Solid and Hazardous Waste

U.S. - 11 B tons per year of solid waste!

- Agriculture 50%
- Mining, etc. 33%
- Other 17%

Solid and Hazardous Waste

Animal Waste

<table>
<thead>
<tr>
<th>Type of Waste</th>
<th>BOD5 (mg/L)</th>
<th>Ammonia (mg/L)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Undiluted Livestock Waste</td>
<td>40,000</td>
<td>10,000</td>
</tr>
<tr>
<td>Manure Lagoon Effluent</td>
<td>14,400</td>
<td>-</td>
</tr>
<tr>
<td>Runoff from a Concrete Lot</td>
<td>1,000</td>
<td>-</td>
</tr>
<tr>
<td>Runoff from a Dirt Lot</td>
<td>500</td>
<td>-</td>
</tr>
<tr>
<td>Raw Municipal Sewage</td>
<td>250</td>
<td>50</td>
</tr>
<tr>
<td>Treated Municipal Sewage</td>
<td>30</td>
<td>15</td>
</tr>
</tbody>
</table>
Solid and Hazardous Waste

Industrial Waste

400 M tonnes per year (60 M = hazardous)
- recycled, converted to other forms, destroyed, put in landfills, put in deep injection wells

Municipal Waste

209 M tonnes per year
- household and commercial refuse
- In the U.S.: 4.6 lbs per person per day - 2x Europe/Japan - 5-10x developing countries

Solid and Hazardous Waste

Municipal Waste

Solid and Hazardous Waste

Disposing of waste includes use of open dumps, ocean dumping, landfills, exporting waste and incineration.

1. Open dumping - drop trash into a big hole - predominant method in developing countries - e.g. Manila, Philippines has “Smoky Mountain” a 30 m high smoldering heap of trash on which 1000s of people work and live! They spend the day looking for edible and recyclable items.

Most developed countries forbid open dumping - U.S. - 200 M liters per year of waste motor oil poured into sewers or onto the ground
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2. Ocean dumping - every year 25,000 tons of packaging including 500,000 bottles, cans and plastic containers dumped at sea

150,000 tons of fishing gear including 1000 km of nets is lost or discarded at sea

Until 1992, U.S continued to dump municipal refuse, industrial waste, sewage and sewage sludge in the ocean

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3. Landfills - sanitary landfills: solid waste disposal is regulated and controlled - costs U.S. $10 B per year

Landfill operators are required to compact and cover refuse every day - but the dirt cover takes up as much as 20% of the space

Since 1994 all U.S. landfills must control such things as oil, chemicals, toxic metals and contaminated rain water by using clay/plastic liners, etc.

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4. Exporting waste - Most industrialized countries no longer export waste but it still occurs

1999 - The Formosa Plastics Company of Taiwan dumped 3000 tons of incinerator waste in Cambodia (during the night) after they paid a $3,000,000 bribe to Cambodian officials
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5. Incineration (and Resource Recovery) - Burn garbage to produce steam to turn a turbine and produce electricity.
   Reduces the waste stream by about 90% but the incinerator ash is then more concentrated with toxins such as dioxins, furans, lead and cadmium.
Solid and Hazardous Waste

Shrinking the Waste Stream includes recycling, composting, demanufacturing and reusing

3. Demanufacturing - the disassembly and recycling of obsolete consumer products such as TVs, computers, refrigerators, washing machines and air conditioners

Computers and other electronics contain toxic metals and valuable metals - U.S. discards 50 M computers per year

Cheapest way is to ship junk to developing countries

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4. Reusing - cleaning and reusing materials in their present form - old auto parts from the junkyard, stained glass from demolished houses, fine woodwork and bricks from old houses, etc. Returning and refilling old beer bottles is another example.

This is usually much cheaper than buying new parts

Solid and Hazardous Waste

Hazardous waste disposal - EPA estimates that there are 36,000 seriously contaminated sites in the U.S. - total cost for cleanup $370 - $1700 B

- In Oswego County - 4 Federal Clothier site (south of county), Fulton Terminals, Bateman (E. Seneca, Oswego, it was the 7th biggest site in the country), Volney/Shek Rd./Oswego Valley Landfill - all remediated, and 2 monitored by 19 wells AND 2 state; all remediated, 2 under continuous monitoring

- ALCAN- several sites investigated: lagoon with PCBs left to self-preserve them.
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Secure Landfill