

Explosive Destruction System (EDS)

Fact Sheet

A Transportable System for Safe Destruction of Legacy Chemical Weapons

Sandia National Laboratories, under the sponsorship of the U.S. Army Nonstockpile Chemical Materiel Program, has designed and successfully tested the EDS Phase 1 – a transportable system which safely disposes of recovered chemical warfare materiel in an environmentally sound manner.

EDS was designed for use with WWI and certain WWII vintage chemical warfare materiel (CWM).

The system was designed to be useful in three distinct scenarios:

- When a chemical munition is deemed unsafe to transport or store by routine means
- When a stored munition is determined to be unsafe for continued storage
- When the limited quantity of munitions requiring destruction do not justify the use of other destruction systems

System Components

The EDS, pictured above, consists of the following components:

- An oscillating vessel which contains the blast and fragments, and serves as the container for the chemical neutralization process
- A system of linear and conical charges to open the munition
- A chemical storage and feed system that supplies reagents and water to the containment vessel
- A waste handling system for draining and storage of the treated effluent

The entire EDS system is mounted on an open flatbed trailer, making it easily transportable for rapid response to emergency situations.



How It Works

The munition is placed in the EDS's fragment suppression cylinder and then secured in the containment vessel by trained Explosive Ordnance Disposal personnel. The hinged door is the same diameter as the containment vessel, allowing for easy insertion and removal of munitions and debris.

Once enclosed in the EDS, the munition is opened and the burster destroyed with a combination of linear and conical shaped charges. The use of such charges is a simple, safe, well-understood practice that is exceptionally reliable and requires minimal access through the containment vessel wall.

Once exposed, the chemical agents are treated with a low-temperature, low-pressure method that relies on chemistries developed by the U.S. Army. Treatment takes place inside the containment vessel, so there is no transfer or release of untreated chemical agent.

Liquid effluent is drained into standard 55 U.S. gallon drums. Gaseous overpressure is vented through a silica gel/ASZM-TEDA carbon filter. All resulting waste can be disposed of at commercial hazardous waste facilities.

Proven Performance

In October, 1999 the EDS Phase I was transported to Porton Down, England to conduct tests on recovered WWI-era munitions. Sandia performed qualification tests on the system, and the U.S. Army then conducted follow-on engineering and operational tests in collaboration with Edgewood Chemical Biological Center and the United Kingdom Defense Evaluation and Research Agency.

The Porton Down testing included trials using phosgene and mustard-filled munitions. Tests were designed to prove not only the effectiveness of the EDS munitions treatment system, but also the robustness and efficacy of the EDS major components.

Pre-trials verified the effectiveness of operator training and demonstrated EDS's capability to explosively access munitions, and introduce reagent into the oscillating containment vessel.



*Above: A mock 75mm munition with linear shaped charge in place.
Below: the same munition, post test.*



Following the successful pre-trials, EDS successfully treated 19 old phosgene or mustard-filled munitions including Stokes Mortars, 4.2-inch, and 4.5-inch munitions. In addition a cylinder containing approximately one pound of Sarin nerve agent was successfully treated.

The Porton Down tests demonstrated the ability of EDS to provide total containment and treatment of chemical munitions. It also tested the ability of the EDS to be operated in an environment similar to what can be expected when it is deployed, and that existing procedures, training, and crew size are adequate for EDS operation.

Following the testing at Porton Down, EDS was returned to the U.S. where it was called into service to safely destroy sarin nerve gas bomblets discovered at Rocky Mountain Arsenal.

EDS Called To Action

Between October 16th and November 20th, 2000, cleanup crews found six grapefruit-sized sarin nerve gas bomblets in a pile of scrap metal at Rocky Mountain Arsenal.

The arsenal, located between Denver, Commerce City, and Denver International Airport, is a Superfund site where the army once produced nerve and mustard gases and napalm. Five years ago the arsenal was named a national wildlife refuge. It has become a critical wintering area for bald eagles, and regularly hosts nature classes for local school children.



Three of the six M139 bomblets found at Rocky Mountain Arsenal.

When the bomblets were discovered, news sources cited frightening statistics on sarin gas, including references to the 1995 sarin gas attack in a Tokyo subway that killed 12 people.

The Army's initial response was a recommendation to destroy the bomblets by detonating them in the open air. Public concern and the Colorado Department of Public Health and Environment demanded a different solution. On December 1st, the EDS was chosen as the technology to dispose of the bomblets.

By February 10th, all six bomblets had been successfully destroyed without endangering nearby residents or wildlife. The EDS and the Army received high praise from news sources, government officials, and the public.

For more information contact

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