United States General Accounting Office

GAO

Report to Congressional Committees

May 2000

CHEMICAL WEAPONS DISPOSAL

Improvements Needed in Program Accountability and Financial Management

GAO

Accountability * Integrity * Reliability

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Abbreviations

DCAA	Defense Contract Audit Agency
DFAS	Defense Finance and Accounting Service
DOD	Department of Defense
FEMA	Federal Emergency Management Agency

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Congressional Committees

The Department of Defense's (DOD) program to destroy chemical agents and munitions has been controversial from its inception and has experienced delays, cost increases, and management weaknesses. Recently, concerns over the financial management of the program surfaced following a review by the Office of the Under Secretary of Defense (Comptroller), which suggested that significant portions of prior years' appropriations remained unliquidated.

This report responds to mandates contained in the National Defense Authorization Act for Fiscal Year 2000 and the House Report No. 106-244 on DOD's Appropriations Act for Fiscal Year 2000 and to a request from the Chairmen of the Subcommittees on Defense and Foreign Operations, Senate Committee on Appropriations, to report on the management of the program. Accordingly, this report discusses whether (1) the program will meet the Chemical Weapons Convention's time frames within the costs projected, (2) obligations and liquidations of funds appropriated for the program have been adequately managed, and (3) the management structure of the program allows for coordinated accountability of the program.

We are sending copies of this report to Senators Pete V. Domenici, Frank R. Lautenberg, Joseph I. Lieberman, Fred Thompson, and Charles S. Robb and to Representatives John R. Kasich and John M. Spratt, Jr., in their capacities as Chair or Ranking Minority Member of cognizant Senate and House Committees and Subcommittees. We are also sending copies of this report to the Honorable William S. Cohen, Secretary of Defense; the Honorable William J. Lynn, Under Secretary of Defense (Comptroller); the Honorable Louis Caldera, Secretary of the Army; the Honorable James Lee Witt, Director, Federal Emergency Management Agency; and the Honorable Jacob Lew, Director, Office of Management and Budget. Copies will also be made available to others upon request.

GAO contacts and key contributors to this report are listed in appendix IV.

David R. Warren, Director
Defense Management Issues

List of Congressional Committees

The Honorable John W. Warner, Chairman
The Honorable Carl Levin
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United States Senate

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House of Representatives

The Honorable C.W. Bill Young, Chairman
The Honorable David R. Obey
Ranking Minority Member
Committee on Appropriations
House of Representatives

Executive Summary

Purpose

In 1985, the Congress required the Department of Defense to carry out the destruction of the U.S. stockpile of chemical agents and munitions and establish an organization within the Army to manage the disposal program. Over time, the Congress also directed the Department of Defense to dispose of chemical warfare materiel not included in the stockpile and to research and develop technological alternatives for disposing of chemical agents and munitions. Under the United Nations-sponsored Chemical Weapons Convention ratified by the U.S. Senate in 1997, the Department of Defense agreed to dispose of its 31,496-ton stockpile of chemical weapons stored throughout the United States and its territories. The convention requires that the chemical stockpile and chemical warfare materiel, such as recovered chemical weapons and training sets, be destroyed by April 29, 2007. The Department of Defense has spent approximately $6.2 billion and estimates that it will spend another $8.7 billion on its disposal efforts under the Chemical Demilitarization Program.

In response to recent congressional concerns about the financial management of the Chemical Demilitarization Program, GAO assessed whether (1) the program will meet the convention's time frames within the costs projected, (2) obligations and liquidations of funds appropriated for the program have been adequately managed, and (3) the management structure of the program allows for coordinated accountability of the program.

Background

In section 1412 of the Department of Defense Authorization Act for Fiscal Year 1986 (P.L. 99-145),[1] the Congress directed the Department of Defense to destroy the U.S. stockpile of lethal chemical agents and munitions that existed on the date of the legislation's enactment. The stockpile consisted of nerve and mustard agents contained in rockets, bombs, projectiles, spray tanks, and bulk containers. These items are stored at eight sites in the continental United States and on Johnston Atoll in the Pacific Ocean. Since then, disposal activities have evolved into the Chemical Demilitarization Program, which comprises the following five elements:

[1] 50 U.S.C. 1521.

Chemical Stockpile Disposal Project. This project was set up in 1988 to destroy the stockpile of unitary chemical weapons[2] stored at eight sites in the continental United States and on Johnston Atoll in the Pacific Ocean. The method chosen for destruction was incineration.

Chemical Stockpile Emergency Preparedness Project. This project was set up in 1988 to help communities in 10 states near the chemical stockpile storage sites and the associated Army installations enhance existing emergency management and response capabilities in the unlikely event of a chemical stockpile accident.

Nonstockpile Chemical Materiel Product. This project was set up in 1993 to identify, locate, and destroy binary chemical weapons,[3] miscellaneous chemical warfare materiel, recovered chemical warfare materiel, and former production facilities and identify and locate buried chemical warfare materiel.

Alternative Technologies and Approaches Project. This project was set up in 1994 to develop and support testing of two technologies for neutralizing chemical agents at two sites that store only large containers holding one type of agent.

Assembled Chemical Weapons Assessment Program. This program was established under congressional direction in 1997 to identify and test two or more technologies (other than incineration) for destroying assembled chemical weapons. Such weapons include fuzes, explosives, propellants, chemical agents, shipping and firing tubes, and packaging materials.

Several different offices within the Office of the Secretary of Defense and the Department of the Army share management roles and responsibilities for the five elements of the Chemical Demilitarization Program. The Assistant Secretary of the Army (Acquisition, Logistics, and Technology) oversees the chemical stockpile, nonstockpile, and alternative technologies projects. The Assistant Secretary of the Army (Installations and Environment) and the Federal Emergency Management Agency oversee

[2] A unitary chemical weapon is a munition containing a single lethal chemical agent.

