

## **SIMULATION OF CHEMICAL AGENT EXPULSION BY PENETRATING WEAPONS THROUGH THE USE OF SMALL SCALE TESTING**

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The proliferation of weapons of mass destruction by Third World countries has required the U.S. to develop computer models of the expulsion and Transport of chemical agent clouds from attacks on chemical weapon facilities. Such models can be used to minimize collateral effects on friendly forces and non-combatants. These models can be based on the theoretical physical and chemical response of the agents, but are usually much more accurate after they have been validated -with experimental data. Tests were conducted at 1/6 scale to provide experimental data to validate the computer models. The tests were conducted in a reusable, steel structure. The tests addressed three structural configurations:

- (1) Underground bunker (confined explosion),
- (2) frangible structure (semi-confined explosion), and
- (3) ammunition dump (unconfined explosion).

The chemical simulant used was triethyl phosphate, which has physical properties similar to certain nerve agents. The measurements include the internal pressure and temperature, the mass of agent retained. the amount of rare earth chemical expelled, the size and velocity of expelled droplets and t , he infrared spectra of the expulsion cloud. The tests define the fraction of agent expelled. the droplet properties and the chemical composition of the expulsion cloud for each scenario.