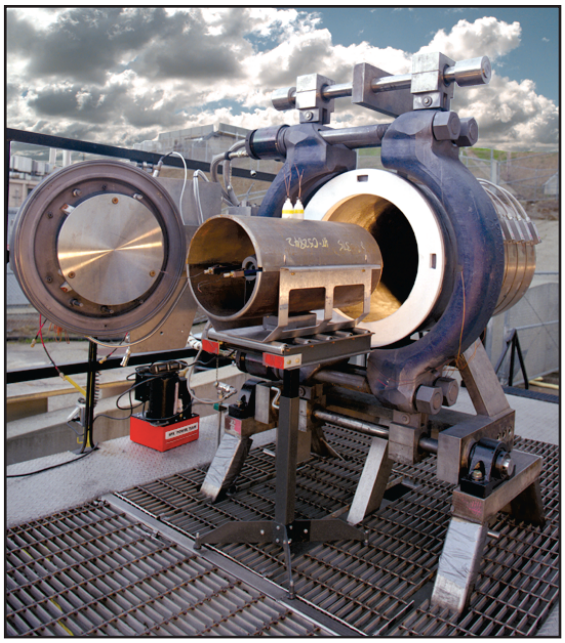
Explosive Destruction System (EDS)

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 demonstrated EDS, 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 in an environmentally sound manner.

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, or 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 door.

Once exposed, the agent is neutralized with caustic chemicals inside the containment vessel, so there is no transfer or release of untreated agent. The effluent is then disposed of in an environmentally sound manner.

Proven Performance

Sandia performed qualification tests on the system prior to delivery of the first system to the U.S. Army in 1998. The U.S. Army conducted developmental tests with the United Kingdom Defense Evaluation and Research Agency, Edgewood Chemical Biological Center and Sandia. The system was transported to Porton Down, England, to demonstrate total containment and treatment of recovered WWI-era munitions containing phosgene or mustard. In addition, a cylinder containing approximately one pound of sarin nerve agent was successfully treated.

In 2003, a second-phase system demonstrated the capability of handling larger 155mm projectiles and

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8-inch projectiles, as well as the capacity to treat multiple, smaller 90mm projectiles at one time (usually three at once).

In March, 2003, the team returned to Porton Down, England with this larger version and successfully destroyed more than 30 munitions and/or bottles filled with chemical agent.

These pictures are an example of a multiple shot using three 90mm munitions.

Four EDS units were fabricated and more than 100 munitions or bottles containing a chemical agent were destroyed in the first five years of the program alone. A fifth EDS system which will be the second of the larger version, was ordered for delivery at the end of 2004.

EDS Called to Action

EDS was first called to action after cleanup crews found six grapefruit-sized sarin nerve gas bomblets in scrap metal at the Rocky Mountain Arsenal in the fall of 2000. By Feb. 10, 2001, all six bomblets were successfully destroyed without endangering nearby residents or wildlife. EDS and the Army were praised by the media, government and public. In July 2001, the EDS safely destroyed an additional four sarin bomblets at the same site.

The following year EDS destroyed a 4.2-inch mortar containing phosgene that was found in a farmer's field in Gadsden, Alabama, on land that was previously owned by Camp Sibert, a WWII Army training base.

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

Then in May 2003 EDS treated 15 75mm mustard-filled mortars recovered at the Spring Valley subdivision of Washington, D.C. During WWI the area was a chemical weapon development and testing site operated by American University's extension service. Following the first recovery of aging munitions there in 1993, the Army estimates that there are more than 100 possible buried munitions sites in the U.S.

EDS also conducted operations for cleanup at Edgewood Arsenal at the Army's Aberdeen Proving Ground in Maryland. Based on the demonstrated increased throughput from destroying multiple rounds in one shot, the Army anticipates additional use of EDS systems for cleanup at military installations. The mission will be expanded to include destruction of non-explosively configured munitions held in non-stockpile storage.

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