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Use of Activated Sodium Persulfate on Hard to Treat VOC Contaminants By Gary Cronk

In-situ chemical oxidation (ISCO) treatment using activated sodium persulfate has been proven in numerous field applications to be extremely effective in the treatment of hard to treat contaminants such as 1,4-Dioxane, methylene chloride, vinyl chloride, benzene, MTBE, TCE, 1,1-DCE and many other volatile organic compounds (VOCs). Sodium persulfate can be activated using a variety of techniques, including ferrous iron or chelated iron (transition metals), high pH, hydrogen peroxide (Fenton's type reaction) and/or heat (over 120 degrees F). Once activated, sodium persulfate produces sulfate radicals and other free radicals, depending on the activation technique, which are very effective in destroying VOC compounds. Activated persulfate can remain active in the subsurface for 30 to 40 days.

Recent analytical results from five ISCO treatment sites in California indicate that activated persulfate can achieve contaminant reductions on the order of 90% to 99% on the most common VOC contaminants in groundwater. At Site A, persulfate treatment was effective in reducing 1,4-Dioxane levels from 18,000 ug/l to 120 ug/l (99% reduction) after 231 days. Methylene chloride was reduced at Site B from 15,000 ug/l to 11 ug/l (99% reduction). At Site C benzene was reduced up to 99% and vinyl chloride was reduced up to 96%. At Site D, post treatment data have shown 84% reductions in MTBE. At Site E, TCE was reduced 94%, 1,1-DCE was reduced 99% and 1,4 Dioxane was reduced 98%.

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