

CHEMICAL DEMILITARIZATION (CHEM DEMIL)



Army ACAT IC Program

Total Number of Stockpile Disposal Systems:	9
Total Program Cost (TY\$) for Stockpile Disposal:	\$11.8B
Total Number of Non-Stockpile Disposal Systems (6 types):	<u>15 total</u>
- EDS-1, EDS-2	3, 4
- MAPS	1
- MMAS	3
- MMD-1	1
- PBAFF	1
- RRS	2
Total Program Cost (TY\$) for Non-Stockpile Disposal:	\$1.32B

Prime Contractors:

Johnston Atoll - Washington Group	Pine Bluff, AR - Washington Group
Tooele, UT - EG&G	Aberdeen, MD - Bechtel
Anniston, AL - Westinghouse Anniston	Newport, IN - Parsons
Umatilla, OR - Washington Group	Pueblo, CO - TBD
<u>Non-Stockpile:</u> Teledyne Brown	Blue Grass, KY - TBD

SYSTEM DESCRIPTION & CONTRIBUTION TO JOINT VISION 2020

The Chemical Demilitarization (Chem Demil) program is responsible for the destruction of 100 percent of the U.S. stockpile of lethal chemical agents and munitions by April 29, 2007. The Chem Demil program is managed by the U.S. Army and consists of three separate projects:

- Chemical Stockpile Disposal Project
- Alternative Technology and Approaches Project
- Non-Stockpile Chemical Materiel Project

The *Chemical Stockpile Disposal Project* is responsible for destruction of the U.S. stockpile of unitary chemical weapons. A chemical weapon destruction facility has been or will be constructed at each of the nine stockpile storage sites. The first five facilities use incineration technology.

Incineration disposal facilities:

1. Johnston Atoll Chemical Agent Disposal System: operational
2. Tooele Chemical Agent Disposal Facility (UT): operational
3. Anniston Chemical Agent Disposal Facility (AL): under construction
4. Umatilla Chemical Agent Disposal Facility (OR): under construction
5. Pine Bluff Chemical Agent Disposal Facility (AR): under construction

Neutralization disposal facilities:

6. Aberdeen Chemical Agent Disposal Facility (MD): under construction
7. Newport Chemical Agent Disposal Facility (IN): in design

Alternative disposal technologies still to be determined:

8. Pueblo Chemical Agent Disposal Facility (CO)
9. Blue Grass Chemical Agent Disposal Facility (KY)

Ninety percent of the unitary chemical stockpile is now under contract for destruction.

The *Alternative Technology and Approaches Project* is responsible for conducting pilot testing of alternative destruction technologies. By law, the U.S. Army and the National Research Council (NRC) completed a detailed examination of alternatives to the baseline chemical weapons disassembly and incineration process. The NRC recommended that the Army continue the current baseline incineration program at the sites that were operational or under construction while evaluating potential alternative technologies for bulk chemical agent destruction. The Army elected to use chemical neutralization of agent followed by post-treatment of the neutralized products at the Aberdeen and Newport facilities.

At the direction of Congress, the Army established the *Assembled Chemical Weapons Assessment (ACWA) Program* in 1996. This program is separate from Chem Demil, and was designed to evaluate alternative technologies for the Pueblo and Blue Grass disposal facilities. The *ACWA Program* provided a supplemental report to Congress on October 1, 1999, which contained the demonstration results of alternative technologies. The final destruction method for the Pueblo and Blue Grass facilities is still under consideration. The Army is working Environmental Impact Statements for these sites.

The *Non-Stockpile Chemical Materiel Project* is responsible for the destruction of non-stockpile chemical warfare materiel, including the components of binary chemical weapons, miscellaneous chemical warfare materiel, recovered chemical weapons, former production facilities, and buried chemical warfare materiel. The following distinct hardware systems are under development, each requiring its own developmental and operational testing:

- The Explosive Destruction System (EDS-1 and EDS-2): A mobile capability designed to explosively open chemical agents; contain their blasts, fragments, and contents; and destroy the chemical agent contents in a safe and environmentally compliant manner. EDS-2 will be able to destroy larger scale munitions.

