

# IEG Technical Briefing Note No. 8

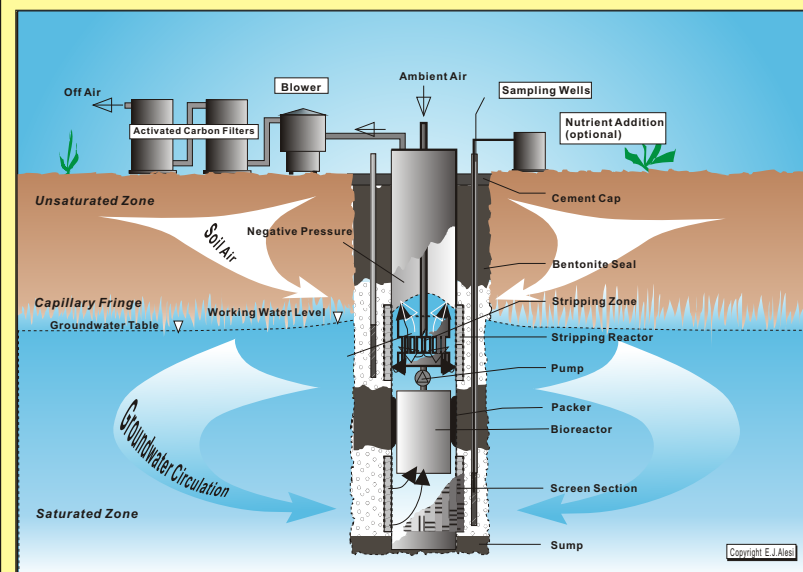
## Groundwater Circulation Well™ - IEG GCW™

The IEG **Groundwater Circulation Well™** (IEG GCW™) process is an in-situ system for the remediation of contaminated aquifers, especially those contaminated with volatile and semi-volatile hydrocarbons, using a combination of chemical, physical and biological processes. An **IEG GCW™** process unit consists of a specially-adapted groundwater well, at least one submersible pump, a negative pressure stripping reactor located in a sub-surface vault, an above-ground mounted blower, and a waste air decontamination system (for example disposable filters or regenerative activated carbon filters).

A **GCW™** well has at least two screened sections which are separated by a solid casing. Negative pressure generated by a blower is applied to the air-tight vault. Through a pipe connected to the stripping reactor located in the vault, ambient air is pulled through the multi-stage stripper (labyrinth stripper). The strippable contaminants are removed from the groundwater. When the contaminated exhaust air passes through the activated carbon filter, no water condensation occurs due to the low humidity of the air. Therefore, a significantly greater part of the activated carbon filter (typically 30-40%) can be utilized for adsorption of pollutants as compared to conventional air stripping (typically 5%).

Clean, aerated groundwater exits the well after passing a horizontal sand filter which is located at the bottom of the vault. If precipitation/biofouling occurs, the sand filter can be cleaned accordingly. Activated carbon at the bottom of the sand filter can optionally be used for additional treatment of the groundwater.

A flow pattern with a calculable horizontal and vertical component is produced in the aquifer to compensate for the directed water flow within the GCW well. The vertical circulation pattern can be adjusted (normal-reverse flow direction) depending on the location of the submersible pump(s). Thus, treated groundwater circulates through the sphere of influence (within the aquifer) before returning to the well. The **IEG CCW™** process is capable of extracting soil air and/or removing Light Non-Aqueous Phase Liquids (LNAPL's) during groundwater treatment. The amount of soil air and groundwater passing through the decontamination system can be adjusted according to the type of contamination and the well construction. A GCW well can effectively treat the unsaturated zone, the capillary fringe, and the saturated zone simultaneously.



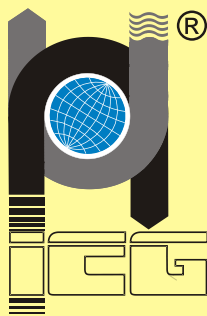
IEG Vertical Groundwater Circulation Well™ System  
for biological-physical groundwater remediation  
(IEG GCW™ Process)

### Advantages

- No groundwater abstraction, no waste water, no effluent discharge fees.
- No drawdown of groundwater, no structural damage to existing buildings.
- Treated groundwater is enriched with dissolved oxygen which increases the potential for natural aerobic degradation processes.
- Low energy take-up (system needs about 4.5 kW/hr).
- Low space requirements (subsurface installation is possible).
- Simultaneous treatment of unsaturated zone and capillary fringe by vapour extraction and free product recovery.
- Adjustment of the circulation pattern according to the contamination.
- Variety of possible combination with state-of-the-art treatment technologies according to the type of contamination (nanoparticles, in-well bioreactors, molecular sieve polymers).

- **Patented design - proven engineering**
- **Quicker, Smaller, Smarter, Greener**

The **IEG GCW™** method is a process patented by IEG.



**To discuss your in situ soil and groundwater remediation requirements, or for a free remediation concept and quotation, please contact us**

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