Effect of Pitting Corrosion Promoters on the Treatment of 2,4-Dinitrotoluene Contaminated Water Using Integrated Reductive/Oxidative Processes

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Several States have ammunition production facilities listed in the Superfund National Priority List (NPL). Some of these NPL Sites include Alabama , Louisiana, and Longhorn (Texas) Army Ammunition Plants. Surface and groundwater contaminants of concern at these sites include 2,4,6 trinitrotoluene, 2,4 dinitrotoluene (DNT), 2,6-dinitrotoluene, nitrobenzene, and other nitroaromatic compounds (NACs). Application of zero valent metals has been proposed as an alternative for the treatment of NACs contaminated waters. Unfortunately, ZVMs cannot be used as a stand-alone technology for treating NACs contaminated waters because the reduction reaction by-products (nitroamines) that are produced are still of environmental concern and adsorb strongly onto the metal surface. Innovative and cost effective technologies are necessary for the complete mineralization of NACs during contaminated water remediation activities.

This research investigated the integration of zero-valent metals and advanced oxidation processes (AOPs) for treating 2,4-DNT contaminated water. AOPs are processes that rely on the generation of the hydroxyl radical, a powerful oxidizer, to degrade water contaminants. The presentation will include results on the effect of different pitting corrosion promoters on 2,4-DNT reduction kinetics by iron or manganese. A mechanism is proposed to explain the effect of the different pitting corrosion promoters on 2,4-DNT degradation. The effect of oxidizers on the degradation of 2,4-DNT reduction by-products was followed measuring total organic carbon degradation.