[3] Binary weapons are formed from two nonlethal elements through a chemical reaction after the munitions are fired or launched. The weapons are manufactured, stored, and transported with only one of the chemical elements in the weapon. The second element is to be loaded into the weapon at the battlefield.

the emergency preparedness project. The Agency manages the emergency preparedness activities in the civilian communities, and the U.S. Army Soldier and Biological Chemical Command manages similar activities on the Army installations. The Under Secretary of Defense (Acquisition and Technology) oversees the assembled chemical weapons program.

On April 24, 1997, the Senate ratified the Chemical Weapons Convention, committing the United States to dispose of its unitary chemical weapons stockpile, binary chemical warfare materiel, recovered chemical warfare materiel, and former chemical weapons production facilities by April 29, 2007. If a country is unable to meet the convention's deadline, the convention's Organization for the Prohibition of Chemical Weapons may grant an extension of up to 5 years.

Results in Brief

The Army had destroyed approximately 17.7 percent of the chemical weapons stockpile as of January 31, 2000, and could destroy about 90 percent of the stockpile by the convention's 2007 deadline, given its recent progress and projected plans. However, the Army may not meet the deadline for the remaining 10 percent of the stockpile because the incineration method of destruction has not been acceptable to two of the states where the chemical stockpile is located. Additionally, some of the nonstockpile materiel may not be destroyed before the deadline because the proposed method of destruction has not been proven safe and effective and accepted by state and local communities. The Army's $14.9 billion estimate for program costs will likely increase due to (1) the additional time required to develop and select disposal methods for the remaining 10 percent of the stockpile and for some of the nonstockpile chemical materiel and (2) possible delays in demolition of a former chemical weapons production facility.

The Army has experienced significant problems in recent years in effectively managing the use of funds appropriated for the Chemical Demilitarization Program. The Army reported that as of September 30, 1999, $498 million (16.1 percent) of the $3.1 billion appropriated for the program in fiscal years 1993-98 was unliquidated.[4] During the review, GAO examined the transactions for which most of these obligations were recorded, a type of interagency order known as a military interdepartmental purchase request.[5] In an assessment of these interagency orders that account for $495.1 million (99.4 percent) of the unliquidated obligations, GAO found that $63.1 million (12.7 percent) had been liquidated but was not recorded in accounting records or included in financial reports prepared by the Defense Finance and Accounting Service. Of the remaining $432 million, most was for work completed but not yet billed by the contractor or verified by the Defense Contract Audit Agency or for work in progress but not yet completed. In addition, program officials could not explain why $10.4 million of the $432 million had not been liquidated. Some obligations remain unliquidated due to a lack of attention to and a fragmented structure for managing program activities and tracking liquidations, failure to liquidate obligations on completed contracts and deobligate excess funds, and program delays. The Army has begun to improve its management of funds appropriated for the program.

[4] Federal agencies must have budget authority prior to incurring obligations of appropriated funds. Obligations are the amounts of orders placed, contracts awarded, services received, and similar transactions during a given period that will require disbursements (payments) during the same or future period. As services are rendered or goods delivered, an agency makes the required disbursements to liquidate the obligation. Appropriation laws usually make budget authority available for one or more fiscal years but do not require agencies to liquidate obligations during the specific years the budget authority is available. The liquidation can occur after the appropriation has expired but must occur prior to closing the account—5 years after the appropriation has expired.

[5] These interagency orders are used by the program offices (ordering agency) to obtain goods and services from another agency (the servicing agency), such as the U.S. Army Corps of Engineers or the U.S. Army Soldier and Biological Chemical Command, that has the capability or expertise necessary to perform the needed work. The servicing agency in turn typically awards contracts to third parties, uses its existing contracts, or uses its own resources to fill the order. The orders are made on either a reimbursable order basis or by advancing funds of the ordering agency. For reimbursable orders, the ordering agency obligates funds upon acceptance of the order by the servicing agency. These obligations are liquidated as the servicing agency bills the ordering agency for the work performed under the contract or as the servicing agency completes the work itself and payments are made. For direct orders, once the servicing agency accepts the order, funds from the ordering agency are obligated and advanced for the resulting contract or for the work done by the servicing agency. The obligation is liquidated as payments are made to the contractor or the servicing agency as work is performed.

However, it has not consistently implemented improvements across the program, and it is too soon to assess the effect of these improvements.

Effective management of the Chemical Demilitarization Program has been hindered by its complex management structure and ineffective coordination among program offices and with state and local officials. In addition, coordination and communication among officials responsible for elements of the program have been inadequate, thus causing confusion about what actions would be taken at certain sites. Further, officials of the Departments of Defense and the Army have not agreed on whether or when management roles, responsibilities, and accountability should be consolidated for destruction of the chemical stockpiles in Kentucky and Colorado. Consequently, state and local officials have expressed concern that no single office is accountable for achieving the desired results of the Chemical Demilitarization Program's activities.

GAO is making recommendations to address problems noted involving financial and program management and coordination and accountability.

Most of the Chemical Stockpile and Nonstockpile Materiel Could Be Destroyed by the Convention's Deadline

Despite early delays in the destruction program, the Army could destroy about 90 percent of its stockpile of chemical agents and munitions and most of its nonstockpile chemical warfare materiel[6] before the Chemical Weapons Convention's 2007 deadline. The convention contains provisions that, if granted, could extend the deadline by as much as 5 years to 2012.

[6] Because nonstockpile chemical materiel includes a large variety of items, such as recovered chemical weapons and materiel and former production facilities, the Army is unable to assign percentages to the total amount of nonstockpile materiel destroyed.

