THREAT AGENT DEFEAT MODELING AND TESTING USING WMD SIMULANTS

Physical Property Review And Assessment Of Diisopropyl Methylphosphonate (DIMP)

Inge Corbin DTRA JSTO **Correy Vigil** DTRA RD-TSTS **John Furey** US Army Engineer Research and Development Center

A review of the physical properties of diisopropyl methylphosphonate (DIMP) was conducted and available data showed missing or conflicting information for basic physical parameters. Much of the literature is old (pre-1980) and focuses on detection of DIMP as a groundwater contaminant and its subsequent remediation. DTRA's tests focus on providing mass balance information by tracking the presence of DIMP and its breakdown products, and by providing post-test total phosphorus determination. DTRA's RD-TS group partnered with the US Army Corps of Engineers' ERDC lab to determine the solubility of DIMP in water and in a water-surfactant solution to assist in post-test cleanup and future analytical planning. In a second, separate test post-explosive defeat samples were collected from a sealed small-scale test article to determine if the gases produced posed hazards to cleanup personnel, and to test cleanup methods. ERDC also performed a mechanical compatibility evaluation of several gasket materials proposed for use in DTRA's UAS disseminator. DIMP was found to be fully miscible in water. Addition of 0.5% (v/v) non-phosphorus detergent was found to be effective in removing DIMP from test surfaces. Approximately one-third of DIMP products were chemically recoverable by GC/MS after extraction. Analysis of the aqueous rinsate by LC/MS was performed to determine additional recovery. For the mechanical compatibility evaluation, gaskets composed of several different types of material were immersed in DIMP for up to 24 hours and subjected to a qualitative fatigue test to determine how well the different materials resist attack. The results of these tests are presented here.

Thanks to Dr Anthony Bednar, Mr Charles Laber, and Mr Caleb Farrar for facilitating and providing analytical support.