



# A Citizen's Guide to Solvent Extraction

## The Citizen's Guide Series

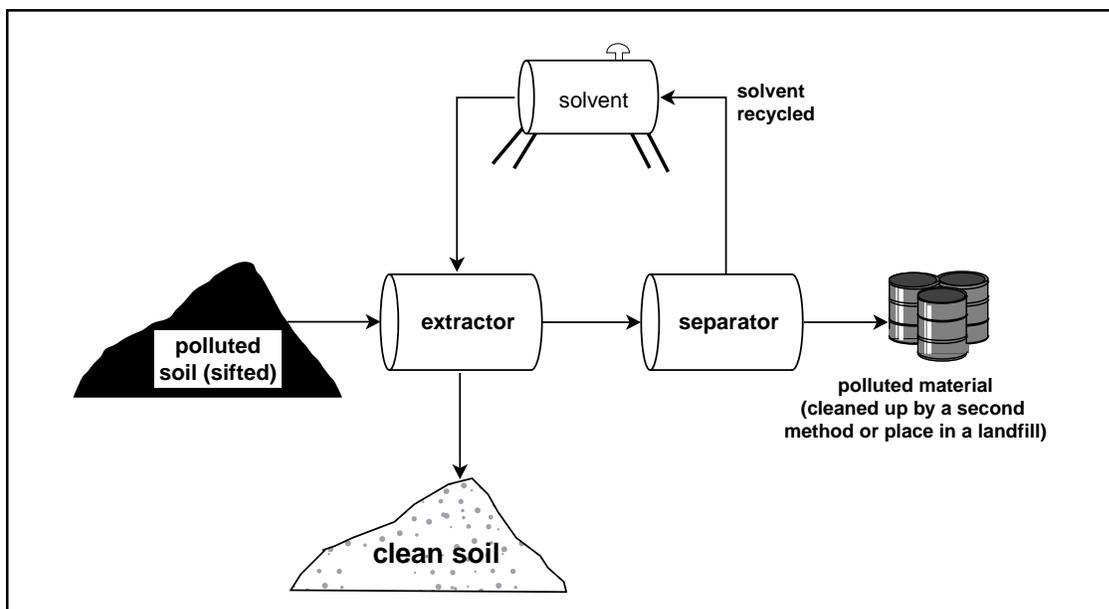
EPA uses many methods to clean up pollution at Superfund and other sites. Some, like solvent extraction, are considered new or *innovative*. Such methods can be quicker and cheaper than more common methods. If you live, work, or go to school near a Superfund site, you may want to learn more about cleanup 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 solvent extraction?

Solvent extraction (also known as chemical extraction) is a cleanup method that uses solvents to *extract* or remove harmful chemicals from polluted materials. Chemicals like PCBs, oil, and grease do not dissolve in water. Instead, they tend to stick or *sorb* to soil, sediment, and sludge, making it hard to clean them up. Solvents are chemicals that can dissolve sorbed chemicals and remove them from polluted materials.

### How does it work?

Before using solvent extraction, the soil must be dug from the polluted area to be treated. The soil is sifted to remove large objects like rocks and debris. The sifted soil is then placed in a machine called an *extractor* where it is mixed with a solvent. The type of solvent will depend on the harmful chemicals present and the material being treated. For example, the solvent triethylamine is often used to clean up PCBs from soil.



The cleaned soil is tested to make sure that the harmful chemicals have been removed. If harmful chemicals remain, the soil is placed back in the extractor to repeat the process. Clean soil (or sediment) can be placed back on the site.

Once the solvent dissolves the sorbed chemicals, the solvent is drained into a *separator*. This is where the chemicals are separated from the solvent. The used solvent often can be recycled and reused to clean up more soil. Otherwise, the solvents must be destroyed or disposed of in a landfill.

If any solvent remains in the soil following treatment, the soil is heated to remove it. The heat evaporates the solvent, changing it from a liquid to a gas. The gas is then removed from the clean soil. As the gas cools, it changes back to a liquid solvent, which can be recycled and reused.

## Is solvent extraction safe?

When properly designed and operated, solvent extraction is a safe cleanup method for soil, sediment, and sludge. EPA tests the air while the materials are being dug. This ensures that chemicals are not released to the air in harmful amounts. The rest of the process is usually conducted in an enclosed area. Therefore, any harmful chemicals or solvents that evaporate can be captured and cleaned up. Following solvent extraction, EPA tests the soil to be sure it is clean before it is placed back on the site.

### How long will it take ?

Solvent extraction can clean up to 125 tons of soil at a site per day. The time it takes to clean up a site depends on several factors:

- amount of polluted soil
- type of soil and conditions present (Is it wet or dry? Does it contain a lot of debris?)
- type and amounts of harmful chemicals present

Cleanup usually takes less than a year, depending on the site.



### For more information

write the Technology Innovation Office at:

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1200 Pennsylvania Ave.,  
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Washington, DC 20460

or call them at  
(703) 603-9910.

Further information also  
can be obtained at  
[www.cluin.org](http://www.cluin.org) or  
[www.epa.gov/  
superfund/sites](http://www.epa.gov/superfund/sites).

## Why use solvent extraction?

Solvent extraction is used to clean up many chemicals that are difficult to remove from soil. Cleanup using solvent extraction is generally quicker than methods that treat the soil in place. It can be done at the site to avoid trucking polluted soil to cleanup facilities offsite. This saves money on transport and disposal of the soil. In addition, the solvents can often be recycled and reused. Solvent extraction is being used at four Superfund sites and at other sites across the country.

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