

CHEMICAL DEMILITARIZATION (CHEM DEMIL)



Army ACAT IC Program

Total Number of Systems: 9
Total Program Cost (TY\$): \$13.8B

Prime Contractors

JCADS - Raytheon	Aberdeen, MD - Bechtel
TOCDF - EG&G	Newport, IN - Parsons
Anniston, AL - Westinghouse	NSCMP - Teledyne Brown
Umatilla, OR - Raytheon	Other Sites - TBD
Pine Bluff, AR - Raytheon	

SYSTEM DESCRIPTION & CONTRIBUTION TO JOINT VISION 2010

The Chemical Demilitarization (Chem Demil) program is responsible for the destruction of all U.S. chemical warfare related materiel, including the U.S. stockpile of unitary chemical weapons. The program is designed to ensure maximum protection to the environment, general public, and personnel involved in the destruction effort. Chem Demil is managed by the U.S. Army and consists of three separate projects:

The *Chemical Stockpile Disposal Project* is responsible for destruction of the U.S. stockpile of unitary chemical weapons. A chemical weapon destruction facility will be constructed at each of the nine stockpile storage sites. The current technology uses manual unpacking, automated disassembly, and incineration of agent, explosives, metal, and dunnage in four separate incinerators, followed by exhaust gas processing through separate pollution abatement systems. Currently, only the Johnston Atoll Chemical Agent Disposal System and the Tooele Chemical Agent Disposal Facility (Utah) are operational.

The *Alternative Technology and Approaches Project* is responsible for conducting pilot testing of alternative destruction technologies that will be implemented in future chemical weapon destruction facilities at Newport, IN and Aberdeen, MD.

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.

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 August 1997.

Upon completion of the Operational Verification Test of the Chemical Stockpile Disposal Project at the Johnston Atoll Facility, the U.S. Army declared the facility operational in March 1993 (prior to the OSD oversight designation). The U.S. Army concluded that future *Chemical Stockpile Disposal Project* facilities using Johnston Atoll Facility technology would be required to successfully pass systemization testing rather than an Operational Verification Test prior to being declared operational. Systemization testing is essentially an end-to-end operational test, except for the use of surrogate chemicals in place of actual chemical agents.

DOT&E reviewed the Johnston Atoll Facility Operational Verification Test results. The Operational Verification Test was adequate to address the Johnston Atoll Facility's operational performance. Mitre (McLean, VA) was contracted by the U.S. Army to provide an independent assessment of the Operational Verification Test. DOT&E agreed with the findings of their summary report published May 1993: "there are no apparent fundamental safety, environmental, or process-related problems in utilizing the technology on Johnston Island for disposal of chemical munitions."

Systemization testing of the Tooele Chemical Agent Disposal Facility, the second *Chemical Stockpile Disposal Project* facility, commenced in August 1993 and concluded in June 1996. Systemization testing of the Tooele Chemical Agent Disposal Facility was ongoing at the time the Chem Demil program was placed under OSD oversight; therefore, testing was conducted without an OSD approved TEMP and DOT&E did not perform an independent evaluation. DOT&E observed the testing and reviewed the evaluation of the U.S. Army Materiel Systems Analysis Activity, which serves as the U.S. Army's independent evaluator for Chem Demil. DOT&E reviewed and concurred with the U.S. Army Materiel Systems Analysis Activity's conclusion that there were no issues precluding the start of operations. The Tooele Chemical Agent Disposal Facility was declared operational by the U.S. Army and began operations with chemical agents in August 1996.

A separate TEMP is required for each succeeding *Chemical Stockpile Disposal Project* site. The TEMP for the Anniston, AL site was approved by OSD on July 15, 1999. A formal TEMP has not been submitted to DOT&E for approval of any additional *Chemical Stockpile Disposal Project* sites. The *Chemical Stockpile Disposal Project* is beyond Milestone III and a B-LRIP report is not required.

During 1996, the Alternative Technology and Approaches Project performed technical testing and evaluation of several alternative technologies for the two bulk storage sites at Aberdeen Proving Ground, MD and Newport Chemical Activity, IN. DOT&E observed the testing and reviewed the evaluation. DOT&E approved the Alternative Technology and Approaches Project TEMP in September 1996. In January 1997, a decision was made to authorize further planning steps for the implementation of alternative technology pilot plants at Aberdeen Proving Ground and Newport Chemical Activity, to

demonstrate agent destruction with the neutralization process followed by on-site or off-site post-treatment.

At the direction of Congress, the Army established the Assembled Chemical Munitions program in 1996. This program is separate from Chem Demil and was designed to evaluate alternative technologies for the Pueblo, CO and Blue Grass, KY sites. The Assembled Chemical Munitions program provided to Congress on October 1, 1999, a supplemental report containing the demonstration results of alternative technologies. However, no decision has been made as to which destruction method will be implemented by the *Chemical Stockpile Disposal Project* for each site.