The Army has made progress toward establishing the capabilities needed to destroy the stockpile and, absent unanticipated delays, could destroy about 90 percent of the chemical stockpile before the convention's 2007 deadline. It now has two operational destruction sites, at Johnston Atoll and Tooele, Utah, that have incinerated about 17.7 percent of the original chemical stockpile. These two sites accounted for 49.7 percent of the original stockpile. The Army has also begun constructing chemical disposal facilities at five other sites—Aberdeen, Maryland; Anniston, Alabama; Newport, Indiana; Pine Bluff, Arkansas; and Umatilla, Oregon.[7] These sites account for approximately 40.4 percent of the stockpile. The Army has selected incineration as the method of destruction of the chemical stockpile in Alabama, Arkansas, and Oregon, and state and local governments have agreed to this method. In Maryland and Indiana, the states have agreed to test neutralization technologies as an alternative to incineration and have granted permits for the construction of full-scale pilot facilities. Because of the testing, these sites may experience some initial delays in their destruction of chemical weapons, but the Army still expects to meet the 2007 deadline.

Two sites—Blue Grass, Kentucky, and Pueblo, Colorado—are unlikely to meet the 2007 deadline. These two sites account for about 10 percent of the original stockpile. Recent program schedules show that operations using alternative technologies at the two sites would not begin until after the 2007 deadline because of the time needed to validate, certify, and obtain approval of the technologies. Even if it decided to use incineration as the method of destruction, the Army would have difficulty obtaining the environmental permits from the states in time to meet the 2007 deadline.

The Army has destroyed a large portion of its nonstockpile chemical warfare materiel. However, it may not meet the 2007 deadline for destroying some recovered chemical warfare materiel. The methods developed by the Army for destroying this materiel have not been proven safe and effective and have not been approved by state and local communities. In addition, the Army may not meet the deadline for demolition of part of a former chemical weapons production facility because it must destroy the chemical weapons stockpiled there first. Any delay in the stockpile disposal may push demolition operations past the deadline.

[7] The proposed disposal facilities in Maryland and Indiana will pilot test alternative technologies selected under the Alternative Technologies and Approaches Project.

Costs for the Chemical Demilitarization Program are likely to exceed the Army's estimate of $14.9 billion. This estimate does not include the costs associated with likely delays in destruction of the stockpile in Kentucky and Colorado and delays in destroying nonstockpile materiel. Also, the Army has not developed a reliable baseline to estimate costs to clean and close chemical stockpile disposal facilities and adjacent areas. In response to congressional direction, the Army has implemented cost-reduction initiatives to reduce contract costs and reduce costs associated with extended state and local processes for obtaining environmental permits.

The Army Has Not Adequately Managed the Liquidation of Program Funds

The Army has not adequately managed program activities and tracked disbursements to ensure the timely liquidation of funds appropriated for the Chemical Demilitarization Program. This has occurred because of a lack of attention to and a fragmented organizational structure for managing program activities and tracking liquidations, delays in recording financial transactions and untimely liquidation of obligations under completed contracts, and delays in program schedules. The Army reported that as of September 30, 1999, $498 million (16.1 percent) of the $3.1 billion appropriated for the program in fiscal years 1993-98 was unliquidated. In an assessment of obligation documents that accounted for $495.1 million, or 99.4 percent of the unliquidated balance, GAO found that $63.1 million (12.7 percent) had been liquidated but was not recorded in accounting records or included in financial reports prepared by the Defense Finance and Accounting Service. Of the remaining $432 million, most was for work completed but not yet billed by the contractor or verified by the Defense Contract Audit Agency or for work being done but not yet completed. In addition, program officials could not explain why $10.4 million of the $432 million had not been liquidated.

Program officials have historically placed a priority on the timely obligation of appropriations and paid much less attention to tracking liquidations of obligations. During GAO's review, program officials could not readily determine whether unliquidated obligations were for completed or ongoing efforts and admittedly gave little priority to deobligating excess funds under completed or closed contracts. In addition, several different entities were responsible for managing program activities and tracking the dispersal of funds. In some cases, this has caused confusion as to who was accountable for liquidating obligations and deobligating excess funds.

Delays in reporting transactions in the defense accounting records and financial reports have contributed to the magnitude of unliquidated

obligations. Such delays were generally due to the time contractors took to validate and process liquidations and the time the Defense Finance and Accounting Service took to record them. Other unliquidated obligations were due to the amount of time contractors took to submit their final bills after completing work or the time the Defense Contract Audit Agency took to review and approve costs associated with completed contracts. Finally, delays in program schedules have resulted in unliquidated obligations. Program officials have underestimated the time it would take to obtain states' approvals for permits to construct destruction facilities. For example, permits to construct disposal facilities in Oregon, Alabama, and Arkansas took longer than anticipated to obtain, and the program office could not liquidate construction and procurement obligations for these sites until it obtained the approvals to start construction. In addition, obligations could not be liquidated due to technical and contractual delays.

The Army could liquidate some of its obligations soon, as it has recently obtained permits to construct destruction facilities at five of the stockpile sites. Additionally, actions by the Congress and the Office of the Under Secretary of the Defense (Comptroller) to reduce the funding requested for the program have decreased the amount of funds available for obligation and better aligned funding with the program's execution. This will decrease the likelihood that these funds will be obligated far in advance of when they are needed.

The Army has begun to improve its management of obligations and liquidations of appropriated funds for the destruction program. For example, the Program Manager for Chemical Demilitarization recently required the managers for stockpile, nonstockpile, and alternative technology projects to report monthly on obligations, disbursements, and planned and actual cost information. However, at the time of GAO's review, these improvements have not been consistently and systematically implemented across all program elements, and program officials could not explain why $10.4 million had not been liquidated.

