

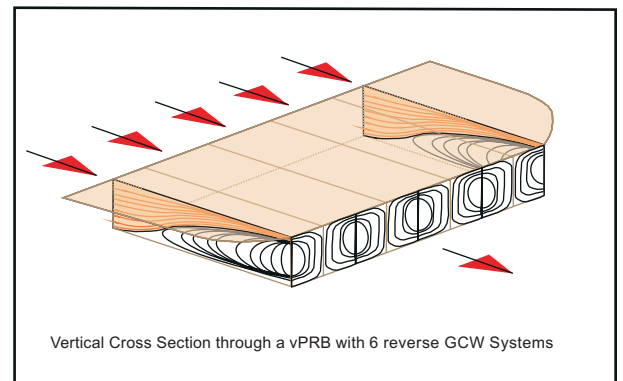
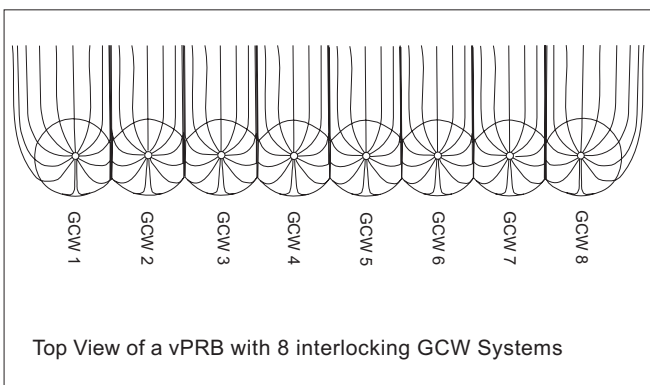
IEG Technical Briefing Note No. 16

Virtual Permeable Reactive Barrier - (IEG-vPRB)

IEG-vPRB *In situ* Virtual Permeable Reactive Barrier with Overlapped Circulation Cells

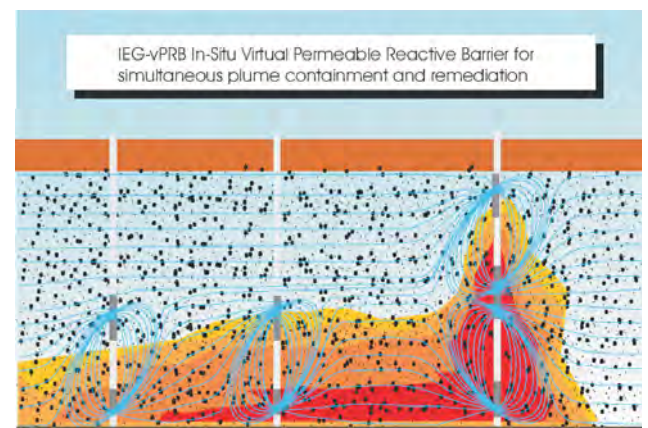
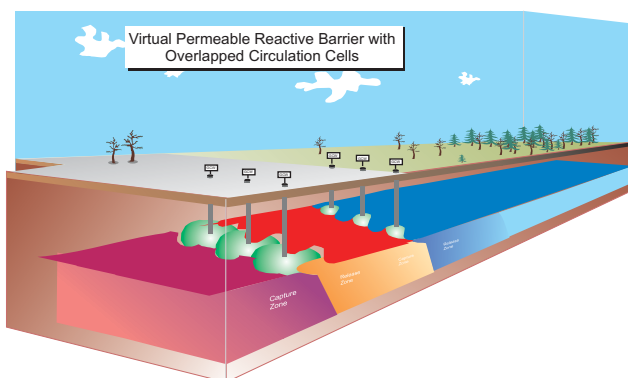
If the width of a contamination plume is larger than the capture zone of a single GCW, several systems can be arranged in one line perpendicular to or along the length of the plume. When applied as multiple systems arranged in this way, the capture zone of each well may be successfully overlapped thus transforming the aquifer within this zone into a series of interlocked active reactive *in situ* remediation cells. The distance between each system can be accurately determined from site hydrogeological measurements in order to ensure that no groundwater can pass the systems without first being captured and treated. Thus, a line of several GCW's represents a Virtual Permeable Reactive Barrier (the IEG-vPRB) and no contamination coming from upstream can pass through the vPRB without first being treated in accordance with design criteria.

The IEG-vPRB™ system can be designed and uniquely configured for a particular site. The technology can simultaneously provide *in situ* treatment of soil (unsaturated zone) and the aquifer (saturated zone) without removing groundwater from the aquifer. When a GCW is situated within the body of a groundwater contamination plume, this creates effective hydraulic control across a large diameter spherical capture zone within the aquifer. The polluted upstream groundwater is systematically captured by the GCW and treated in the well and within the aquifer.



Due to mass conservation, the same quantity is released by the well downgradient. The natural groundwater flow field is only locally influenced because no groundwater is extracted from the system. If the width of a plume is larger than the capture zone of a single well, several systems can be arranged in one line perpendicular to or along the length of a groundwater pollution plume. When applied as multiple systems arranged in this way, the capture zone of each well can be interlocked thus transforming the aquifer within this zone into a series of reactive cells. The distance between each system is determined from hydrogeological measurements in order to ensure that no water can pass without being caught and treated.

Thus, a line of several wells represents a Virtual Permeable Reactive Barrier, through which no contamination coming from upstream can pass without having first being treated.



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