IEG Technical Briefing Note No. 4

Soil Air Circulation-Bioventing - IEG SAC-Bioventing

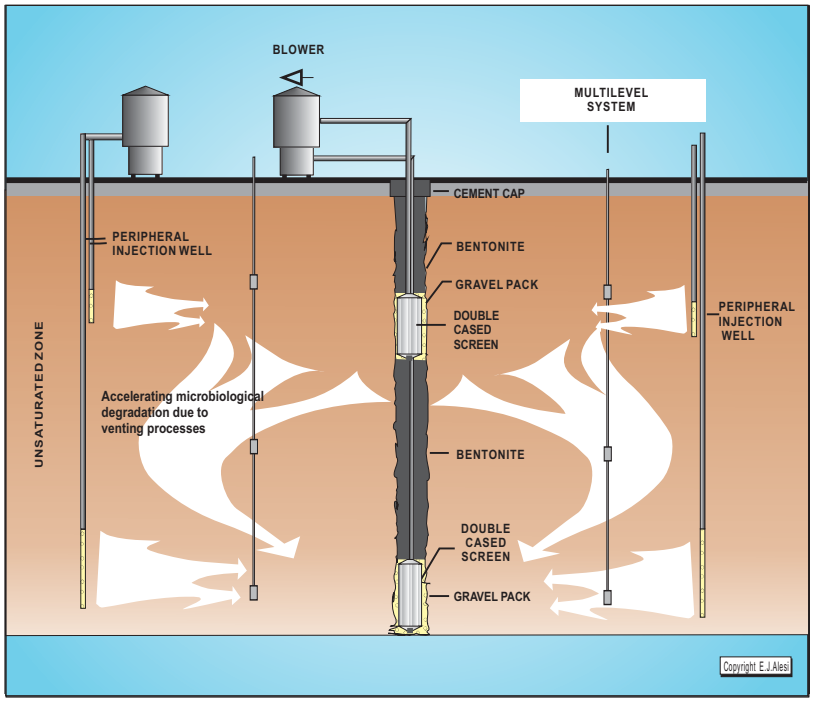
Directed **Soil Air Circulation** systems (SAC) are employed for the remediation by Bioventing of soils contaminated with volatile hydrocarbons by enhancing the **IEG Vacuum Vapour Extraction** (IEG VVE) technique. In addition, they can be used to inject gas into the soil for the stimulation of biological or chemical degradation.

If only biodegradable substances are to be removed from the subsoil, a **SAC-Bioventing** system (without an above-ground extraction unit) consisting of an axial ventilator in the screened well can be implemented. Two screens built into the borehole are separated into an upper and a lower section, each of which is connected to an above-ground blower. This allows for the withdrawal of air from either segment individually or from both simultaneously. The extracted air is re-infiltrated into the soil. Horizontal and vertical flow circulation cells are generated in the soil surrounding the extraction well. The circulation direction is reversible and can be adjusted according to the contaminant distribution in the soil.

The **SAC-Bioventing** system, in contrast to conventional soil venting methods, is capable of generating a directed circulation through the centre of the contamination. No fresh air is added to the circulation system. Air passing through the blower is heated, thereby enhancing desorption of contaminants adsorbed onto soil particles. This leads to a more effective remediation of the site.

In order to stimulate the biological degradation of contaminants nutrients, in either liquid or gaseous form, can be introduced into the circulation cell. Chemical conversion of toxic substances into harmless and/or immobile material can also be achieved in-situ by introducing, for example, strongly reactive gases into the soil.

If the capillary fringe is to be remediated along with the unsaturated zone, it is possible to create a circulation cell directly around the well rinsing the capillary fringe.



Soil Air Circulation-Bioventing
for microbiological degradation of non volatile contaminants
(IEG SAC-Bioventing Process)

Advantages

- The **IEG SAC-Bioventing** system can be operated in clay and silt with a low hydraulic conductivity
- The system needs less energy and less maintenance
- Increase in the percentage removal of pollutants from the subsoil
- Inclusion of the often highly-contaminated capillary fringe zone in the remediation process
- Larger effective radius of treatment
- Lower number of ventilation wells required for the remediation of a specific area
- Reduction in the total remediation time
- One-directional vacuum can be pulled from either the upper or lower extraction point
- Circular flow can be achieved by extracting from the lower or upper point and reinjecting into upper of lower point

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