Complex Structure and Ineffective Coordination Hinder Program Effectiveness

Effective management of the Chemical Demilitarization Program has been hindered by its complex management structure and ineffective coordination among program offices and with state and local officials. Several changes in the organization and structure of the program during 1997-99, including some changes to implement legislative requirements, divided the management roles, responsibilities, and accountability among offices at several different levels within the Departments of Defense and

the Army. In addition, coordination and communication among managers of the various elements of the program have been inadequate. Further, officials of the Departments of Defense and the Army have not agreed on whether or when management roles, responsibilities, and accountability should be consolidated for destruction of the chemical stockpiles in Kentucky and Colorado. Consequently, state and local officials have expressed concern that no single office is accountable for achieving the desired results of the Chemical Demilitarization Program's activities. The Congress has also expressed concern about the management of the program.

Some state and local officials have expressed concern because they have received conflicting information about the program and because no single office is clearly accountable for the execution of the program. For example, according to state and local officials, spokespersons for the Chemical Stockpile Disposal Project and the Assembled Chemical Weapons Assessment Program have made conflicting and inconsistent statements about the possible disposal methods for the chemical stockpile stored in Kentucky and Colorado. Consequently, the perception is that the program lacks a single vision for accomplishing its objectives effectively. To complicate matters, Department of Defense and Army officials have not decided on whether or when management roles, responsibilities, and accountability should be consolidated for destruction of the chemical stockpiles in Kentucky and Colorado. Whatever the decision is, closer cooperation will be needed between the two program elements.

GAO also found instances where coordination and communication among project managers for the program was inadequate. For example, as previously discussed, the Program Manager for Chemical Demilitarization's efforts to improve the office's management of program funds have not been consistently and systematically implemented across all program elements. In another case, officials of the stockpile and nonstockpile projects in Arkansas were not coordinating their efforts to obtain environmental permits and approvals for their disposal operations.

The Congress has expressed concern over the management of the Chemical Demilitarization Program. In the Department of Defense Appropriations Act for Fiscal Year 2000,[8] the Congress directed the Secretary of Defense to report on the management of the Chemical Demilitarization Program, including an assessment of the Assembled Chemical Weapons Assessment Program. Some in the Congress have also expressed concern that, in recent budget submissions, the Department of Defense included the budget for the Chemical Demilitarization Program as part of the Army's budget. In its report for the National Defense Authorization Act for Fiscal Year 2000,[9] the House Armed Services Committee reaffirmed its belief that, as required by the original statute establishing the program, chemical demilitarization funds should be set forth in a Defense Department-wide budget account to emphasize that destruction of the chemical weapons stockpile is a national issue that affects the entire Department.

Recommendations

GAO recommends that the Secretary of Defense monitor the Army's actions to

- develop a systematic approach for ensuring the timely, effective expenditure of funds appropriated for all elements of the Chemical Demilitarization Program and
- direct program officials to account for the $10.4 million in unliquidated obligations that they could not give an explanation for, or explain why the obligations have not been liquidated.

In addition, GAO recommends that the Secretary of Defense direct the Secretary of the Army to clarify the management roles and responsibilities of program participants, assign accountability for achieving program goals and results, and establish procedures to improve coordination among the program's various elements and with state and local officials.

[8] Public Law 106-79 section 8159.

[9] House Report No. 106-162, page 63.

Agency Comments and GAO's Evaluation

The Department of Defense and the Federal Emergency Management Agency provided separate, written comments on a draft of this report. Both agencies generally agreed with the report's findings and recommendations.

In its comments on the draft report, the Department of Defense agreed with GAO's recommendations to develop a systematic approach for ensuring the timely, effective expenditure of funds appropriated for all elements of the Chemical Demilitarization Program and direct program officials to account for the $10.4 million in unliquidated obligations that they could not explain. However, the Department disagreed that the Secretary of Defense should direct the Secretary of the Army to implement the recommendations because the Army's Program Manager for Chemical Demilitarization had already initiated implementation actions. Given these actions and the long-standing nature of the concerns raised in the draft report, GAO modified the recommendations to call for the Secretary of the Defense to monitor the actions to ensure that the Army completes them fully and in a timely way and that appropriate results are obtained. The Department of Defense concurred with the last recommendation in the draft report, which called for more management accountability.

The Federal Emergency Management Agency concurred with the recommended principle of a systematic approach for ensuring the timely, effective expenditure of funds and elaborated on its actions to implement the principle behind the recommendation. Because the recommendation to account for the $10.4 million in unliquidated obligations pertains to the Army, the Agency had no comment on that recommendation. To the extent that the Chemical Demilitarization Program management impacts state and local emergency preparedness, the Federal Emergency Management Agency concurred with last the recommendation, which called for more management accountability.

The comments of the Department of Defense and the Federal Emergency Management Agency are presented in their entirety in appendixes II and III, respectively. The two agencies also provided technical clarifications, and where appropriate, GAO incorporated them in the report.

Introduction

Since World War I, the United States has maintained a stockpile of chemical agents and munitions to deter the use of chemical weapons against its troops. From 1917 through the 1960s, obsolete or unserviceable chemical agents and munitions were disposed of by fire in an open pit, burial, and dumping in the ocean. However, because of public concern about the potential effects of these methods of disposal on public health and the environment, they were discontinued during the 1970s. In 1985, the Congress required the Department of Defense (DOD) to carry out the destruction of the U.S. stockpile of chemical agents and munitions and establish an organization within the Army to be responsible for the disposal program. Over time, the Congress also directed DOD to dispose of chemical warfare materiel not included in the stockpile and to research and develop technological alternatives for disposing of chemical agents and munitions. In April 1997, the U.S. Senate ratified the U.N.-sponsored Chemical Weapons Convention, effectively agreeing to dispose of the chemical stockpile weapons and chemical warfare materiel by April 29, 2007. If a country is unable to maintain the convention's disposal schedule, the convention's management organization may grant an extension of up to 5 years.

