Summary and Evaluation for White Phosphorus Remediation: A Literature Review

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Abstract: This report summarizes an extensive literature search that was conducted regarding the environmental fate of white phosphorus (WP) and applicable treatment technologies. The health risks associated with WP exposure, documented environmental effects, transformation processes, degradation products, and the potentially applicable treatment technologies will be identified and evaluated. WP contamination has been identified in soil and water at military training and munitions production facilities and is the third highest ranked contaminants of concern of the U.S. Army (Feige and Strauss 1994). Until recently, long-term environmental contamination from the explosion of projectiles containing WP was considered unlikely due to the thermodynamic instability of WP in the presence of atmospheric oxygen. However, Berkowitz et al. (1981), in assessing the potential hazards associated with the use of phosphorus smoke munitions, reported that WP residues in aquatic systems can be extremely toxic. Berkowitz stated that the deposition or washout of any undegraded WP, especially in small water bodies, may create exposure risks to resident finfish, invertebrates, and waterfowl, even if resultant WP concentrations are in the low ppb range. All these concerns motivated the Interagency Testing Committee (ITC) to designate WP for priority testing under the Toxic Substances Control Act (TSCA) (BNA Chemical Regulation Daily, 1994). The is a congressionally mandated committee comprised of representatives from more than a dozen Federal regulatory and research agencies. The ITC was established to make recommendations to the Environmental Protection Agency (EPA) regarding the chemical substances and mixtures to which the EPA would give priority consideration for the promulgation of rules. These rules are presented in 32 Code of Fed.

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