Characterization of Municipal Solid Waste (MSW)

Characterization of Solid Waste by kind, composition, and source.
Two mains categories:

- G_____ : animal and vegetable waste resulting from f_____ preparation, originates primarily from k_____ and r_____, large part of the putrescible matter in MSW, source of o_____

- R_____: combustible and non-combustible components of MSW
  — combustible fraction includes p_____, r_____, cartons, boxes, furniture, tree branches, etc. *T*_____ is synonymous with combustible portion of rubbish
  — noncombustibles, includes i_____ portion of rubbish: tin cans, metals, glass, etc.

Other categories:

- A_____
- S_____ Refuse
- Dead A_____
- Abandoned v_____
- I_____ Wastes (food processing wastes, lumber and metal scraps, shavings)
- D_____ Wastes (lumber, pipes, bricks, masonry)
- C_____ Wastes (lumber, pipe, scraps)
- Special Wastes (includes hazardous substances, explosives, radioactive materials)
- W_____ Treatment Plant Residues (includes screenings and grit)

MSW Composition by material:

- p_____ and paperboard
- g_____
- m_____ (steel, aluminum, other nonferrous metals)
- p_____
- r_____ and leather
- t_____
- w_____
- other m_____

MSW Characterization by Product Category:

- c_____ and packaging
- n_____ goods (e.g., newspapers, "selected consumer electronics")
- d_____ goods (e.g., appliances)
- y_____ trimmings
- f_____ scraps
- other

Integrated Solid Waste Management

- Priority is on s_____ r_____
- Progress since 1992:

Source Reduction

Year	Tons Reduced at Source
1992	630,000
1994	7,974,000
1995	21,418,000
1996	23,286,000
1997	32,019,000
1998	40,319,000

Source Reduction By Major Material Category

Waste Stream	Tons Reduced
Durable Goods	5,289,000
Nondurable Goods	8,956,000
Containers & Packaging	12,004,000
Other MSW	23,793,000
Total for 1999:	50,042,000

Second Priority following Source Reduction is Recycling and Reuse.

- _____ % recycling rate in 1999 (64 million tons)
- _____ curbside recycling programs in 1998
- _____ yard trimmings and composting programs in 1997

Least Favorable MSW Management Activity: Ultimate Disposal (e.g., landfills)

Number of landfills in U.S. continues to decrease from about _____ in 1988 to about _____ today

Landfills must:

1. keep out regulated h_____ w_____;
2. apply a d_____ c_____;
3. control d_____ v_____ populations (rodents, flies, mosquitoes, etc.);
4. monitor m_____ g_____;
5. restrict p_____ a_____;
6. control s_____ w_____ run-on and run-off,
7. protect surface water from p_____; and
8. keep appropriate r_____.

Design Standards

Landfills must be designed to ensure d_____ w_____ standards are not exceeded in groundwater. Landfills must be designed with a c_____ l_____ made of synthetic membrane liner on top of a two-foot c_____ l_____.

Ground-water Monitoring and Corrective Action

All landfills must have monitoring w_____ to detect any groundwater contamination. If ground-water is contaminated, the owner/operator is required to clean it up to acceptable standards to protect human health and the environment.

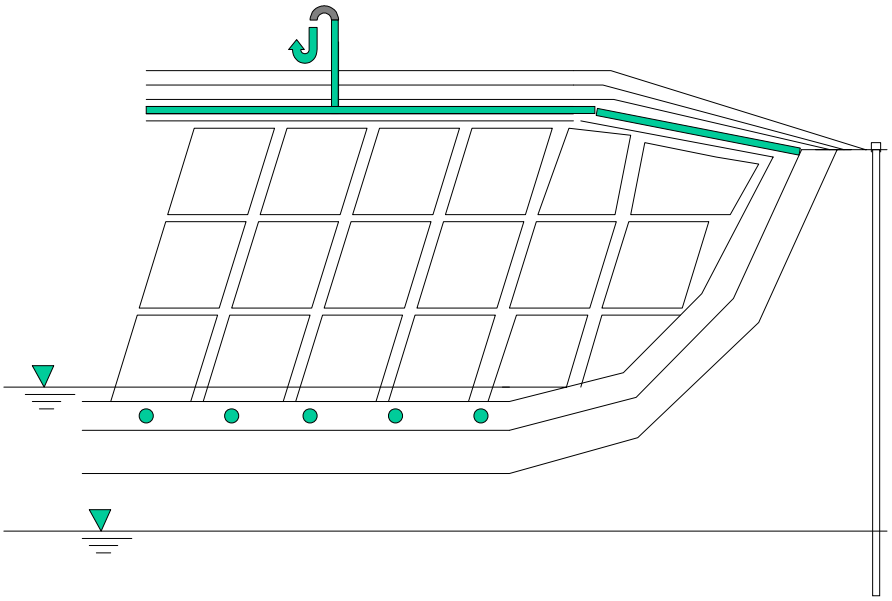
Closure and Post-Closure Care

When a landfill stops accepting waste, it must be capped to keep any liquid away from the buried waste. Once the landfill is closed, the owner/operator is responsible for maintaining the final cover, monitoring groundwater, methane, and continuing l_____ management for 30 years.

Financial Assurance

Landfill owners/operators must show that they have f_____ mechanisms to cover the costs of closure, post-closure care, and any needed cleanups from releases. Financial mechanisms can include s_____ bonds, letters of credit, insurance, or guarantees, among others. The majority of landfills are small (less than 20 tons of municipal solid waste per day) and some may qualify for an exemption from the design standards, ground-water monitoring, and corrective action requirements. To qualify for an exemption, a small landfill must not be causing ground-water contamination, and must be located in either a very dry climate or a very remote location.

Components of a Solid Waste Landfill:



• Liner:

• Leachate:

• LCRS:

• Cell:

• Daily Cover:

• Lift:

• Final Lift:

• Final Cover:

• Cap

• Postclosure: