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www.epa.gov/superfund/sites
www.cluin.org

A Citizen's Guide to Soil Washing

The Citizen's Guide Series

EPA uses many methods to clean up pollution at Superfund and other sites. Some, like soil washing, are considered new or *innovative*. Such methods can be quicker and cheaper than more common methods. If you live, work, or go to school near a Superfund site, you may want to know more about cleanup methods. Perhaps they are being used or are proposed for use at your site. How do they work? Are they safe? This Citizen's Guide is one in a series to help answer your questions.

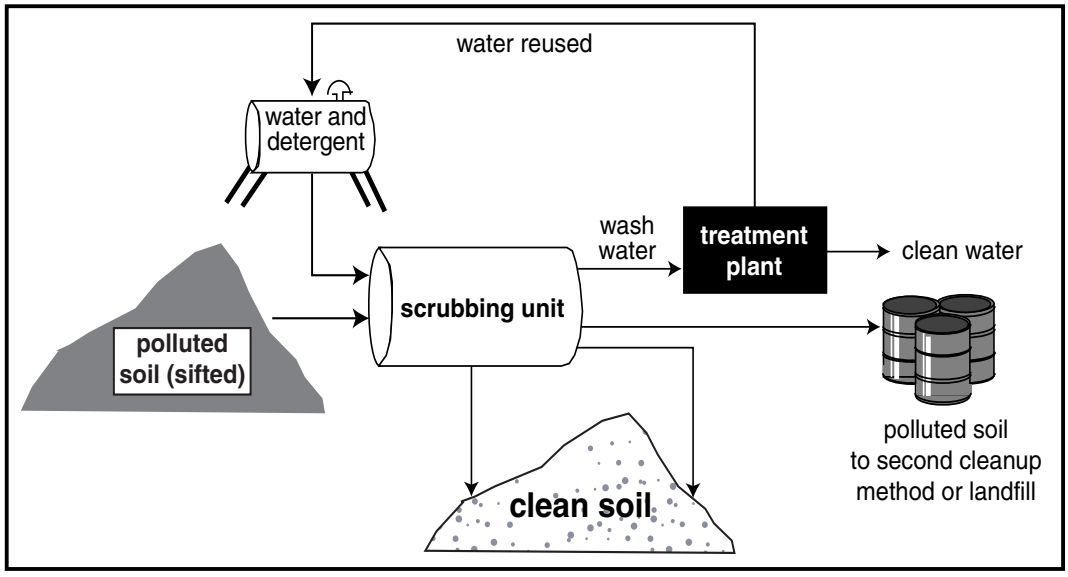
What is soil washing?

Soil washing "scrubs" soil to remove and separate the portion of the soil that is most polluted. This reduces the amount of soil needing further cleanup. Soil washing alone may not be enough to clean polluted soil. Therefore, most often it is used with other methods that finish the cleanup.

How does it work?

Chemicals tend to stick or *sorb* to some types of soil more than others. For instance, chemicals sorb more to fine-grained soils like silt and clay than to larger-grained soils like sand and gravel. The silt and clay, in turn, tend to stick to sand and gravel. Soil washing helps separate the silt and clay from the larger-grained, cleaner soils. It works best when the soil contains a much bigger portion of the larger-grained soils than the fine-grained ones. Soil washing can clean up a variety of chemicals, such as fuels, metals, and pesticides, that can sorb to soil.

Before using soil washing, soil dug from the polluted area is sifted to remove large objects, like rocks and debris. The sifted soil is placed in a machine called a *scrubbing unit*. Water,



and sometimes detergents, are added to the polluted soil in the scrubbing unit. The mixture of soil and water is passed through sieves, mixing blades, and water sprays. This washes the silt and clay from the larger-grained soil and separates them. Some of the pollution may dissolve in the water or float to the top. The polluted wash water is removed and cleaned up at a treatment plant. The clean water then can be reused in the scrubbing unit or discharged.

The silt and clay, which contain most of the pollution, are tested for chemicals. Sometimes all of the pollution is removed in the wash water, but most often the silt and clay need further cleanup. The silt and clay may be washed again in the scrubbing unit or cleaned using another method like bioremediation or thermal desorption. (See *A Citizen's Guide to Bioremediation* [EPA 542-F-01-001] or *A Citizen's Guide to Thermal Desorption* [EPA 542-F-01-003].) Another option is to dispose of the polluted soils in a landfill.

The sand and gravel that settle to the bottom of the scrubbing unit also are tested for chemicals. If the sand and gravel are clean, they can be placed back on the site. If pollution is still present, they are washed again in the scrubbing unit. If necessary, another method is used to finish the cleanup.

Is soil washing safe?

Soil washing is usually performed at the site. This avoids the risks involved with trucking polluted soil from the site to a cleanup facility. During digging and cleanup, air pollution control equipment takes care of dust and other potential air pollution problems. Chemicals are seldom released from the scrubbing unit to the air. However, EPA tests the air at the site to ensure that chemicals are not released in harmful amounts. EPA also tests the soil to be sure it is clean before it is placed back on the site. When properly designed and operated, soil washing is quite safe.

How long will it take ?

The time it takes to clean up a site using soil washing depends on several factors:

- amount of silt, clay, and debris in the soil
- type and amount of pollution in the soil
- size of scrubbing unit (The largest units can clean up to 100 cubic yards of soil per day.)

Cleanup usually takes weeks to months, depending on the site.

Why use soil washing?

The greatest advantage of soil washing is that it reduces the amount of soil needing further cleanup. This reduction lowers the cost of cleanup and the cost for disposing of polluted material.

Soil washing can remove many types of pollution. It also works when the soil is very polluted, but may not be cost-effective for small amounts of pollution. It is also not as cost-effective on soils with a large amount of silt or clay. Soil washing is being used at six Superfund sites and other sites across the country.

For more information

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Further information also can be obtained at **www.cluin.org** or **www.epa.gov/superfund/sites**.

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