



# A Citizen's Guide to Vitrification

## The Citizen's Guide Series

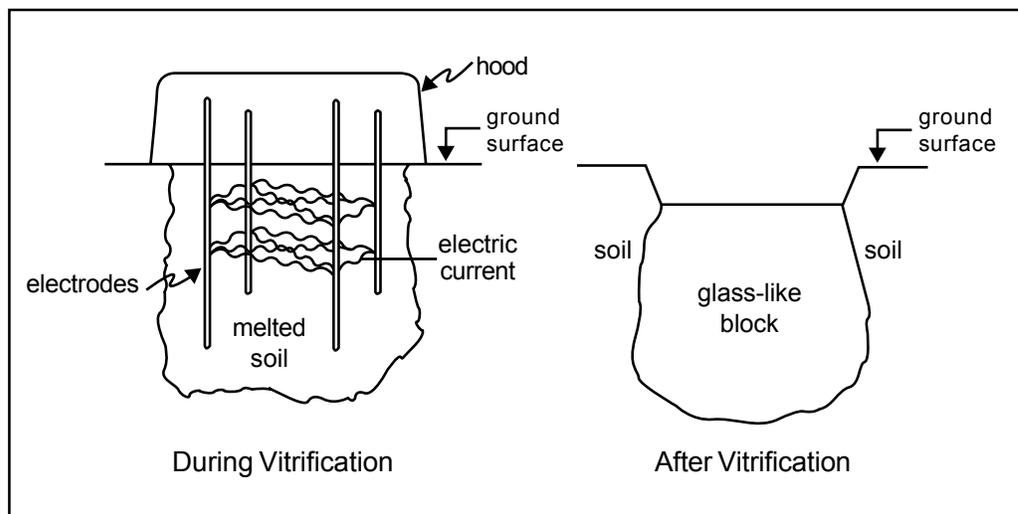
EPA uses many methods to clean up pollution at Superfund and other sites. Some, like vitrification, are considered new or *innovative*. Such methods can be quicker and cheaper than more common methods. If you live, work, or go to school near a Superfund site, you may want to learn more about cleanup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

Vitrification is a process that permanently traps harmful chemicals in a solid block of glass-like material. This keeps them from leaving the site. Vitrification can be done either in place or above ground.

### How does it work?

Vitrification uses electric power to create the heat needed to melt soil. Four rods, called electrodes, are drilled in the polluted area. An electric current is passed between the electrodes, melting the soil between them. Melting starts near the ground surface and moves down. As the soil melts, the electrodes sink further into the ground causing deeper soil to melt. When the power is turned off, the melted soil cools and *vitrifies*, which means it turns into a solid block of glass-like material. The electrodes become part of the block. When vitrified, the original volume of soil shrinks. This causes the ground surface in the area to sink slightly. To level it, the sunken area is filled with clean soil.



The heat used to melt the soil can also destroy some of the harmful chemicals and cause others to evaporate. The evaporated chemicals rise through the melted soil to the ground surface. Here, a hood, which covers the heated area, collects the chemicals. These chemicals are sent to a treatment system where they are cleaned up.

Any harmful chemicals that remain underground become trapped in the vitrified block, which is left in place. This prevents rainfall, groundwater flow, and wind from transporting the chemicals offsite.

## Is vitrification safe?

When used properly, vitrification can be quite safe. The gas hood must be large enough to cover the polluted area so it can capture all the chemicals released from the soil. Any wet soil must be dried first to prevent steam from forming. The release of steam can splash hot, melted soil above ground. The hood further prevents site workers from being splashed.

The vitrified block that is left in place is permanent and not harmful to people. However, EPA may limit construction on the land to avoid damage to it. EPA also tests the soil and groundwater near the vitrified block to make sure that chemicals are not being released.

## How long will it take?

The time it takes for in situ vitrification to clean up a site depends on several factors:

- size and depth of the polluted area
- types and amounts of chemicals present
- how wet the soil is (wet soil must be dried, which takes more time)

In general, in situ vitrification offers faster cleanup times than most methods. Cleanup can take from weeks to months, rather than years.



### For more information

write the Technology Innovation Office at:

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1200 Pennsylvania Ave.,  
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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 vitrification?

Vitrification has been used at sites across the country, including one Superfund site. It can clean up several types of chemicals and soils. By cleaning up soil in place, it avoids the expense of digging up soil or trucking it to a landfill for disposal. Vitrification also tends to be faster than other methods.

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