FYI
DHEC's Office of Solid Waste Reduction and Recycling
For Your Information...

How Landfills Work

It's not a dump – so don't call it that.

It's not just some hole in the ground either – it's much too expensive to build and operate to think of it that way. It's a Class 3 landfill that accepts municipal solid waste (MSW). It's the place your household garbage calls home.

So, just what is a Class 3 landfill? A Class 3 landfill is a scientifically engineered facility built into or on the ground that is designed to hold and isolate waste from the environment. Federal and state regulations strictly govern the location, design, operation and closure of Class 3 landfills in order to protect human health and the environment.

Class 3 landfills are the most common places for waste disposal and are an important part of an integrated waste management system. Today, about 73 percent of the MSW generated in South Carolina is disposed of in the state's 25 permitted Class 3 landfills. Nationwide, about 54 percent of the MSW generated is disposed of in landfills according to the U.S. Environmental Protection Agency (EPA).

From Your Home to the Landfill

You think garbage, you think garbage truck. Depending on the Class 3 landfill's size, as many as 200 trucks may come every day. The trucks come from all over, too. Why? Well, Class 3 landfills are difficult to locate as well as expensive to build and operate. Given that, there are fewer Class 3 landfills today than in the past, but they are larger and accept MSW from greater distances.

There are, of course, different types of garbage trucks that hold different amounts of waste. The truck that comes through your neighborhood can hold anywhere from 12 to 14 tons of waste. How much is that? Well, on average, this type of garbage truck can pick up waste from about 800-850 homes. When the truck is full, it heads to the landfill. At the landfill, the truck drives on to a scale and is weighed on its way in, on its way out, or both. The truck carefully drives to a specific area of the landfill and dumps or "tips" its load. Then it leaves and drives to another neighborhood to repeat the process.

What Happens Every Day

The daily operation at a Class 3 landfill includes dumping of waste into a specific area of the landfill – called a working face – followed by compaction (crushing) of the waste and then covering of the waste with soil.

Waste is dumped into an open area of the landfill called a cell. Class 3 landfills almost always just have one cell open at a time to accept waste. At the same time, another cell is being built so it is ready when the current cell becomes full.

Space is money. Garbage is compacted or crushed to save space. You've seen the giant tractor with spiked wheels that goes back and forth over the garbage. Well, that's a compactor. It weighs 100,000 pounds. The compactor makes three to five passes over the garbage to crush as much garbage into the space as possible. On average, about 1,200 to 1,400 pounds of garbage can be compacted into one cubic yard of space.

At the end of the day, the working face of the cell is covered with a layer of soil or other cover material to minimize odor, pests and rodents as well as litter. This is called daily cover.

This three-step process is repeated over and over until the cell is filled.