- The Mobile Munitions Assessment System (MMAS): Designed to store and transport U.S. Army Technical Escort Unit equipment and personnel to a recovered munitions site where they will be able to identify the condition and contents of recovered munitions and other containers suspected of containing chemical warfare agents. MMAS assesses the suspect munition on-site without opening and with minimal disturbance to the recovered munition.
- The Munitions Assessment and Processing System (MAPS) (one of two fixed facility replacements for the Munitions Management Device Version 2): A controlled system to allow for separation of chemical payload from an explosively/non-explosively configured munition; decontaminate munition bodies; and destroy the explosively configured bodies. MAPS will be a fixed facility at Aberdeen Proving Ground only.
- The Munitions Management Device Version 1: A transportable system designed to destroy recovered non-explosively configured chemical warfare materiel, up to the size of a 500-pound chemical weapon.
- The Pine Bluff Arsenal Fixed Facility (one of two fixed facility replacements for the Munitions Management Device Version 2): Will be developed to destroy recovered explosively/non-explosively configured chemical warfare materiel as well as bulk items. This facility will be independent of the Pine Bluff Chemical Agent Disposal Facility.
- The Rapid Response System: A transportable system designed to destroy Chemical Agent Identification Sets (CAIS). CAIS are glass tubes that contain small amounts of diluted chemical agent or industrial chemicals that simulate chemical agents. CAIS were developed to train military forces on the proper procedures for identifying chemical agents.

The Chemical Demilitarization Program supports the *Joint Vision 2020* concept of *full dimensional protection* by placing the United States in compliance with the Chemical Weapons Convention (CWC). The protections afforded by compliance with the CWC are twofold: the elimination of the United States' chemical weapons stockpile and related chemical warfare materiel removes a significant peacetime safety hazard while the CWC's binding international treaty protections and penalties reduce the threat of chemical weapons use against the United States' military and people.

BACKGROUND INFORMATION

The Chem Demil program was placed under OSD oversight as an Acquisition Category (ACAT) ID Major Defense Acquisition Program in December 1994. The Chem Demil program designation was changed to ACAT IC in March 1998.

At the time that the Chem Demil program came under OSD oversight, the first disposal facility at Johnston Atoll had already completed testing and was operational (May 1993), and systemization testing at the second disposal facility at Tooele, UT was ongoing. Systemization testing is an end-to-end test that uses surrogate chemicals in place of actual chemical agents. Since systemization testing had started before the program came under OSD oversight, it was conducted without an OSD-approved Test and Evaluation Master Plan, and DOT&E did not perform an independent evaluation. However, DOT&E reviewed the evaluation monitored by the U.S. Army Materiel Systems Analysis Activity and concurred with its conclusion that there were no issues to preclude the start of operations. The Tooele Chemical

Agent Disposal Facility was declared operational and began operations with chemical agents in August 1996. As of September 24, 2000, the Johnston Atoll and Tooele facilities had successfully destroyed approximately 21 percent of the total U.S. chemical weapons stockpile (originally 31,496 agent tons).

A separate TEMP is required for each of the remaining seven *Chemical Stockpile Disposal Project* sites. OSD approved the TEMP for the Anniston facility on July 15, 1999.

The *Chemical Demilitarization Program* is beyond Milestone III, and a Beyond Low Rate Initial Production report is not required.

TEST & EVALUATION ACTIVITY

The *Chemical Stockpile Disposal Project*: Systemization testing (i.e., end-to-end testing with surrogate chemical agent) will begin at the Umatilla, Anniston, and Pine Bluff facilities as construction at each site is completed. Component level developmental testing is already in progress at these sites. The Umatilla and Anniston facilities are scheduled to begin chemical disposal operations in December 2001 and January 2002, respectively. Pine Bluff operations are scheduled to begin in August 2003. DOT&E is an active member of the Systemization Integrated Process Team, which reviews test planning activities for these facilities. The Army developed TEMPs for the Umatilla, Aberdeen, and Newport sites, which are currently in coordination within the Department of the Army before submission to OSD for formal approval. OSD approved the Aberdeen TEMP in November 2000. When the Umatilla TEMP is approved, the Army plans to begin developing the Pine Bluff TEMP.

The *Non-Stockpile Chemical Materiel Project*: In June 2000, DOT&E approved the Army's Overarching Test Concept Plan for the Non-Stockpile Chemical Materiel Project. The Overarching Test Concept Plan was developed in lieu of a TEMP based on agreement between representatives from OSD and the U.S. Army.

