

# Ground Water Treatment

## *Clean up Ground Water with Pump & Treat, Bio-Slurping, & Air Injection Combined*

**T**he predominant treatment for removing high contaminant concentrations found in extracted groundwater has been a combination of air stripping followed by activated carbon polishing prior to discharge. Conventional air strippers require a large air-to-water flow ratio to achieve adequate groundwater treatment objectives. Although removal of the groundwater is an effective plume containment mechanism, this is hardly an efficient means for treating groundwater.



Skid unit in Grangemouth, Scotland

**RSI's (S)pray(A)eration(V)acuum(E)xtraction(S.A.V.E.™) system incorporate the basic principles of air stripping with an innovative new twist.**

**Spray Aeration Vacuum Extraction**  
Most organic contaminants have a favorable Henry's law coefficient for air stripping, given their relatively low solubility in water and high vapor pressure. RSI's patented S.A.V.E.™ system uses the same principles as a conventional air stripper; however, it enhances the stripping process by:

- Maximizing the surface area between groundwater and air using a finely atomized spray.
- Waste heat, generated by the Internal Combustion Engine (ICE) increases the temperature of the contaminated groundwater increasing the vapor pressure of the organic contaminants and furthering their vaporization into the air phase.
- The vacuum generated by the ICE lowers the pressure, which further enhances the transfer of contaminants to the vapor phase.
- ▣ Water in the Spray Aeration tank is re-circulated, which maintains a high water-to-air transfer rate.

U.S. Patent: 4,846,134; 4,979,886

Canadian Patent: 1,287,805

The combination of these four improvements over most conventional air strippers significantly reduces the air/water ratio, which results in less vapor phase treatment. In the case of petroleum hydrocarbons and MTBE, the c o n t a m i n a t e becomes partial fuel for the ICE.



### **Bio-Slurping - Dual Phase Extraction (DPE)**

The introduction of the DPE module to the Soil Venting Equipment (SVE) system allows us to perform dual-phase extraction, removing the petroleum hydrocarbons (NAPL phase) pooled above the groundwater, as well as hydrocarbon vapors and contaminated water at the water table, which considerably reduces site cleanup time and total project costs.





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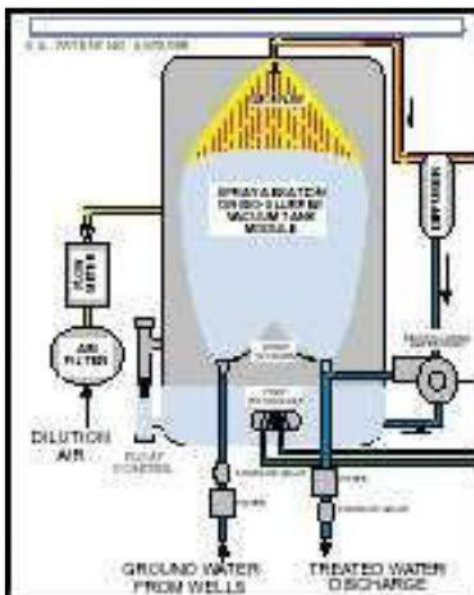
## Air Injection

A blower or air compressor is attached to the ICE to generate a volume of air at a certain design pressure which is injected into the groundwater at the source of contamination. Injected air also promotes biodegradation in the aquifer and in the vadose zone

(Bioventing).

Groundwater with high levels of dissolved iron, calcium and other inorganic constituents must be pretreated before the spray aeration module to reduce maintenance costs. A complete system solution can be provided based on our customer's needs. The S.A.V.E.™ system is mounted on a dual-axle trailer with the ICE, to minimize space requirements and simplify transport and startup.

Automation of these modules using the Phoenix S.A.V.E.™ Controller makes system operation simple and user friendly. Innovative environmental solutions by RSI.



**Note:** Increasing groundwater temperature to accomplish removal efficiency shown may require additional heat beyond waste energy of the engine. Please see RSI representative for complete details.