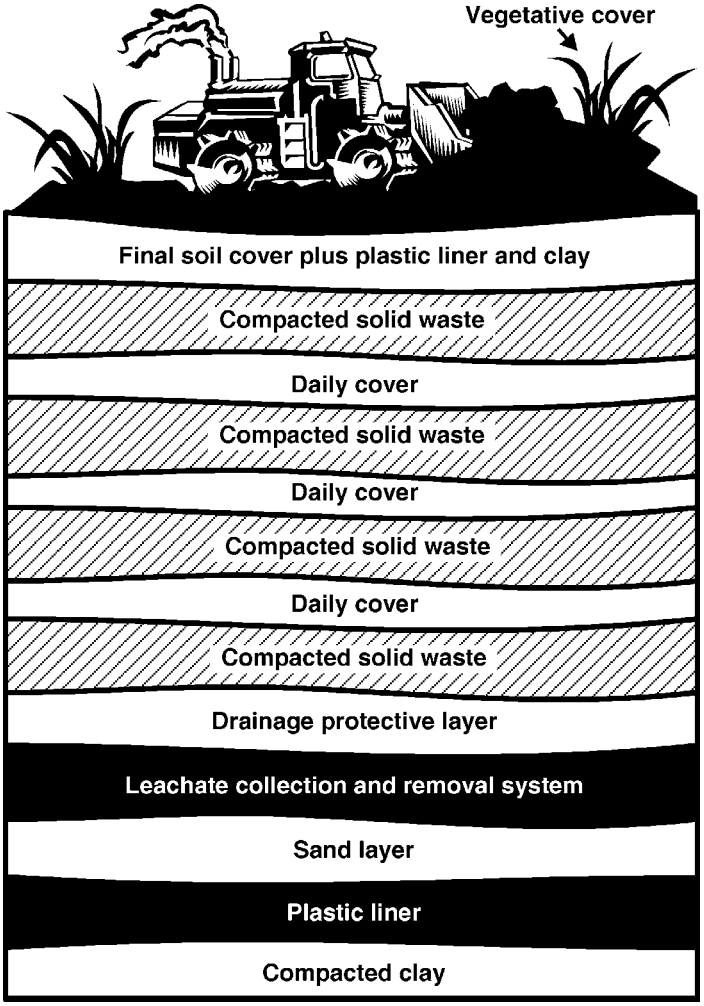
The Sum of Its Parts

Here are some basic parts of a landfill.

1. The **bottom liner system** is designed to keep waste from coming in contact with the environment – particularly groundwater. From the bottom up, the system is: 1) 2 feet of clay 2) a plastic liner and 3) a protective layer 2 feet thick, usually comprised of sand.
2. **Cells** are specific areas where the waste is dumped and compacted (crushed).
3. The **storm water drainage system** collects rainwater that falls on the landfill. The system may include plastic drainage pipes that collect water and move it to a retention pond at the Class 3 landfill. This water has not come into contact with the garbage.
4. The **leachate collection system** collects liquids – called leachate – that are part of the MSW and any water (e.g., rainwater) that comes into contact with the garbage. This water works its way through the Class 3 landfill like water percolating through coffee grounds. As the water moves through the garbage, it picks up contaminants. It must be collected and treated.

5. The **methane collection system** collects methane gas that is created during the decomposition of the garbage. Bacteria break down the garbage. The by-product is landfill gas that is about 50 percent methane and 50 percent carbon dioxide with very small amounts of nitrogen and oxygen. Methane gas presents a hazard because it can explode and/or burn. Methane is actively collected in a series of pipes, then passively vented or burned through a flare. Currently seven Class 3 landfills in South Carolina (Anderson Regional Landfill, Lee County Landfill, Horry County Solid Waste Authority (SWA) Landfill, Palmetto Landfill, Three Rivers SWA Landfill, Greenwood County Landfill and the Richland Landfill) burn methane to produce energy (methane produces about half the energy of natural gas).

6. The **final covering or cap** is placed on the Class 3 landfill when it is closed. The final cover has: 1) 18 inches of clay at the bottom; 2) a plastic liner in the middle; and 3) 2 feet of soil on top. The covering seals the waste from air and reduces the amount of water getting into the landfill. It also prevents pests (birds, rats, mice, flying insects and so on) from getting into the waste.



The Life Expectancy of a Landfill

The life of a landfill depends on the size of the facility, the disposal rate and the compaction rate. All Class 3 landfills are permitted by the S.C. Department of Health and Environmental Control to accept a specific amount (tons) of waste each year – this amount cannot be exceeded. As mentioned earlier, Class 3 landfill operators strive for the maximum compaction rate possible in order to save space. Given these considerations, the average life expectancy could be anywhere from 30 to 50 years. Class 3 landfills must be monitored for 30 years after closure.

When a Class 3 Landfill Closes ...

When a Class 3 landfill is full, it is closed with a final cover that includes a clay layer, a plastic liner and a soil layer. Even though the facility is closed, the responsibility of the landfill operator does not end.

Class 3 landfill owners must set aside money (called financial assurance) to close the landfill and to provide post-closure care in the event of potential environmental issues. Operators must continue to pump the leachate, test the groundwater, inspect the cap, repair any erosion, fill low areas due to settlement, maintain vegetation and prevent trees from growing. Why no trees? Trees have roots and roots can tear the liner.

DISCLAIMER: The definitions in this fact sheet do not constitute DHEC's official use of terms for regulatory purposes. Specific legal definitions of some words may be found in various South Carolina laws and regulations.

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