

GLG 110 – Chapter 17 – Waste Management

- World generates large amounts of waste; urban areas running out of disposal space!
- Disposal costs now run into tens of billions of dollars in U.S.; big industry!
- Modern society produces too much and too varied types of waste for easy disposal
- Often disposal facilities are imposed on blighted/poor neighborhoods and may be a contributing factor to why the neighborhood is poor
- Disposal facility location should be based on sensible locations w.r.t. geology, transport, etc., NOT on where people have least ability to fight against it or where it will simply be cheap to buy the land
- Integrated Waste Management (IWM) attempts to see “whole picture” by:
 - Reduce amount of waste generated
 - Recycle all that can be recycled
 - Reuse things before/instead of disposing of them
- Recycling has become very successful; reducing total waste produced has been less successful
- Recycling of metals very successful (e.g, E-waste and landfills in Silicon Valley, CA)
 - However, toxic substances exist in such waste and workers can be exposed
- Zero Waste production goal may be unreachable, but moving towards this can improve overall waste scenario greatly
- IWM encourages/promotes sustainable urban “ecosystems” for humans
- Materials Management: regulations can be used to reward/subsidize sustainable practices, such as reuse/recycling, instead of extraction of new/virgin resources
 - Tax credits for producing less waste, recycling more, etc.
 - Promotes sustainability
- Solid waste – garbage (as opposed to liquid waste – sewage, etc.)
 - Paper, yard waste, plastics, metals, wood, glass, food waste, etc.
 - Paper is largest source, by mass (much could be recycled)
 - Yard waste is second, by mass, nearly all of which could be composted
 - Toxic/infectious waste involved with biological (food, diapers) materials is also prominent in urban landfills
- Separating waste streams and having distinct disposal sites is more effective at reducing waste and increasing recycling/reuse, BUT it is more expensive than just “throwing everything together in on big hole”
- Garbage disposals re-route food waste to wastewater treatment facilities
 - Reduces solid waste to landfills
 - Can allow/promote disposal of toxic liquid wastes into sewers
 - Easy
 - Cheap
 - Illegal!
- Composting turns food/organic waste into top soil/fertilizer
 - Requires sorting and composting heap location outside one’s house
- Waste incineration reduces waste mass by 50% and results in inert ash residue
 - Saves landfill space

- Risks increased air pollution
- Open dumps – throw crud in a hole
 - “old way” – breeds disease, pests and greatly blights landscape
 - still common in poor countries
 - “uncontrolled” dumping
- “Sanitary” landfills – “newer way”
 - Confines waste to smallish area; encapsulates in non-permeable materials
 - Leachate and methane gas can be released as “new” pollutants to water and air
 - Multi-barrier use, leachate collection and treatment, compacted clay cap
 - Illegal disposal of hazardous wastes (heavy metals, chemicals, acids, meds, pesticides, etc.) can be a serious problem
- Landfill siting:
 - Separated from water table by impermeable materials (clay, etc.) and by large vertical distance (if possible)
 - Arid regions better (less leachate produced)
 - Slight slope promotes runoff (rather than infiltration into landfill) but not erosion (steep slopes)
 - Clay and shale are your friends w.r.t. landfill siting
- Love Canal – case study
 - Chemical waste dump site in 1940s and 1950s
 - 1953 – Hooker Chemical donated land to city of Niagara Falls
 - Homes and school built over dump
 - 1976-78 – Chemicals found surfacing over the dump
 - 1980s – \$175 million clean-up
 - Poster child for RCRA (1976) and CERCLA (1980) environmental laws
 - Identify and classify Haz Wastes
 - Clean up abandoned Haz Waste sites around U.S.
- Haz Waste – disposal vs. treatment
 - Burial, deep well injection
 - Burning, chemical stabilization (non-leachable)
 - Neutralization of pH, precip. of metals, oxidation

Household haz waste disposal:

<http://www.scottsdaleaz.gov/Recycle/HHWDropoff.asp#AllHHW>

Recycling, by city:

Glendale: <http://www.glendaleaz.com/Sanitation/Recycling/>

Phoenix: <http://phoenix.gov/GARBAGE/recycle1.pdf>
<http://phoenix.gov/GARBAGE/recycle.html>

Peoria: http://www.peoriaaz.gov/publicworks/publicworks_solidwaste_curbrecycle.asp
http://www.peoriaaz.gov/publicworks/publicworks_solidwaste_hazmat.asp