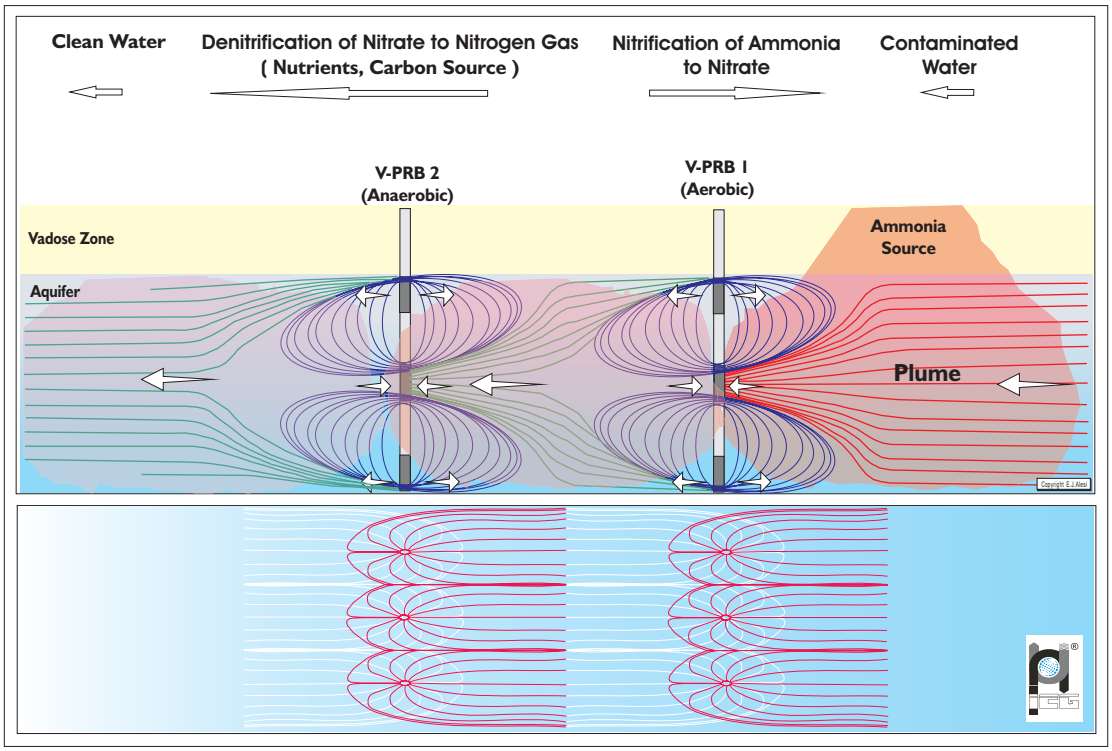
IEG Technical Briefing Note No. 26

In situ Remediation of Ammonia and Nitrate Impacted Groundwater

IEG's Groundwater Circulation Well (IEG GCW) technology offers enhanced treatability of conservative contaminants in groundwater, such as ammonia and nitrate, arising as a result of the manufacture of town gas and the agricultural application of nitrogenous fertilisers. The IEG GCW provides the ability to effect both the simultaneous containment of groundwater plumes and provide accelerated removal of contaminants through a combination of physical, chemical and biological processes.

This effective and efficient treatment system works in two ways:

First of all, the principle of in-ground circulation of groundwater, to bring about hydraulic control of groundwater, the containment of the contamination and hence the minimisation of further contamination movement off-site, and the delivery of contaminated groundwater to the in situ treatment well;
secondly, the in situ treatment itself, for the removal of ammonia, which occurs in two phases:
- bulk removal of gross ammonia containation using negative pressure air stripping
- final polishing of recirculated groundwater to target concentration using nutrient-enhanced reactive Zero Valent Iron for accelerated bioremediation



In-Situ Microbiological Denitrification of Groundwater using Groundwater Circulation Wells as Virtual PRB´s

Two lines of IEG PRB systems perpendicular to the direction of groundwater plume flow will be installed to create two discrete bioreactive zones. The first, up-gradient aerobic zone serves the purpose of nitrifying the residual ammonia to nitrate. The second, down-gradient anaerobic zone denitrifies the nitrate direct to harmless nitrogen gas.

The benefits of this system are considerable, given that remediation may be undertaken by the selective removal of ammonia in situ, using naturally occurring micro-organisms, and that the system does not require the removal of groundwater from the aquifer for above ground treatment by expensive methods, followed by the treated effluent's discharge to sewer. Further, once installed, these small footprint low energy systems are capable of performing over an extended period of time with minimal maintenance and for a relatively low cost, with minimum disruption to ongoing (or future) site activities.

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