Fenton Oxidation of Constituents with Insensitive Munitions Formulation IMX-101

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Background/Objectives. Current treatment technologies for waters contaminated with insensitive munition (IM) compounds are inefficient or unsustainable. Additionally, the current state of the science regarding treatment technologies for these waters in limited. Currently, the industrial base relies heavily upon granular activated carbon (GAC) for treatment of industrial process waters containing compounds for the IM formulation IMX-101. Though GAC adsorption is a cost-efficient technology for process waters containing traditional munitions, it incurs a high treatment cost for streams containing IMX-101 because of the relatively high solubilities of the three components within the formulation. Alternative treatment technologies have been researched and evaluated.

Approach/Activities. Fenton oxidation has been evaluated as an alternative treatment technology for these streams based upon its operational cost and efficacy for transforming nitrotriazolone (NTO) and 2,4-dinitroanisole (DNAN); nitroguanidine (NQ) is impervious to this form of oxidation. Laboratory and small pilot evaluations of this technology have been conducted. Samples of industrial process waters containing IMX-101 from two load-assembly-pack (LAP) have been analyzed using Fenton oxidation.

Results/Lessons Learned. Similar results in terms of stoichiometry and reaction kinetics for NTO and DNAN were observed for the samples collected from both LAP facilities. The consistency between the two samples asserts the applicability of Fenton oxidation as an effective process water treatment technology.