The *Non-Stockpile Chemical Materiel Project* will be conducted as a set of independent projects at over 60 sites utilizing a site-specific combination of mobile and fixed equipment and facilities. A total of six distinct hardware systems are planned, each requiring their own developmental and operational testing. Instead of an overarching TEMP, a test concept plan outlining test strategy for each separate system, with respect to the requirements for all *Non-Stockpile Chemical Materiel Project* sites, will be submitted for DOT&E approval. A formal test concept plan has not been submitted to DOT&E, but draft versions with comments have been provided for review.

TEST & EVALUATION ACTIVITY

DOT&E approved a TEMP for the Anniston site. Work on development of the *Non-Stockpile Chemical Materiel Project* test concept plan continued in FY99. The ATAP is continuing to make adequate progress in technical development testing, leading to final development of pilot plants for the Aberdeen Proving Ground and Newport Chemical Activity sites.

The *Non-Stockpile Chemical Materiel Project* Rapid Response System underwent an end-to-end operational test using agent simulants in January 1999. This test is referred to as a pre-operational survey by the program office. This test is required for all *Non-Stockpile Chemical Materiel Project* systems handling an agent prior to beginning operational testing with an agent. The Rapid Response System underwent a second pre-operational survey in November 1999. The *Non-Stockpile Chemical Materiel Project* Munitions Management Device, Version 1, underwent a pre-operational survey in July 1999. The *Non-Stockpile Chemical Materiel Project* Mobile Munitions Assessment System underwent its planned final operational test and evaluation from November-December 1999.

The Chem Demil program is not Y2K compliant at this time; however, the Program Office has certified the Johnston and Tooele facilities as Y2K compliant. The Program Office is completing all activities and does not expect any issues to prevent the program from moving forward as scheduled.

TEST & EVALUATION ASSESSMENT

As of September 26, 1999, the operational Johnston Atoll Facility and Tooele Chemical Agent Disposal Facility have successfully destroyed 16.1 percent of the U.S. chemical weapons stockpile. The Johnston Atoll Facility is projected to complete operations in 1QFY01. The Tooele Chemical Agent Disposal Facility is projected to complete operations in 4QFY03.

In January 1997, higher than expected levels of polychlorinated biphenyls were detected during M-55 rocket trial burns. Polychlorinated biphenyls are covered under the Toxic Substance Control Act permit, which is being processed as a national permit covering all sites. The state of Utah has imposed

additional requirements as part of the approval process for full-rate production of the Deactivation Furnace System, which is required to process M-55 rocket fuel. Included in these requirements was a set of trial burn runs. The Tooele Chemical Agent Disposal Facility has successfully passed its required trial burns for full-rate production of the Deactivation Furnace System. In addition, the Tooele Chemical Agent Disposal Facility has received Environmental Protection Agency approval to resume processing the remaining M-55 rockets. Full-rate production of the Metal Parts Furnace at the Tooele Chemical Agent Disposal Facility began in June 1998.

The Chem Demil program has encountered a variety of munition and agent specific problems. These problems realistically could not have been foreseen during developmental testing with inert, simulant-filled munitions prior to operational verification testing. When actual agents were used at Johnston Atoll Facility for operational verification testing, process engineering problems were experienced which impacted throughput. A critical lesson learned for future test and evaluation of other *Chemical Stockpile Disposal Project* sites is to focus on site-specific munitions and processes previously untested, while developing adequate measures to assess end-to-end operational performance adapted to each site. To ensure that the facility is operationally effective and suitable, states permitting tests that use chemical agents should be included with systemization testing in the formal operational tests. The current Anniston site TEMP includes these new, site-specific procedures for agent testing as part of operational testing, and adequately addresses site-specific munitions and end-to-end measures of operational performance.

Test and evaluation of the remaining *Chemical Stockpile Disposal Project* sites will not commence until completion of the construction of the facilities. Construction has begun at the Anniston, AL, Umatilla, OR, and Pine Bluff, AK sites. The Pueblo, CO and Blue Grass, KY sites are effectively on hold until the destruction technology method recommendations from the separate Assembled Chemical Munitions program are received.

The Army has elected to pursue the use of on-site biodegradation for post treatment at Aberdeen Proving Ground, with the exception of non-water soluble volatile organic products that will be treated off-site. Additionally, the Army has decided to pursue super-critical water oxidation for post-treatment at the Newport Chemical Activity. Operational testing of both sites will commence with completion of construction of the on-site facilities.

The results of the January 1999 Rapid Response System pre-operational survey revealed a large number of operational shortfalls, specifically in personnel training and site operational procedures—most of which require correction prior to the PM releasing the system for operational testing with chemical agents. The number of findings, and the length of time required to correct the identified shortfalls, has necessitated conducting a second Rapid Response System pre-operational survey in November 1999 to address whether previously identified operational shortfalls have been corrected. Analyses of the test results are in progress. Evaluations of the test results for the Munitions Management Device, Version 1, pre-operational survey and Mobile Munitions Assessment System planned final OT&E are in progress.