HRC TECHNICAL BULLETIN H-2.7.4

Hydrogen Release Compound HRC™

The Formation of Vinyl Chloride Using HRC

We have sometimes been asked "will the use of HRC on chlorinated ethene compounds lead to the formation of vinyl chloride (VC)?" The answer is basically yes, but only as a transitional state as the dechlorination proceeds ultimately producing ethene. In all of the applications of HRC accomplished to date, not one of the sites created a buildup of vinyl chloride that persisted or moved off-site. In the event that there was such a site, a simple ORC oxygen barrier could be installed to degrade the vinyl chloride before leaving the treatment area.

VC is Produced Naturally

VC formation is a natural process. In the scope of natural attenuation, by all chemical processes both biotic and abiotic (reduction by metals), VC will form. Now, if we add organic substrates to the aquifer to accelerate natural attenuation – a sensible and cost effective strategy – we will accelerate the dechlorination process, temporarily forming VC from DCE as the degradation proceeds to ethene. Note that this is true for all organic substrates not just HRC, however, if one uses HRC with its consistent generation of low hydrogen concentrations, then the enhanced rate of VC formation will be minimized. This will effectively give the rate of VC degradation to ethene a chance to keep pace with the formation of VC itself.

VC Degrades Rapidly with Oxygen

As mentioned above, HRC has never been shown to stimulate a significant or permanent buildup of VC. However, in cases where site conditions do not allow the VC to have an adequate residence time in contact with the HRC, it is conceivable that the vinyl chloride could move off-site without conversion to ethene. In this rare case Regenesis recommends that a down gradient passive ORC oxygen barrier be installed, which will stimulate the rapid and complete mineralization of the vinyl chloride moving across the barrier zone. The use of ORC to rapidly degrade vinyl chloride is well documented and is summarized in TB 2.2.2.3 as well as others.