026 and F028).
- EPA has developed product-like/waste-like distinctions for determining which recycled materials are wastes and which are raw materials.
- Under EPA's "contained-in" interpretation, ground water and soils are not considered solid wastes because they are not "discarded" in the sense of being abandoned, recycled, or inherently waste-like.

Exceptions to the Definition of Solid Waste (40 CFR 261.2)

- Materials used or reused as ingredients in an industrial process to make a product, provided the materials are not being reclaimed.
- Materials used or reused as effective substitutes for commercial products.
- Materials returned to the original process from which they are generated, without first being reclaimed.

Exclusions from the Definition of Solid Waste (40 CFR 261.4)

- Domestic sewage and any mixture of domestic sewage and other wastes that pass through a sewer system to a POTW.
- Industrial wastewater discharges regulated under the Clean Water Act.
- Irrigation return flow.
- Nuclear materials, or by products, as defined by the Atomic Energy Act of 1954.

- Mining materials that are not removed from the ground during the extraction process.
- Pulping liquors reclaimed in a pulping liquor recovery furnace and reused in the pulping process (unless speculatively accumulated).
- Spent sulfuric acid used to produce virgin sulfuric acid (unless speculatively accumulated).
- Secondary materials that are reclaimed and returned to the original process in which they were generated and are being reused in the process.

Identification of a RCRA Hazardous Waste

- A solid waste is a hazardous waste if it meets one of the following conditions.
 - Is listed in Subpart D of 40 CFR Part 261.
 - Exhibits a characteristic defined in Subpart C of 40 CFR Part 261.
 - Is a mixture containing a listed hazardous waste and a non-hazardous solid waste.
 - Is derived from storage, treatment or disposal of a hazardous waste.
 - Is not excluded from regulation as a hazardous waste.
- Materials that do not satisfy any of these above conditions are not “hazardous” regardless of how dangerous they actually are (e.g., asbestos and PCBs are not RCRA hazardous wastes).

Listings of Hazardous Waste

A solid waste is a listed hazardous waste if it is named on one of the following lists:

- Commercial chemical products, P and U wastes (40 CFR 261.33(e) and (f)).
- Specific source wastes, K wastes (40 CFR 261.32).
- Non-specific source wastes, F wastes (40 CFR 261.31).

Commercial Chemical Products Listings (P and U Wastes)

- These lists are limited in scope.
- The listings cover only those products that are generically identified using the name of a single listed constituent. For example:

- Discarded benzene and discarded toluene are both listed commercial chemical products.
- A discarded mixture of benzene and toluene, however, will not qualify as a listed commercial chemical product.
- A discarded mixture of dieldrin (a listed pesticide), benzene, and toluene will qualify as a listed commercial chemical product, however, because it is a formulation that is generically referred to as “dieldrin” (the sole active ingredient).
- The listings cover only unused commercial chemical products
 - Even if a material is used in such a way that its composition is not altered, the material will not qualify as a commercial chemical product.
 - The most common materials covered are off-specification products. Materials that are capable of being used will not generally be discarded.
- Other materials that contain P- and U-listed constituents are not considered hazardous unless they are listed elsewhere in the regulations or exhibit a characteristic.

Listings for Waste from Specific Sources (K Wastes)

- The listings in 40 CFR 261.32 identify individual waste streams from specific industries (e.g., “heat exchanger bundle cleaning sludge from the petroleum refining industry”).
- Many of these listings are difficult to interpret (e.g., they are related to the source of the material as well as to the composition).
- Examples of these hazardous wastes from specific sources are
 - Wood preservation (Waste Water Treatment (WWT) sludges).
 - Inorganic pigments (WWT sludges, process residues).
 - Organic chemicals (still bottoms, spent catalysts, process residues).
 - Pesticides (WWT sludges, filter solids, still bottoms, by-product salts, wastewaters).
 - Inorganic chemicals (WWT sludges, process residues, wastewaters).
 - Secondary lead (emission control dust/sludge, waste leaching solution).

