Community Guide to Capping

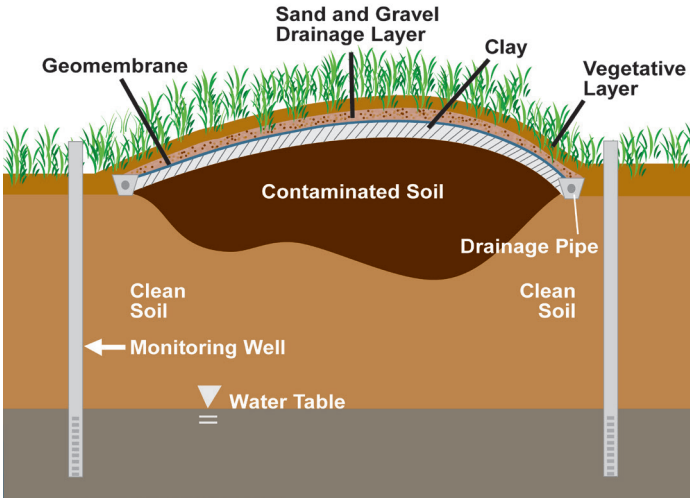
What Is Capping?

Capping involves placing a cover over contaminated material such as landfill waste or contaminated soil. Such covers are called "caps." Caps do not destroy or remove contaminants. Instead, they isolate them and keep them in place to avoid the spread of contamination. Caps also prevent people and wildlife from coming in contact with contaminants.

How Does It Work?

A cap isolates and prevents the spread of contamination in several ways. For example, it can:

- Stop rain and snowmelt from seeping through the material and carrying contaminants to the groundwater.
- Keep stormwater runoff from carrying contaminated material offsite or into lakes and streams.
- Prevent wind from blowing contaminated material offsite.
- Control releases of gas from wastes containing or producing "volatile" chemicals (those that evaporate).



Example of a cap with several layers.

- Keep people and wildlife from coming into contact with the hazardous material and tracking contaminants offsite.

The cap design selected for a site will depend on several factors, including the types and concentrations of contaminants present, the size of the site, the amount of rainfall the area receives, and the future use of the property. One or more layers may be needed. For example, an asphalt cap might be selected to cover low levels of soil contamination on a property whose future reuse requires a parking lot. A cap for a hazardous waste landfill, however, might require several layers, including a vegetative layer, drainage layer, geomembrane and clay layer to ensure water is kept out of the waste. Here are some types of cap layers:

- **Asphalt or concrete:** A surface layer of these materials can serve as a cap and a parking lot or building slab foundation.
- **Vegetative layer:** A top layer of soil planted with grass or other vegetation can help prevent soil erosion and make the area look more natural and attractive. An evapotranspiration or "ET" cover is a vegetative cap in which the plants and underlying soil keep rain and snowmelt from soaking down into the contaminated area. (See *Community Guide to Evapotranspiration Covers*.)
- **Drainage layer:** A layer of sand and gravel, often containing rows of slotted pipes, collects and drains any water that makes it through the top layers of a cap.
- **Geomembrane:** A sheet of strong plastic-like material prevents downward drainage of water and upward escape of gases.
- **Clay:** A layer of compacted clay helps prevent the downward drainage of water.

Some landfill covers, such as those for municipal landfills, also may include collection and venting systems for methane and other gases that could build up underground.

How Long Will It Take?

Building a cap can take a few days or up to several months. The construction time will depend on several factors that vary from site to site. For example, capping will take longer where:

- The contaminated area is large.
- The design of the cap is thick or complex.
- Supplies of clean topsoil, clay or other cap materials are not available locally.

Caps can be effective for many years when they are properly maintained. They are maintained for as long as the contaminated materials remain in place.

Is Capping Safe?

When properly built and maintained, a cap can safely keep contaminated material in place. A cap will isolate contamination as long as it does not erode or develop cracks or holes that allow water to reach the contaminated material. Any cracks or holes must be repaired so the cap continues to be effective. Regular inspections ensure that weather, plant roots and human activity have not damaged the cap and that plants on vegetative caps are still growing. Typically, groundwater monitoring wells are placed around the capped area and sampled to detect leaks.

How Might It Affect Me?

You may notice increased truck traffic as cap materials come to the site. You also might hear bulldozers, backhoes and other equipment during construction of the cap or see stockpiles of soil for use in the cap. The capped area may be fenced off to prevent entry.

Why Use Capping?

Capping is the traditional method for isolating landfill wastes and contaminants. It sometimes is used to address large volumes of soil or waste with low levels of contamination. Caps made of asphalt or concrete, or even a layer of soil planted with grass, can allow some sites to be reused. Caps have been selected for use on hundreds of Superfund sites and other cleanup sites across the country.

Spring grasses grow on the cap of a hazardous waste landfill.

Example

Capping is one of several methods used to protect people and the environment from contamination at the Roebling Steel Superfund site in New Jersey. Drums and other wastes were removed from a 5-acre area of the site. Some of the soil remaining after the excavation contained metals and other contaminants from steel manufacturing. In 2005, this soil was covered with two types of caps: asphalt and clean soil planted with grass. The purpose of these caps was to prevent the spread of contaminants and to keep people from coming into contact with contaminated soil.

The caps also were designed with the future use of the site in mind. A station for New Jersey's light rail system was constructed on the property, and the asphalt cap serves as its parking lot. Grassy landscaping surrounds the rest of the property. A plan is in place for the long-term maintenance and monitoring of the caps to ensure that they remain protective. Future excavation through the soil cap is not permitted.

For More Information

- About this and other technologies in the Community Guide Series, visit: https://clu-in.org/cguides or https://clu-in.org/remediation/
- About use of cleanup technologies at a Superfund site in your community, contact the site's community involvement coordinator or remedial project manager. Select the site name from the list or map at http://www.epa.gov/superfund/sites to view their contact information.