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

<table>
<thead>
<tr>
<th>Year</th>
<th>Tons Reduced at Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>1992</td>
<td>630,000</td>
</tr>
<tr>
<td>1994</td>
<td>7,974,000</td>
</tr>
<tr>
<td>1995</td>
<td>21,418,000</td>
</tr>
<tr>
<td>1996</td>
<td>23,286,000</td>
</tr>
<tr>
<td>1997</td>
<td>32,019,000</td>
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<tr>
<td>1998</td>
<td>40,319,000</td>
</tr>
</tbody>
</table>

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: