What is Hazardous Waste?
Part 1, The Federal Perspective

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The general public is often confused and sometimes scared when they read or hear about "hazardous waste," "hazardous materials" or a "toxic substance." When the average person hears the "hazardous" or "toxic" words bandied about, I believe they conjure thoughts and images that often belie the truth. I will attempt to demystify this confusing subject and put in perspective that, for most of us on a day-to-day basis, hazardous substances are to be properly recognized, avoided most of the time (sometimes handled), and always respected.

Because this subject is complicated, I will address it in three separate e-newsletters. Part 1 addresses hazardous waste from the federal perspective. The United States Environmental Protection Agency (EPA), following its legislative mandate, created a body of federal regulations that (among other things) govern how hazardous waste is defined and then monitored from its generation to its final disposition, a.k.a., "cradle to grave." Indeed, hazardous waste as defined by the EPA is a highly regulated and well-enforced group of substances.

Part 2 discusses site remediation. If it is true that hazardous waste is so strongly regulated, then why are there so many hazardous waste cleanups? Why are soil and groundwater impacted, at multiple locations in virtually every town in New Jersey? And why does our world seem so darn polluted? (Hint: mostly, it's not.) All this will be amplified in Part 2.

Part 3 addresses chemicals and other substances that may exist in your home. Did you know at this very moment virtually every reader of this e-newsletter has chemicals in their homes that are hazardous or toxic? How can that be and what does it mean for the safety of your family? This too will be explained.

Hazardous Waste per the US Environmental Protection Agency (EPA)

First, let's differentiate hazardous waste from hazardous material. The United States Environmental Protection Agency defined Hazardous Waste within the Resource Conservation and Recovery Act (RCRA) of 1976.

RCRA defines hazardous waste both chemically and administratively. Thus when someone generates hazardous waste (depending if they generate a little or a lot of waste) there are a wide array of regulations that regulate how that waste is to be stored and labeled, how long it can be stored, how and where it can be disposed, and the paperwork trail (created via Hazardous Waste Manifests) that accompanies the waste material "from cradle to grave." These waste materials are often defined merely by their chemical characteristics (pH, e.g.) while other wastes are defined by their chemical identity (selected heavy metals like arsenic, chromium, mercury, etc. if found above certain concentrations), and yet other wastes are defined by their means of manufacture or generation (e.g., certain wastes from leather tanning).

EPA's regulation of hazardous waste is the "law of the land". Each state must follow the EPA regulations. And each state has the right to enact its own regulations as long it adheres to the federal regulations. In other words, each state can enact regulations that are tougher or more restrictive than those imposed by EPA. And New Jersey, for one, has invoked this prerogative. One common example is non-hazardous oil spill cleanup waste.

At what point does a chemical transition from being an ingredient (or product) in a manufacturing process to a waste material? Sometimes it is merely a function of when the generator says so. Here's an example. Let's say a manufacturer uses sulfuric acid to pickle[1] steel pipe. Sulfuric acid has a very low pH. And low pH is one of the EPA's chemical characteristics that can render something as hazardous waste. But the manufacturers who pickle steel buy fresh sulfuric acid (a product or raw material, not a waste material) to bath the pipe. During the pickling process an acidic sludge collects on the bottom of the pickling tank. At some point the manufacturer will determine that the acid bath is "spent"; i.e., it is no longer fully effective at doing what it was purchased to do. At that point the manufacturer deems the pickling solution a waste material and it immediately becomes subject to the EPA hazardous waste regulations that include strict time tables for disposal. Typically the acid sludge will also be properly disposed when the tank is emptied.

Regulated Waste Materials that are Not Hazardous per the EPA Definition

Typically EPA does not regulate such materials; rather they are addressed on the state level. A common example is petroleum-impacted soil. For example, what if an underground storage tank leaks, thereby releasing gasoline or heating oil? The impacted soil is treated as a regulated waste material and is disposed locally. Typically the soil is sent to either a soil burner where the petroleum is incinerated, or it can be sent to a large-scale biotreatment center where the petroleum is bioremediated in a controlled environment. In both cases the soil is typically reused, dependent upon the remedial process that it has undergone.

Another common example is polychlorinated biphenyls (PCBs). PCBs are a class of compounds invented in the 1930's and used as a dielectric fluid. While they had various applications, they were most commonly used as a cooling fluid in electrical transformers. Electrical transformers take current and step it up or down. PCB liquid is incredibly stable at the high temperatures generated within a transformer. In other words, PCBs were exceptionally good at fulfilling their intended purpose. PCBs are not considered a hazardous material, yet are strictly controlled and regulated under the Toxic Substances and Control Act (TSCA). As such, when PCBs are found in soil they present an expensive remedial problem for the responsible party.

The last example is asbestos. Asbestos is a naturally occurring mineral with outstanding fireproof properties. As such it was used as an insulator, fireproofing material, and fire retardant in the manufacture of many hundreds (if not thousands) of products. It was eventually learned that when asbestos fibers are inhaled chronically, a wide variety of respiratory maladies (including cancer) can occur. Accordingly this material has been defined by TSCA and is regulated within a number of laws, the most common law being the Asbestos Hazard Emergency Response Act (AHERA).

How are These Materials Routinely Handled and Managed?

The EPA has strict rules and procedures for generating, transporting, and disposing of hazardous wastes. Moreover because of a three-decade federal impetus mandating "waste minimization," vast volumes of hazardous waste have been reduced at its very source: the generator. This has had a societal ripple effect. Generators produce less waste material, thus their management and disposal costs are less. Consequently, less of this material moves over the road because less is shipped to disposal facilities. The

hazardous waste disposal industry (companies that would process and legally dispose of hazardous waste) was vast in the 1980's. Because many licensed disposal companies have folded or consolidated, the industry is a fraction of its original size.

And despite all of these regulations sometimes these materials are found in the environment. And when that happens, ESA is among the companies that are called to investigate and remediate the situation. For example, almost two years ago ESA was hired to perform a routine environmental service for a commercial building owner who was about to sell. During the process, and to everyone's shock, ESA discovered that there was PCB contamination in the soil. No one had any clue as to its origin, and nor did our due diligence investigation shed any light. Regardless, the seller (who was totally innocent) was stuck paying for the cleanup. Was that fair? No, not from the seller's perspective. But from the perspective of society, the waste regulations worked! That is, the owner became the de facto party responsible for ensuring that the cleanup was performed. And society is better for it because an area of soil with potentially harmful contamination was remediated.

Conclusions

As stated earlier, this is a complicated subject. It is well beyond the ability of this article to address every hazardous substance or situation. Therefore, if I failed to address something that you wish to know, please call me at 732-469-8888 x201 or send me an email at sfauer@askesa.com and I will answer your questions.

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[1] Pickling refers to immersion of metal into an acid bath to remove surface impurities such as rust, stains, or inorganic impurities.