DF (METHYLPHOSPHONIC DIFLUORIDE)

Pine Bluff Arsenal produced the precursor chemical methylphosphonic difluoride, or DF, at its Integrated Binary Production Facilities (IBPF) in the late 1980s and early 1990s as part of the United States' Binary Chemical Weapons Program. Binary munitions contain two non-lethal chemicals that mix together in flight to form a lethal chemical.

Operators placed DF, a clear non-lethal liquid chemical with a pungent acid-like odor, inside a M20 canister. The M20 canister was designed for insertion into an artillery projectile on the battlefield. The projectile also contained a M21 canister filled with a solution of isopropyl alcohol and isopropylamine (OPA). Once fired, disks in the canisters would rupture allowing the DF and OPA to mix, forming GB nerve agent. The projectile consisted of a steel body containing a burster, fuze and two plastic-lined, hermetically sealed metal canisters. The explosive burster would shatter the projectile's steel body, spreading agent onto a target area. This artillery projectile was the only binary chemical munition produced. International treaties now ban the production and stockpiling of chemical weapons and call for their destruction, including binary chemical munitions.

DF Storage

Officials stored the projectiles containing the M21 canisters separate from the M20 canisters at Deseret Chemical Depot, Utah, and Umatilla Chemical Depot, Oregon. The destruction of the artillery projectiles and M21 OPA-filled canisters ended in 1999 at Hawthorne Army Depot, Nevada. All M20 canisters and several 55-gallon drums of DF were sent to Pine Bluff Arsenal for destruction.

WHAT COMPOUNDS WERE IN DF NEUTRALENTS?

DF neutralent contained:

- about 70 percent water
- about 20 percent methylphosphonic acid
- nearly 9 percent hydrogen fluoride
- trace amounts of sodium fluoride

Processing DF Neutralent

DF, a clear, non-flammable liquid, has a strong acid-like odor. The compound can be combined with a second component to form the nerve agent sarin (GB). To destroy DF, operators add water to react with DF. The waste water that results from the process, while now free of DF, will contain hazardous byproducts that require additional treatment before disposal. The estimated 155,000 gallons of DF neutralent waste were shipped to Texas Molecular, Inc. in Deer Park, Texas, for treatment.

For the chemical treatment, the Army renovated an existing building into the Pine Bluff Binary Destruction Facility (PB BDF). PB BDF neutralization operations began December 2005, treating the canisters and drums of DF using neutralization, combining water with the DF. DF neutralization operations ended in April 2006.

After completing its QL destruction mission in September 2006, the Army demolished the PB BDF in accordance with U.S. international obligations. Destruction was completed in December 2006.

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