

Passive in situ remediation using permeable reactive barrier for groundwater treatment

ABSTRACT

The contamination of water bodies from heavy metals, either from natural sources or anthropogenic sources, has become a major concern to the public. Industrial activities with improper water treatment, and then leach into the water body, have become contaminated and harmful to consume. Passive remediation is one of the treatments introduced to counter this problem as it is a low cost but effective technique. After being widely acknowledged and through research conducted, the most suitable remediation technique found is the permeable reactive barriers (PRBs). PRB is defined as an in situ permeable treatment zone filled with reactive materials, designed to intercept and remediate a contaminant plume under natural hydraulic gradients. There have been many findings made from PRB which can be used to remove contaminants such as heavy metal, chlorinated solvents, carbonates and aromatic hydrocarbons. The most crucial criteria in making a successful PRB is the reactive media used to remove contaminants. The current paper presents an overview of the PRB selective medias that have been used and also the unresolved issue on the long term performance of PRB. The overall methodology for the application of PRB at a given site is also discussed in this paper. This inexpensive but effective technique is crucial as a sustainable technology in order to treat the drainage before it enters water tables to prevent water pollution and can be used as an alternative raw water source.

Keyword: In situ; Heavy metal; Passive remediation; Permeable reactive barrier; Reactive media; Water pollution