Elements of the Chemical Demilitarization Program

Since the 1980s, DOD's chemical weapons disposal activities have evolved into the current program, known as the Chemical Demilitarization Program. It now consists of the Chemical Stockpile Disposal Project, the Chemical Stockpile Emergency Preparedness Project, the Nonstockpile Chemical Materiel Product, the Alternative Technologies and Approaches Project, and the Assembled Chemical Weapons Assessment Program.

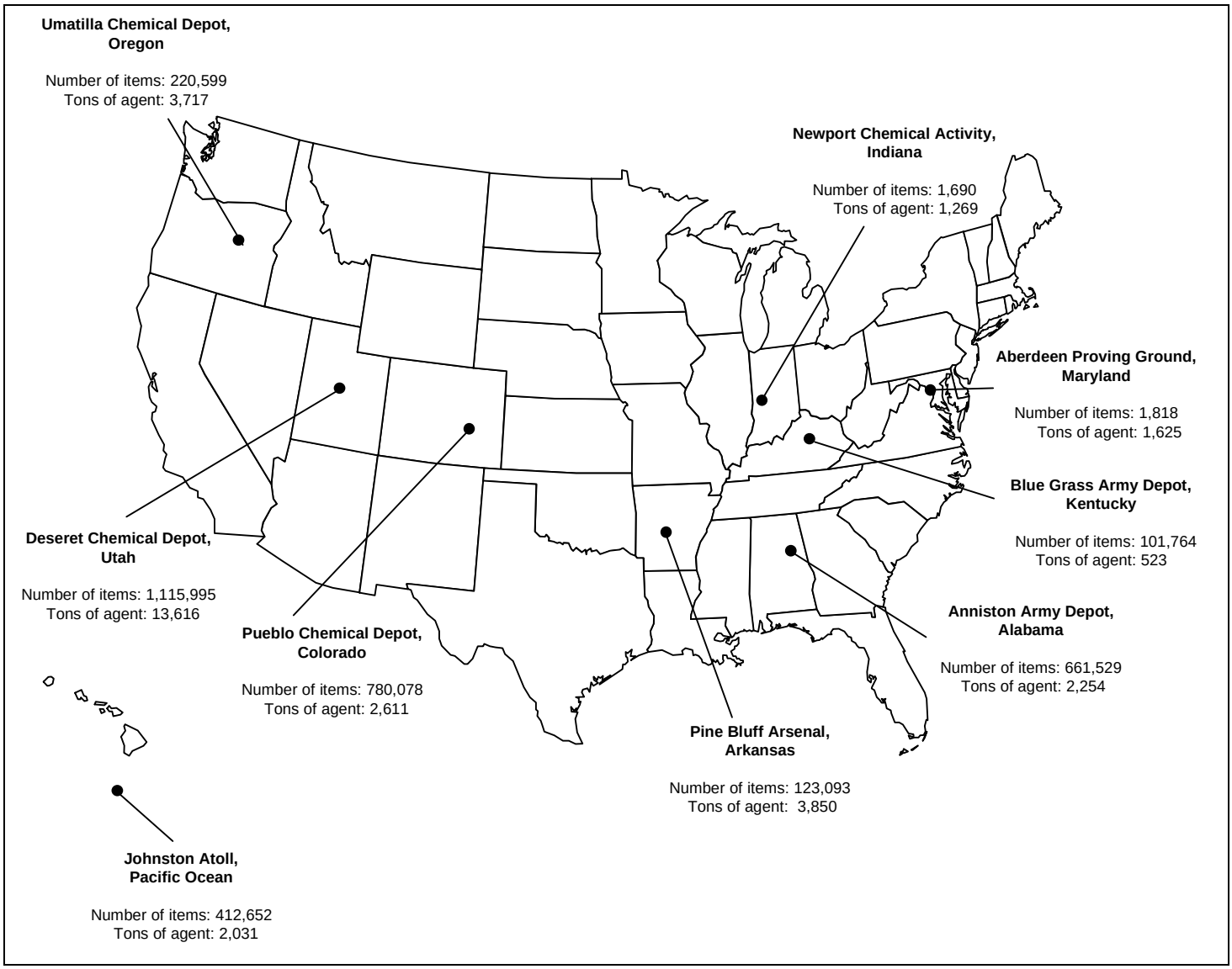
Chemical Stockpile Disposal Project

In section 1412 of the Fiscal Year 1986 Department of Defense Authorization Act (P.L. 99-145),[1] the Congress directed DOD to destroy the U.S. stockpile of lethal chemical agents and munitions that existed on the date of the legislation's enactment. The original stockpile consisted of 31,496 tons of nerve and mustard agents contained in rockets, bombs, projectiles, spray tanks, and bulk containers. Some munitions contained nerve agents, which can disrupt the nervous system and lead to loss of muscular control and death. Others contained a series of mustard agents that blister the skin and can be lethal in large amounts. The stockpile is

[1] 50 U.S.C. 1521.

stored at eight sites in the continental United States and on Johnston Atoll in the Pacific Ocean, as shown in figure 1.

Figure 1: Original Stockpile of Chemical Agents and Munitions (prior to the start of disposal operations at Johnston Atoll in June 1990)



Note: Program officials consider the original stockpile to be those chemical agents and munitions that existed before the start of disposal operations at Johnston Atoll in June 1990.

Source: Program office for chemical demilitarization.

In 1988, the Army formally announced its Chemical Stockpile Disposal Project and stated that incineration on site at each of the existing stockpile locations was the preferred disposal method. The objectives of the program are to (1) destroy the stockpile of chemical weapons and (2) provide maximum protection to the environment, the public, and personnel involved in the storage, handling, and disposal of the stockpile. To destroy the weapons, the Army uses a "reverse-assembly" procedure that drains the chemical agent from the weapons and takes apart the weapons in the reverse order of assembly. Once disassembled, the chemical agents and weapons are incinerated in separate furnaces.