- The Explosive Destruction System (EDS): An extended series of initial developmental tests using a prototype EDS-1 system were conducted at Porton Down, United Kingdom (UK), from May-July 2000. This developmental testing was conducted using phosgene and mustard agent munitions supplied by the UK. Several hardware and process deficiencies were identified during this testing, which was not unusual for an early developmental prototype. This testing has shown the value of employing actual agent materiel early in the testing process. A second phase of engineering development testing is currently being conducted in the UK after which the Army plans to relocate the EDS-1 prototype to Aberdeen Proving Ground to conduct a pre-operational survey with simulant followed by operational testing with phosgene and mustard agent. EDS-2, which can handle larger-scale munitions, is still under development.
- The Mobile Munitions Assessment System (MMAS): MMAS operational testing was conducted over a two-week period from November 16, 1999-December 3, 1999 at Aberdeen Proving Ground. The U.S. Army Materiel Systems Analysis Activity (AMSAA) published an Independent Evaluation Report in June 2000, recommending that MMAS be released for operational use by the U.S. Army Technical Escort Unit. There were no major discrepancies identified during the testing, but there were numerous suggestions for improvement. DOT&E observed portions of the operational testing and concurs with the report's

recommendations. The Program Manager subsequently approved MMAS for operational use.

- The Munitions Management Device Version 1 (MMD-1): Developmental testing using live phosgene agent at Dugway Proving Ground began on June 27, 2000. During testing of the first four phosgene rounds, testing had to be stopped several times due to a minor leak and several hardware failures and processing problems that necessitated maintenance actions and in one case a configuration change. The Project Manager truncated further MMD-1 phosgene testing pending reassessment of the MMD-1 system. A pre-operational survey with mustard simulant, followed by a developmental test using live mustard agent, is planned to begin in December 2000. Test results will be used to help develop the Pine Bluff Arsenal Fixed Facility for disposal of various chemical agents at that location.
- The Rapid Response System: On September 22, 2000, the state of Utah approved the permits to begin chemical operations developmental and operational testing with live Chemical Agent Identification Sets at the Deseret Chemical Depot in Utah.
- The Munitions Assessment and Processing System and the Pine Bluff Arsenal Fixed Facility are still in early development. No operational test activities have been conducted to date.

TEST & EVALUATION ASSESSMENT

U.S. Army testing of stockpile and non-stockpile systems in the *Chemical Demilitarization Program* has been adequate to ensure the safe and efficient disposal of the inventory of chemical warfare materiel. The *Chemical Stockpile Disposal Project* management staff has developed thorough TEMPs for the stockpile incineration disposal facility at Umatilla and the stockpile neutralization facilities at Aberdeen and Newport. As previously noted, these TEMPs are currently in coordination within the Department of the Army before delivery to OSD for approval, with the exception of the Aberdeen TEMP, which has already been approved.

The U.S. Army has made considerable progress in resolving previously identified shortfalls in several *Non-Stockpile Chemical Materiel Project* systems, including the Rapid Response System, the Munitions Management Device Version 1, and the Mobile Munitions Assessment System. Analysis of the test results of the pre-operational surveys and operational testing revealed significant progress in resolving operating procedures and training shortfalls identified earlier in these systems. The U.S. Army Materiel Systems Analysis Activity is thoroughly evaluating the non-stockpile systems prior to beginning operational testing with live chemical agent and is providing independent recommendations to the *Non-Stockpile Chemical Materiel Project* office.

Since originally assessing the validity of the Operational Verification Test at the Johnston Atoll facility and systemization testing at the Tooele facility, DOT&E has continued to monitor operations at these facilities. On May 8, 2000, an agent emission that exceeded State of Utah permit levels occurred at the Tooele Facility, resulting in suspension of activities. Four independent investigations were conducted by the U.S. Army, the Utah Department of Environmental Quality, the on-site operations contractor (EG&G), and the Center for Disease Control and Prevention. Corrective actions were identified and implemented, and the Tooele facility restarted chemical agent disposal operations on September 20, 2000. The system designs for the disposal facilities under construction at Umatilla, Anniston, and Pine Bluff are incorporating lessons learned from the Johnston Atoll and Tooele facilities.

As previously noted, initial developmental testing of the non-stockpile Explosive Destruction System demonstrated the value of testing with live chemical agent early in the development process. In the case of EDS, one incident included degradation of the seals by corrosive action of the agent and condensation of agent in unexpected places, leading to leaks when the chamber was opened. Pre-operational surveys with simulant could not have demonstrated this same chemical reaction. Obviously, the earlier these problems are detected, the earlier they can be corrected to ensure safe and efficient operations. Tests with live chemical agent are scheduled in the formal operational tests, consistent with each state's permitting processes.