- Ink formulation (wastewater, solvent washes and sludges, WWT sludges).
- Explosives (WWT sludges, spent carbon, wastewater).
- Petroleum refining (slop oil, WWT sludges, tank bottoms).
- Iron and steel (spent pickle liquor, emission control dust/sludge).
- Coke (process residues, tar residues, WWT sludges).
- Veterinary pharmaceuticals (WWT sludges).

Listings for Wastes from Non-specific Sources (F Wastes)

- The listings in 40 CFR 261.31 identify waste streams that may be generated in several industries.
 - Spent solvents.
 - Electroplating wastes.
 - Dioxin-containing wastes.
- Many of these listings are difficult to interpret.
- Examples of hazardous wastes from non-specific sources are
 - Spent Solvents.
 - Electroplating wastes.
 - Metal heat-treating wastes.
 - Chlorinated aliphatic manufacturing residues.
 - Wastes from the production or manufacturing use of chlorophenolics.

Spent Solvent Listings (F001-F005)

- The spent solvent listings are the most difficult listings to understand.
- The listings identify several of the most common spent industrial solvents as hazardous materials (e.g., spent methanol, toluene, acetone, methylene chloride, and perchloroethylene).

- However, many materials that contain these constituents are not considered to be F-listed wastes.
- The listed chemicals must have been used for their “solvent properties” (i.e., to dissolve or mobilize other constituents). Examples of solvent use covered by the listings are.
 - Degreasers and cleaners
 - Diluents
 - Extractants
 - Reaction and synthesis media
- Listed chemicals that are used for some other purpose (e.g., to serve as a reactant in a chemical reaction) and not considered to be F-listed wastes.
- Listed chemicals that are used as ingredients in commercial products are also not considered to be F-listed wastes, even if they fulfill a solvent function (e.g., as carriers in a solvent-based paint).
- There are exclusions from the mixture rule for certain mixtures of solvents and wastewaters.

Characteristic materials

- EPA has identified four characteristics of hazardous waste (Subpart C of 40 CFR 261).
 - Ignitability
 - Corrosivity
 - Reactivity
 - Extraction Procedure (EP) toxicity
- Solid waste generators are required to determine whether their wastes exhibit any of these characteristics.

Characteristic Materials – Ignitability

- A liquid material is ignitable if it has a flash point lower than 140° F.

- Solid materials and container gaseous materials also may be ignitable, but different standards apply to such materials.
 - Is solid material capable under standard temperature and pressure of causing fire through friction, absorption of moisture or spontaneous chemical changes and, when ignited, burns so vigorously and persistently that it creates a hazard?
 - Is the substance an ignitable compressed gas as defined in 49 CFR 173.300? or
 - Is the substance an oxidizer as defined in 49 CFR 173.151?

Characteristic Materials – Corrosivity

- A liquid material is corrosive if any one of the following criteria is satisfied.
 - It has a pH less than or equal to 2.0
 - It has a pH greater than or equal to 12.5; or
 - It is capable of corroding steel at a rate of more than one-quarter of an inch per year at a temperature of 55° C.
- Solid and gaseous materials are never considered corrosive.

Characteristic Materials – Reactivity

- A material is reactive if
 - It is explosive
 - It reacts violently with water; or
 - It generates toxic gas when exposed to water or other liquids that are moderately acidic or alkaline.

Characteristic Materials – Extraction Procedure (EP) Toxicity

- The EP Toxicity Characteristic is the only characteristic that was developed specifically for use in the RCRA hazardous waste program.
- EP toxicity is designed to identify those wastes that would leach dangerous concentrations of toxic constituents into ground water supplies if they were disposed in a municipal solid waste landfill.
- The EP test works as follows

- A representative sample of the waste is separated into its solid and liquid components.
- The solid component is diluted with acetic acid and agitated continuously for 34 hours.
- The resulting liquid is added to the original liquid component.
- The combined extract is analyzed for the presence of 8 metals, 4 pesticides, and 2 herbicides.
- If any of the 14 contaminants is present in concentrations greater than certain regulatory thresholds, the material is considered EP toxic.