As of January 30, 2000, the Army had incineration-based disposal operations under way at two sites, had destroyed approximately 17.7 percent of the original chemical stockpile, and had started construction of disposal facilities for future disposal operations at five other sites. The two operational disposal facilities are at the following locations:

- Johnston Atoll is located in the Pacific Ocean about 825 miles southwest of Hawaii. The Army completed construction of its baseline incineration disposal facility in July 1988 and started incineration operations in June 1990. It is the world's first full-scale facility designed specifically for the disposal of chemical weapons and is the prototype plant for the destruction program. The stockpile at Johnston Atoll originally contained 2,031 tons of nerve and mustard agents and represented 6.4 percent of the original stockpile.
- Deseret Chemical Depot is located about 22 miles south of Tooele, Utah. The Army completed construction of the disposal facility in August 1993 and started incineration operations in August 1996. The Army considers this disposal facility to be a first generation incineration facility, and as at the Johnston Atoll facility, it expects to apply lessons learned from its operations to other disposal sites. The Deseret stockpile originally contained 13,616 tons of nerve and mustard agents, representing 43.2 percent of the original stockpile.

Three other baseline incineration disposal facilities are under construction. In June 1997, the Army started construction of both the Umatilla facility, located about 7 miles from Hermiston, Oregon, and the Anniston facility, located about 50 miles east of Birmingham, Alabama. The Umatilla stockpile contains 3,717 tons of nerve and mustard agents, or 11.8 percent of the original stockpile. The Anniston stockpile contains 2,254 tons of nerve and mustard agents, or 7.2 percent of the original stockpile. These

facilities are scheduled to begin destroying agents in late 2001 or early 2002. Construction of the Pine Bluff facility, located about 35 miles southeast of Little Rock, Arkansas, started in 1999. The Pine Bluff stockpile contains 3,850 tons of agents, or 12.2 percent of the original stockpile. The Army plans to begin destroying chemical agents at the Pine Bluff facility in late 2003.

Chemical Stockpile Emergency Preparedness Project

In 1988, DOD established the Chemical Stockpile Emergency Preparedness Project to help communities in 10 states near the stockpile storage sites enhance their emergency management and response capabilities in the unlikely event of a chemical stockpile accident. The project, a companion to the Chemical Stockpile Disposal Project, is necessary to help protect the civilian population, workers, and the environment until disposal of the chemical stockpile is complete. Since 1988, the Army and the Federal Emergency Management Agency (FEMA) have assisted the civilian communities in the vicinity of the eight chemical stockpile storage locations and the storage installations in enhancing their emergency response capabilities. In 1997, the Army and FEMA implemented a management structure under which FEMA assumed responsibility for off-post (civilian community) program activities, while the Army continued to manage on-post chemical emergency preparedness and to provide technical support for both on- and off-post activities. FEMA, with its long-standing knowledge and experience in preparing for and dealing with emergencies of all kinds, provides its expertise, guidance, training, and other support to the civilian community. The Agency also administers the grant funds provided to the states and counties where stockpile facilities are located in order to carry out the program's off-post activities.

Nonstockpile Chemical Materiel Product

Recognizing that the stockpile program did not include all chemical warfare materiel, the Congress directed DOD to plan for the disposal of materiel not included in the stockpile.[2] Consequently, DOD implemented the Nonstockpile Chemical Materiel Product to identify the locations, types, and quantities of chemical materiel not included in the stockpile; develop and implement disposal and transportation methods and procedures; and develop plans, schedules, and cost estimates to implement the program. This materiel, some of which dates as far back as World War I,

[2] The National Defense Authorization Act for Fiscal Year 1993 (P.L. 102-484, sec. 176).

consists of binary chemical warfare materiel, miscellaneous chemical warfare materiel, recovered chemical warfare materiel, former production facilities, and buried chemical warfare materiel. These items are described in table 1.

