

AIM: What other methods are used to deal with waste?

Hazardous Wastes: The four hazardous waste characteristics are ignitability, corrosivity, reactivity, and toxicity. If a solid waste exhibits one or more of four physical or chemical properties deemed hazardous to human health or the environment by EPA, it is a characteristic hazardous waste.

Common Examples:

Car and rechargeable batteries should not be thrown in trash

<i>heavy metals</i>	<i>batteries, some cosmetics</i>
<i>acids / bases</i>	<i>many household cleaners (drain-cleaners, ammonia, furniture polishes)</i>
<i>solvents</i>	<i>TCE & CCl₄ – dry cleaning, acetone & paint thinners</i>
<i>pesticides</i>	<i>DDT, Lindane (lice shampoos), Round-Up (herbicide / weed-killer)</i>
<i>infectious wastes</i>	<i>biohazard waste from hospitals / Dr. office</i>
<i>radioactive wastes</i>	<i>spent fuel rods (kept on site in above ground cement structures), worker clothing</i>

Hazardous Waste Storage and Disposal:

1. temporary structures (tanks, barrels – 55-gallon drums) until treated
2. convert to less hazardous material
 - a. chemical treatment (to neutralize toxic components)
 - b. bioremediation – the use of microbes/bacteria to break down toxic substances
 - c. phytoremediation – phytoextraction - using plants to absorb toxic materials (mainly heavy metals) dispersed in soil/groundwater and then removing plants with those toxins.
 phytodegradation - plants' metabolic processes also break down certain toxins
3. permanent storage: protected/secure landfills
 - underground – abandoned mines and salt domes
 - surface enclosures

Reduction of Waste: “The 4 R’s”

1. refuse	4. recycle – **requires much less energy than retrieving new resources from Earth** open-loop - one product becomes another (ex. plastic bottle → clothing) closed-loop - product is recycled back to same product (aluminum can → aluminum can)
2. reduce	
3. reuse	

Integrated Waste Management - involves the proper mix of all of several waste management approaches, depending upon the prevailing local economic and environmental conditions: source reduction, composting, incineration, recycling, and landfills.

The goal of the integrated waste management approach is to handle each element of a community's waste stream in the most effective, cost-efficient, safe, and environmentally beneficial manner as is realistically practical.