

Community Guide to Evapotranspiration Covers



What Is An Evapotranspiration Cover?

Evapotranspiration (ET) covers are a type of cap placed over contaminated material, such as soil, landfill waste, or mine tailings, to prevent water from reaching it and to isolate it from people and wildlife. They differ from other types of caps in the way they prevent water from seeping into the waste. (See [Community Guide to Capping](#).) ET covers store water from rainfall and snowmelt until: 1) drier or warmer weather evaporates the water, or 2) plant roots take up the water and release it to the air as water vapor through the leaves and stems. This process is called “transpiration.”

How Does it Work?

Like most caps, ET covers do not destroy or remove contaminants. Instead, they isolate contaminants and keep them in place to prevent their spread in order to protect people and wildlife.

A typical ET cover is constructed by placing a layer of organic-rich silty soil over the contaminated material. This type of soil is chosen for its ability to store water and promote plant growth. The thickness of the cover depends on how much rainfall and snowmelt are expected in the area. Grass, shrubs or trees with



Example of ET cover used at Operating Industries, Inc. Landfill Superfund site.

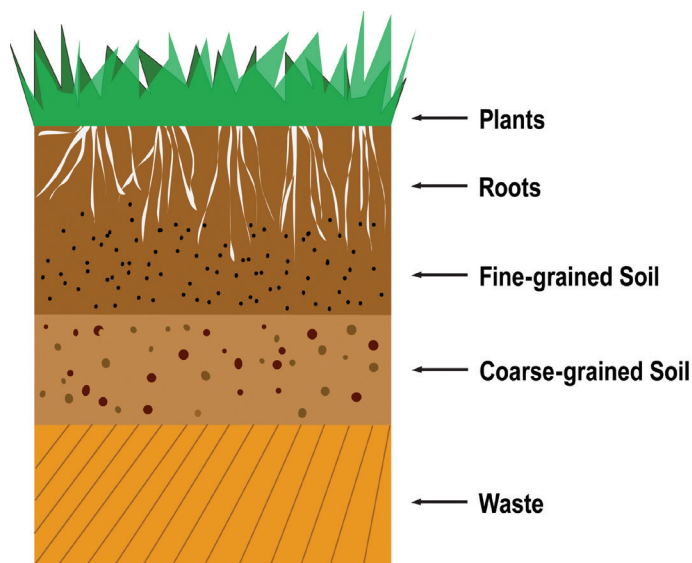
extensive root systems that survive the local climate often work best, and as they grow, the plants transpire more water.

The soil-plant layer of an ET cover acts as a sponge to store rainwater and snowmelt. The stored water will either evaporate directly from the soil or transpire after plant roots take it up. Together, evaporation and transpiration (**evapotranspiration**) keep water from seeping into contaminated material and carrying contaminants offsite.

A different type of ET cover uses a layer of organic-rich soil placed over a layer of coarse-grained soil. The lower, coarse-grained layer allows the fine-grain soil layer to hold more water. This type of cover can use less soil and have the same water storage as a one-layer ET cover.

How Long Will It Take?

Designing an ET cover requires understanding the water balance for each site, which includes annual rainfall patterns, growing season and soil characteristics. Building an ET cover can include building terraces for growing areas and runoff control, layering uncompacted soil, and planting. Construction of ET covers can take a few days to



Plants grow in the upper soil layer of an ET cover.

several months and is generally faster and less expensive than conventional caps. Construction may take longer where:

- The contaminated area is large.
- A thick cover is needed.
- Supplies of clean soil, gravel or other cap materials are not available locally.

ET covers must be maintained for as long as the contaminated materials remain in place to ensure the plants and soil continue to keep water away from contamination. Plants may have to be replaced if they are damaged by extreme weather, pests or animals.

Is An ET Cover Safe?

When designed for local conditions, ET covers offer a very safe and effective way to isolate wastes. Regular inspections are made to ensure that the weather, plant roots, and animal activity have not damaged the soil cover and that any plants that are part of the cover are still growing. Groundwater may be sampled to ensure that the cap is effective and contaminants are not moving to surrounding areas.

How Might It Affect Me?

You may see increased truck traffic as materials are brought 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. Any dust from excavation and construction can be controlled by spraying water or covering stockpiled materials with tarps. After construction, you might enjoy the planted areas, birds and other wildlife that are attracted to the site. Some sites allow trail access after the plants become established.

Why Use An ET Cover?

ET covers can be a quick way to securely isolate landfill wastes and other buried contaminated waste. Plants can make the site more attractive and remove carbon dioxide (a gas in the air that holds in heat) from the air. ET covers have been selected for use at several Superfund sites and other cleanup sites across the country.



Wheatgrasses, sage bush, pinyon and juniper are part of an ET cover at the Monticello Mill Tailings Superfund site in Utah.

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Example

An ET cover was installed over wastes buried in the former Box Canyon Landfill, one of several contaminated areas at the Camp Pendleton Marine Corps Base Superfund site in California. The 28-acre landfill received municipal solid waste and commercial wastes from 1974 to 1984. In the 1990s, low concentrations of contaminants were found in groundwater and soil around the landfill.

Rather than excavate the wastes, in 2002 a 6-foot thick ET cover was constructed over the entire landfill. Quick-growing non-native plants were in the original plant mix to provide erosion control. Native grasses and brush grew back on the site over time and returned it to a natural coastal sage scrub habitat. The cover is inspected routinely to make sure the cover is in good condition and the plants are healthy.

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.