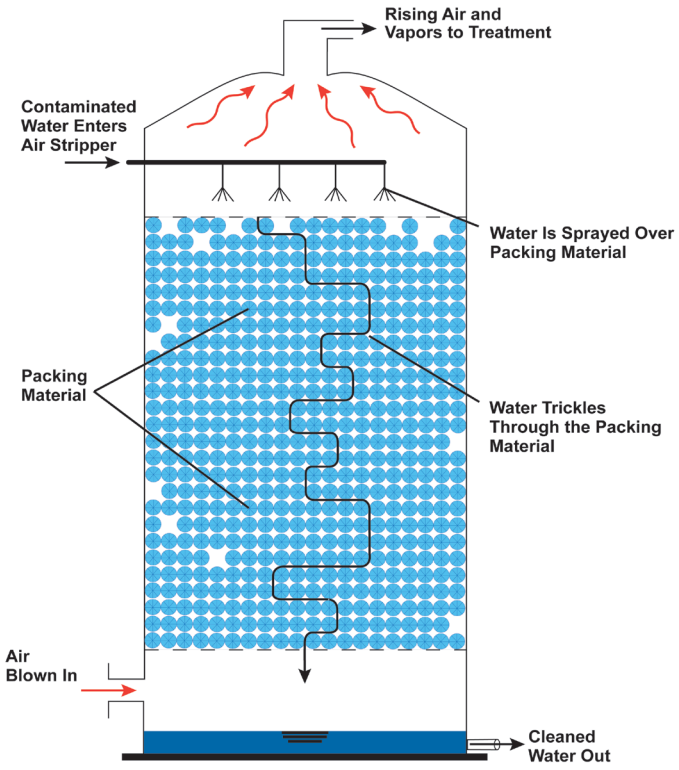
Community Guide to Air Stripping

What Is Air Stripping?

Air stripping is the process of moving air through contaminated water in an aboveground treatment system to remove chemicals called "volatile organic compounds" or "VOCs." VOCs are chemicals that easily evaporate, which means they can change from a liquid to a vapor (a gas). The air passed through contaminated water helps evaporate VOCs faster. The chemical vapors are collected, and either treated or vented outside if VOC levels are low enough. Air stripping is commonly used to treat groundwater as part of the pump and treat cleanup method. (See *Community Guide to Pump and Treat*.)

How Does It Work?

Air stripping uses either an air stripper or aeration tank to force air through contaminated water and evaporate VOCs. The size and type of air stripper or tank selected will depend on the types and amounts of contaminants, as well as the quantity of water requiring treatment. The most common type of air stripper is a **packed-column air stripper**, which is a tall tank filled with pieces of plastic, steel or ceramic packing material. Contaminated water is pumped into the top of the tank and sprayed over the top of the packing material. The water trickles downward through the spaces between the materials, forming a thin film of water that increases its exposure to air blown in at the bottom of the tank. Alternatively, an **aeration tank** removes VOCs by bubbling air into a tank containing only contaminated water.



Packed-column air stripper.

Rising air and vapors accumulate at the top of the air stripper or aeration tank where they are collected for treatment or release. Treated water flows to the bottom, where it is collected and tested to make sure it meets cleanup requirements. The water may need additional treatment to achieve required levels.

Once treated water meets regulatory standards, it may be discharged or reused. Depending on the site, treated groundwater may be pumped into a nearby stream or river or back underground through injection wells or trenches. At other sites, a sprinkler system may distribute the treated water over the ground surface so that it seeps into soil. The water also may be discharged to the public sewer system, or in some cases, reused.

How Long Will It Take?

The flow of water through an air stripper or aeration tank may take only a few minutes, depending on the size of the device and the rate water flows through it. However, cleanup of a large groundwater contaminant plume can take several months to years. The cleanup time will depend on several factors that vary from site to site. For example, air stripping will take longer where:

- Contaminant concentrations are high or the source of dissolved contaminants has not been completely removed.
- The amount of water requiring treatment is large.
- Groundwater cannot be pumped at a fast rate.
- Buildup of mineral deposits or algae on the packing material requires frequent removal.

Is Air Stripping Safe?

Air stripping is generally considered safe to use. Contaminated water is contained throughout cleanup so that there is little chance for anyone to come into contact with it. The chemical vapors that air stripping produces are treated, if necessary, to ensure unsafe levels of vapors are not released.

How Might It Affect Me?

Air stripping treatment generally will not disrupt your community. Initial construction of the treatment system will require use of trucks and heavy machinery. You may see a temporary increase in truck traffic as equipment comes to the site for construction. Air stripping systems are not particularly noisy when running, however.

Air stripper and treatment building.

Why Use Air Stripping?

Air stripping is an effective way of removing VOCs from contaminated water and is commonly used as part of groundwater pump and treat systems at sites around the country. Air strippers can be brought to the site, avoiding the need to transport contaminated water for offsite treatment. Air stripping has been selected for use at hundreds of Superfund sites and other types of sites across the country.

Sample plastic packing material. (Photo from Mass Transfer, Ltd.)

Example

Air stripping is part of the treatment for four of the five groundwater pump and treat systems operating at the Indian Bend Wash Superfund site in Arizona. Groundwater at the site is contaminated with an industrial solvent called trichloroethene (TCE) and other VOCs. Contamination extends over an area of about eight square miles and to depths greater than 100 feet.

The first pump and treat system began operating in 1994. The others were added later to improve cleanup. The packed-column air strippers remove VOC vapors, which are then treated with activated carbon and another method called "ultraviolet oxidation." Cleaned water is discharged to an area irrigation network and reservoir. As of 2016, the five treatment systems had removed 89,000 pounds of TCE from groundwater, and cleanup of some areas was nearly complete.

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.

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