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What is Hazardous Waste?

The short answer is a hazardous waste is a solid waste that is not excluded by definition and either is a listed hazardous waste or exhibits a characteristic of a hazardous waste. But this answer is not very helpful. The more detailed answer below is more useful.

The first thing one should realize is that the definition of a hazardous waste is a regulatory definition and not necessarily a physical definition. In most cases those do not conflict but it does lead to some unusual groupings. For example, the regulatory definition of a solid waste includes both liquids and contained gases. The second thing to realize is that to be a hazardous waste, a material must first be a solid waste. The third thing is that defining hazardous waste is a complicated process. The best common language source for the steps in defining a hazardous waste is EPA's RCRA Orientation Manual (http://www.epa.gov/osw/inforesources/pubs/orientat/). In addition, there are several citations to regulations – CFR (Code of Federal Regulations) in these definitions. You can find these regulations at www.ecfr.gov. The four steps used to determine whether a secondary material is a hazardous waste are:

1. Is the material a solid waste?
2. Is it excluded from either the definition of solid waste or hazardous waste?
3. Is the waste a listed hazardous waste?
4. Is the waste a characteristic hazardous waste?

Let's look at each of these steps in order.

Is the material a solid waste?

Congress defined solid waste in the Solid Waste Disposal Act (42 U.S.C. § 7429(g)(6)) as:

> any garbage, refuse, sludge from a waste treatment plant, water supply treatment plant, or air pollution control facility and other discarded material, including solid, liquid, semisolid, or contained gaseous material resulting from industrial, commercial, mining, and agricultural operations, and from community activities, but does not include solid or dissolved material in domestic sewage, or solid or dissolved materials in

> irrigation return flows or industrial discharges which are point sources subject to permits under section 1342 of title 33, or source, special nuclear, or byproduct material as defined by the Atomic Energy Act of 1954, as amended (68 Stat. 923).

EPA uses this definition as a starting point for all their regulations governing both solid waste and hazardous waste. The definition lists garbage, refuse, sludges, and other discarded materials. As stated earlier, the definition is not based on the physical form of the material but whether it is discarded. EPA regulations further defines that a material is a solid waste if it is discarded by being abandoned, inherently waste like, certain military munitions, or recycled. EPA defines abandoned to mean thrown away and includes disposed of, burned, or incinerated. Unused or defective munitions are solid wastes when abandoned (disposed of, burned, or incinerated), rendered unusable through deterioration, declared a waste, or if components of used (detonated) munitions are collected for storage, treatments, recycling, or disposal. Materials burned for energy recovery is also considered as a solid waste.

<u>What materials are excluded from the definition of solid waste?</u>

As can be seen from the statutory language, Congress specifically excluded several types of materials from being solid waste. Some examples include

- Domestic sewage from publically owned treatment works (covered under the Clean Water Act);
- Industrial wastewater discharges (covered under the Clean water Act)
- Irrigation return flows;
- Radioactive waste (Covered under the Atomic Energy Act); and
- In-situ mining waste.

In addition, EPA allows other materials to be excluded when recycled in order to encourage recycling. Some examples of this group include

- Pulping liquors (used to dissolve wood chips for making paper) when recovered and reused;
- Spent sulfuric acid that is recycled to produce virgin sulfuric acid;
- Closed-loop recycling (e.g., closed solvent recovery systems);
- Spent wood preservatives (collected on drip pads and reused);
- Coke by-product wastes (iron manufacturing) that are recycled into new products;
- Materials burned as fuels if they meet specification comparable to virgin fuels (comparable fuels);
- Recovered oil from refining operations when it is returned to the process;
- Processed scrap metals;

- Zinc fertilizers made from recycled hazardous secondary materials;
- Shredded circuit boards when recycled; and
- Recycled cathode ray tubes.

What materials are excluded from the definition of hazardous waste?

There are 15 exclusions from the definition of hazardous waste. Again, some are required by the statute (agricultural waste, mining overburden, etc.) while others are to promote recycling. Some examples are as follows:

- Household hazardous waste;
- Agricultural waste;
- Mining overburden;
- Certain types of mining and oil and gas exploration waste;
- Arsenic treated wood if disposed of by the end user;
- Used oil filters;
- Landfill leachate derived from certain listed wastes;
- Samples sent to laboratories to be tested;
- Samples used to test treatability; and
- Dredge materials subject to permitting from the Federal Water Pollution Control Act.

Is the solid waste a listed hazardous waste?

Once a facility has determined that a secondary material is a solid waste and is not excluded, they must determine if it is a listed waste. There are four hazardous waste lists. The lists and what are included in each list is shown below.

- The F List includes wastes from common industrial and manufacturing processes. These are wastes from non-specific sources. For example, spent solvents will have waste coded F001 through F005. These solvents can come from a number of different industries (dry cleaning, electronics manufacturing, etc.). This list can be found in 40 CFR 261.31.

- The K list includes manufacturing waste from specific industries. For example, K002 is the wastewater treatment sludge from the production of chrome yellow and orange pigments. This list can be found in 40 CFR 261.32.

- The P and U lists include pure or commercial grade formulations of specific unused chemicals. Chemicals are included on the P list if they are acutely toxic. Chemicals are included on the U list if they are toxic but also exhibit ignitable or reactive characteristics (more on these characteristics below). For example, nail polish remover that is being discarded by the manufacturer (because it is out of

date or off-spec) could have a U002 code because it contains acetone. Both of these lists are found in 40 CFR 261.33.

Is the solid waste a characteristic waste?

If the secondary material is a solid waste, not excluded, and not a listed waste, the facility must determine if is exhibits characteristics of hazardous waste. EPA has established four hazardous waste characteristics

- Ignitability – wastes that readily catch fire and will sustain combustion. EPA defined a secondary material as ignitable if it has a flash point of less than 140 degrees F. Flash point is the lowest temperature at which fumes will ignite when exposed to a flame. Ignitable waste has a D001 waste code.

- Corrosivity – wastes that are either acid or alkaline. Liquid wastes that have a pH greater than 12.5 or less than 2.0 are considered as corrosive. This applies only to liquid wastes. Corrosive waste has a D002 waste code.

- Reactivity – wastes that readily explode or undergo violent reactions. Common examples are discarded munitions or fireworks. Reactive waste carries a D003 waste code.

Toxicity – wastes that are likely to leach toxic compounds when exposed to water. This characteristic is determined using a test called the Toxic Characteristic Leaching Procedure (TCLP). TCLP is a laboratory test designed to replicate leachate generated by a landfill containing a mixture of household and industrial waste. There are 40 toxic waste codes, one for each toxic chemical of concern. These carry waste codes D004 through D043.