

A Citizen's 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 prevent people and wildlife from coming in contact with contaminants.

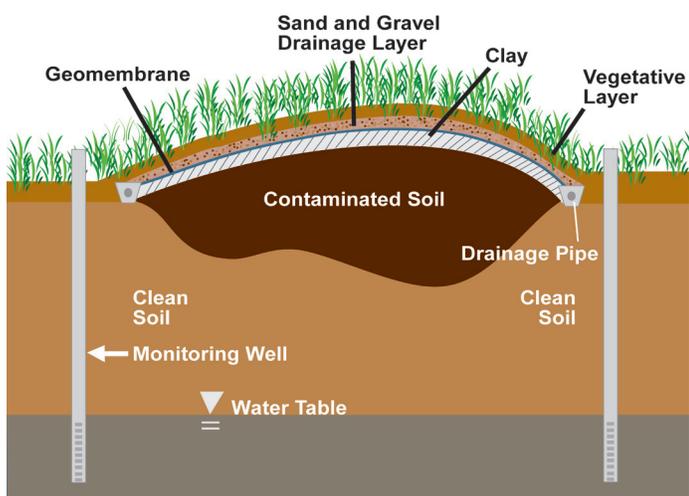
How Does It Work?

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 storm water 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).
- 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. Construction of a cap can be as simple as placing a single layer of a material over lightly contaminated soil to placing several layers of different materials to isolate more highly contaminated wastes. 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. The following are some of the options for caps:

- **Asphalt or concrete:** A layer of these materials can serve as 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. (For more information, please see *A Citizen's Guide to Evapotranspiration Covers* [EPA 542-F-12-006].)
- **Drainage layer:** A layer of sand and gravel, often containing rows of slotted pipes, is built to collect and drain any water that makes it through the top layers of a cap.
- **Geomembrane:** A sheet of strong plastic-like material is used to prevent downward drainage of water and upward escape of gases.
- **Clay:** A layer of compacted clay also can help prevent the downward drainage of water.



Example of a cover with several layers.

Some landfill covers, such as those for municipal landfills, may also 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 up to several months. Construction may take longer when:

- 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 continue to isolate contamination as long as it does not erode or develop cracks or holes that allow water to reach the contaminated material. Regular inspections are made to make sure that the weather, plant roots, and human activity have not damaged the cap and that plants on vegetative caps are still growing. Also, groundwater monitoring wells are placed around the capped area and sampled to help determine if leaks occur.

How Might It Affect Me?

Residents and businesses close to a site may see increased truck traffic as cap materials are brought to the site. Construction of the cap may involve bulldozers, backhoes, and other noisy equipment, and some soil may need to be excavated for use in the cap. Dust from excavation and construction can be controlled by spraying water or covering stockpiled materials with tarps.

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 at many Superfund sites across the country.



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

Example

Capping is one of several methods being 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 one 5-acre area of the site. Two areas of soil that remained 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 avoid the spread of contaminants and to prevent 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. The grassy landscaping surrounds the remainder 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

For more information about this and other technologies in the Citizen's Guide Series, visit:

www.cluin.org/remediation
www.cluin.org/products/citguide

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