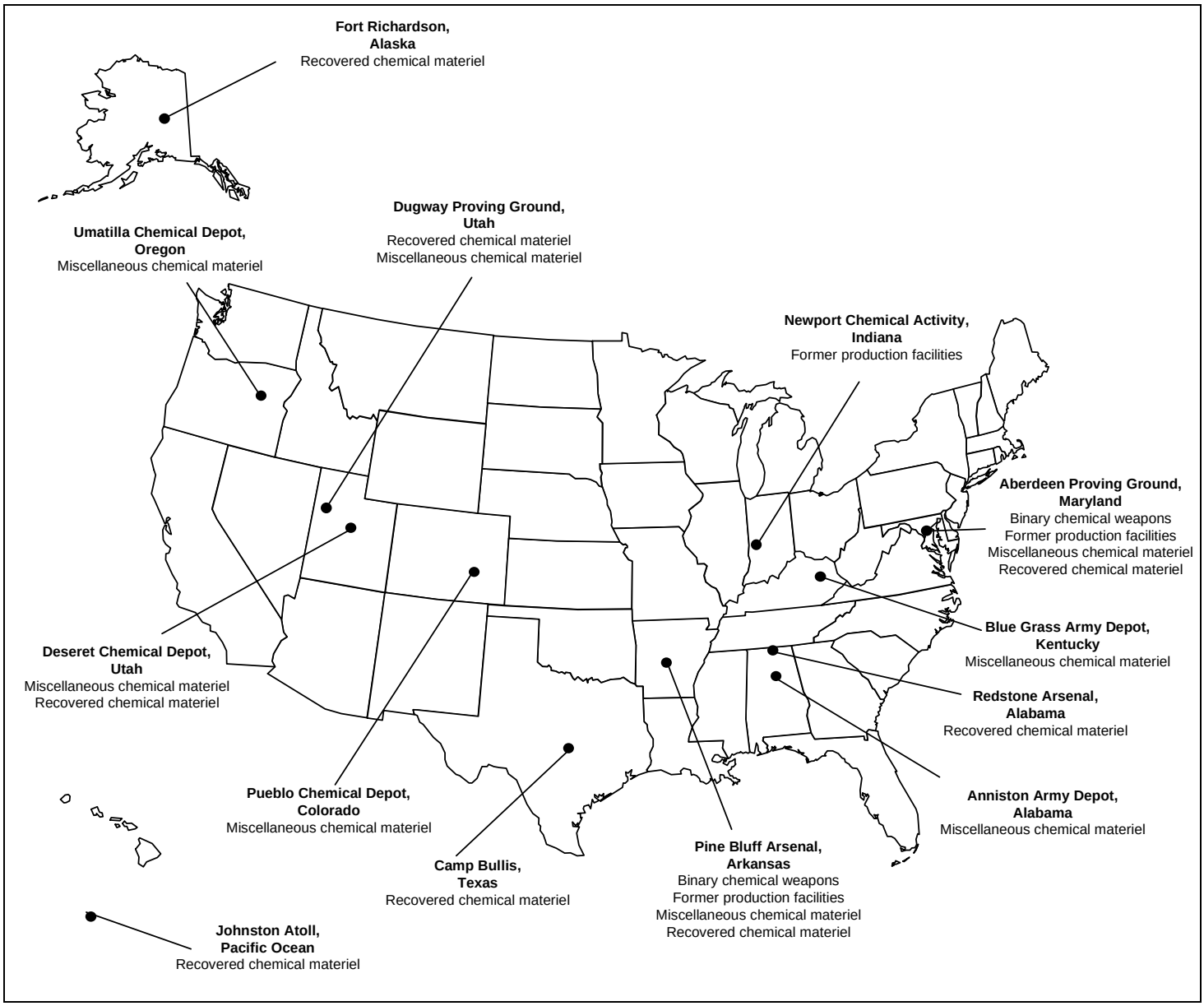
Table 1: Nonstockpile Chemical Materiel

Category	Description
Binary chemical warfare materiel	Binary chemical weapons form lethal chemical agents from two less toxic elements through a chemical reaction during flight to a target. Binary weapons were manufactured, stored, and transported with only one chemical element in the weapon. The second chemical element was to be loaded into the weapon at the battlefield.
Miscellaneous chemical warfare materiel	• Unfilled munitions, devices, and equipment specifically designed for use in the deployment of chemical weapons. • Empty ton containers formerly used to store chemical agents. • Chemical samples such as agents transferred from a research project or from leaking munitions into glass vials, metal cylinders, steel bottles, and ton containers to ensure safe storage of agent.
Recovered chemical warfare materiel	Items that were recovered from range-clearing operations, chemical burial sites, and research and development test areas. The handling and disposal of recovered chemical weapons are difficult because the weapons are more likely to have deteriorated than other nonstockpile materiel, and the identity of the agent is unknown in some of the items. Most recoveries involve very small quantities of materiel and include chemical containers such as training sets, glass bottles, metal containers, artillery projectiles, mortar cartridges, and bombs.
Former chemical weapons production facilities	Prior to 1968, these facilities produced chemical agents, their precursors, and components for chemical weapons or were used for loading and filling chemical munitions.
Buried chemical warfare materiel	Until the late 1950s, disposal by burial was an accepted and approved practice. In most cases, the materiel was burned or chemically neutralized before burial. Although the actual amount, agent, and types of materiel are unknown, the Army estimates that there are 100 known or suspected burial locations in 38 states and 2 U.S. territories. Some locations have multiple burial sites; the Army has identified approximately 227 known or suspected sites.

Source: Program office for nonstockpile chemical materiel.

The locations of the nonstockpile chemical materiel, as of January 31, 2000, are shown in figure 2.

Figure 2: Nonstockpile Chemical Materiel (as of Jan. 31, 2000)



Note: No disposal operations are being conducted at the recovered chemical materiel sites.

Source: Program office for nonstockpile chemical materiel.

Since the early 1990s, the Army has undertaken research and development on several transportable systems that are designed to identify, access, and treat chemical agents in nonstockpile munitions and decontaminate the containers and munitions. All disposal methods are to comply with federal and the affected state's environmental and safety regulations. Until recently, the Army emphasized the use of transportable treatment systems because of the relatively small quantities and the characteristics of nonstockpile chemical weapon materiel located at a potentially large number of sites through the country.

Alternative Technologies and Approaches Project

In November 1991, because of public concern about the safety of incineration, the Army requested the National Research Council to evaluate potential technological alternatives to the baseline incineration process. In the 1993 Defense Authorization Act (sec. 173), the Congress directed the Army to use the Council's evaluation and report on potential technological alternatives to incineration. The Congress also directed the Army to consider safety, environmental protection, and cost-effectiveness when evaluating alternative technologies. Consequently, in August 1994, the Army initiated the Alternative Technologies and Approaches Project, a more aggressive research and development program, to investigate, develop, and support the testing of two technologies based on chemical neutralization of chemical agents at the bulk-only stockpile sites—Aberdeen, Maryland, and Newport, Indiana. The project focused on these two sites because they have only one type of chemical agent stored in large steel bulk containers. The Army is conducting this project in conjunction with the baseline incineration program.

In 1997, the project proceeded with full-scale pilot testing of the neutralization technologies at the following two stockpile sites:

- Edgewood Chemical Activity is located at the Edgewood Area of the Aberdeen Proving Ground, north of Baltimore, Maryland. The Aberdeen stockpile consists of 1,625 tons (or 5.2 percent of the original stockpile) of mustard agent stored in 1,818 ton containers. These containers are designed for safe storage of bulk chemical agents and do not have fuzes, warheads, or other explosive devices. The disposal technology being tested at Aberdeen is neutralization followed by the biodegradation process.[3] The environmental permit was obtained from the state in February 1999, enabling the start of site preparation activities and construction.