Characteristic Materials – EP Toxic Levels

The EP toxic constituents and the maximum concentration allowed in their extracts are:

| EPA Hazardous Waste | Contaminant | Maximum Concentration Number (mg/l) |
|----------------------------|--------------------|--|
| D004 | Arsenic | 5.0 |
| D005 | Barium | 100.0 |
| D006 | Cadmium | 1.0 |
| D007 | Chromium | 5.0 |
| D008 | Lead | 5.0 |
| D009 | Mercury | 0.2 |
| D010 | Selenium | 1.0 |
| D011 | Silver | 5.0 |
| D012 | Endrin | 0.02 |
| D013 | Lindane | 0.4 |
| D014 | Methoxychlor | 10.0 |
| D015 | Toxaphene | 0.5 |
| D016 | 2,4-D | 10.0 |
| D017 | 2,4,5-TP Silvex | 1.0 |

“Mixture” Rule

- Any mixture of a listed hazardous waste and a solid waste is a hazardous waste.
- For example, if a generator mixes one drop of a listed electroplating waste with 1,000 gallons of non-hazardous wastewater, the mixture (all 1,000 gallons) is hazardous.
- If a generator mixes an EP toxic waste (i.e., a RCRA hazardous waste) with 1,000 gallons of non-hazardous wastewater, the resulting mixture is not hazardous (unless it is still EP toxic or meets one of the other hazardous waste characteristics).

- There are de minimus provisions in 40 CFR 261.3 for wastewater/solvent mixtures.

“Derived From” Rule

- Any solid waste derived from the treatment, storage, or disposal of a listed hazardous waste is considered a hazardous waste.
 - For characteristic waste, the derived-from waste is only hazardous if it exhibits a characteristic.
- This rule is designed to identify a wide variety of waste streams that would otherwise not be regulated as hazardous. For example:
 - Sludges from the storage of listed hazardous wastes.
 - Filters that are used to clean spent solvents before the solvents are reused.
- This rule applies even if the purpose of the treatment process is to render the waste non-hazardous. For example:
 - Ash from the incineration of a listed organic waste is considered hazardous.
 - Listed inorganic wastes that have been stabilized to prevent migration of the hazardous constituents are, nevertheless, hazardous.

“Contained In” Interpretation

- Any material that contains a listed hazardous waste must be managed as if it were a hazardous waste, so long as it continues to contain the listed hazardous waste.
- EPA has adopted this interpretation on the grounds that it is regulating only the listed portion of the waste; the rest of the material, such as soil or ground water, is merely “coming along for the ride”.
- The contained in” interpretation eliminated some of the problems associated with the “mixture” rule. For example:
 - Under the “mixture” rule, contaminated soil from a spill of a listed hazardous waste is not hazardous, unless it is P- or U-list contaminated.
 - Soils from cleanup of P and U wastes are specifically listed as P and U wastes.
 - Soil is not a hazardous waste, but the contaminating waste “contained in” the soil still is hazardous.

- Under the “contained in” interpretation, such a soil must be managed as if it was hazardous.
- The “derived from” rule does not apply to “contained in” wastes. As a result, these wastes do not have to be delisted if they are treated so that they no longer contain the listed hazardous waste.
- The determination of when a waste no longer contains a listed hazardous waste (i.e., when it is decontaminated) is subject to future guidance.

Exclusions from RCRA Hazardous Waste

Delisting (40 CFR 261.22)

- Wastes that are hazardous by listing, by the “mixture” rule, or by the “derived from” rule, may be excluded from regulation on a case-by-case basis through the delisting mechanism.
- Delisting can serve as a “safety valve” to avoid regulation of “hazardous materials” that do not actually pose a threat to human health and the environment.
- There are several problems with the delisting program. For example:
 - It is costly, complicated, and time-consuming for both EPA and the regulated community.
 - It is impractical for wastes that are generated on an infrequent or one-time basis.

Categorical Exclusions (40 CFR 261.4(b))

- Household wastes
- Large-volume/low-toxicity wastes for which Subtitle C regulation may not be appropriate (i.e., mining wastes, utility wastes, and oil and gas production wastes).
- Trivalent-chromium wastes (e.g., wastes from the leather tanning industry).
- Arsenical-treated wood products

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