[3] The neutralization process involves mixing mustard agent with hot water; the process results in the destruction of the agent and the generation of a byproduct comprised primarily of thiodiglycol. This byproduct is readily biodegradable and results in an effluent of salts and bacteria waste products.

- Newport Chemical Depot is located 2 miles south of Newport and 32 miles north of Terre Haute in western Indiana. The Newport stockpile consists of 1,269 tons (or 4 percent of the original stockpile) of nerve agent stored in 1,690 ton containers. The technology being tested at Newport was neutralization followed by a supercritical water oxidation process.[4] The environmental permit was obtained from the state in December 1999, enabling the start of construction activities.

Assembled Chemical Weapons Assessment Program

In the National Defense Authorization Act for Fiscal Year 1997,[5] the Congress directed DOD to assess alternative technologies to the baseline incineration process for the disposal of assembled chemical munitions.[6] In addition, section 8065 of the Department of Defense Appropriations Act, 1997, provided $40 million to conduct the Assembled Chemical Weapons Assessment Program, a pilot program to identify and demonstrate two or more alternatives to the incineration process for the destruction of assembled chemical munitions.[7] The appropriations act required the Under Secretary of Defense for Acquisition and Technology to designate a program manager who was not, nor had been, in direct or immediate control of the baseline incineration program to carry out the pilot program. The act also prohibited DOD from obligating any funds for constructing incineration facilities at Blue Grass, Kentucky, and Pueblo, Colorado, until 180 days after the Secretary of Defense reports on alternative disposal methods for assembled chemical weapons. The Strom Thurmond National Defense Authorization Act for Fiscal Year 1999[8] requires that if a technology other than incineration is selected for these sites, the Under Secretary of Defense must certify in writing to the Congress that the alternative is (1) as safe and cost-effective for disposing of assembled chemical munitions as is incineration, (2) capable of completing the

[4] Mixing nerve agent with water and sodium hydroxide solution destroys it. The resultant byproduct mainly comprises water and phosphorous- and sulfur-containing compounds. Supercritical water oxidation is used to convert the neutralization byproduct to carbon dioxide, water, and inorganic salts.

[5] Public Law 104-201 section 142.

[6] Assembled chemical weapons represent the part of the chemical weapons stockpile that is configured with fuzes, explosives, propellants, chemical agents, shipping and firing tubes, and packaging materials.

[7] Omnibus Consolidated Appropriations Act, 1997 (P.L. 104-208).

[8] Pubic Law 105-261 section 142.

destruction of such munitions on or before the later date of either when the destruction would be completed if incineration were used or the convention's deadline, and (3) capable of satisfying federal and state environmental and safety laws.

Because of the legislative prohibition on obligating any funds for constructing incineration facilities and the states' unwillingness to accept incineration as a disposal method, the Army tentatively chose the Blue Grass and Pueblo depots to test alternative technologies for destroying the assembled chemical weapons.

- The Blue Grass Army Depot, located in central Kentucky, has a stockpile of weapons containing 523 tons of nerve and mustard agents, or 1.7 percent of the original stockpile.
- The Pueblo Chemical Depot, located about 14 miles east of Pueblo, Colorado, has a stockpile of weapons containing about 2,611 tons of mustard agent, or 8.3 percent of the original stockpile.

The program involves a three-phased approach that includes the development of technology evaluation criteria, technology assessment, and demonstration of not less than two technologies. The public has thus far participated in all phases of the program. During criteria development in mid-1997, the program office developed three sets of criteria to select proposals of technologies worthy of further evaluation, demonstration, and implementation. From September 1997 through June 1998, the program office selected six technologies as worthy of demonstration from 12 proposals. However, because of funding constraints, the program office selected only three of the six technologies for further testing. This selection was based on the program office's evaluation of the demonstration plans and determination of each technology's value to the government. In May 1998, the program office determined that neutralization followed by supercritical water oxidation was a viable solution for destroying assembled chemical weapons containing either nerve or mustard agents. It determined that neutralization followed by biodegradation was a viable solution for destroying assembled weapons containing mustard agents.

The conference report for the National Defense Authorization Act for Fiscal Year 2000 stated that the conferees had been advised that DOD intended to conduct evaluations of the three technologies previously selected for the demonstration program, but which had not been tested because of funding constraints.[9] In addition, the conference report noted that DOD had decided to spend $40 million for this purpose. In the conference report for the Department of Defense Appropriations Act for Fiscal Year 2000, the conferees directed DOD to make available $40 million to conduct demonstration testing of the three additional alternative technologies.[10] Program officials are now using these funds to demonstrate these technologies. As of February 28, 2000, no decision had been made on which of the alternative technologies or the baseline incineration process would be used to destroy the chemical stockpile in Kentucky or Colorado.

To increase public awareness and acceptance, the program office established, with the assistance of the Keystone Center,[11] the Dialogue on Assembled Chemical Weapons Assessment. The Dialogue includes representatives of the affected communities, national citizens' groups, state regulatory agencies, Native American tribes, the Environmental Protection Agency, and the Departments of Defense and the Army and participates in the Army's decision-making process for the program.

Management Structure of the Chemical Demilitarization Program

DOD and Army managers at several different levels share management roles and responsibilities for elements of the Chemical Demilitarization Program.

- The Assistant Secretary of the Army (Acquisition, Logistics and Technology) oversees the chemical stockpile, nonstockpile, and alternative technologies and approaches projects. The Program Manager for Chemical Demilitarization manages the daily operations of these projects. The office of the program manager is organized into distinct project areas: the Project Manager for Chemical Stockpile

[9] Public Law 106-65 (House Conference Report No. 106-301, page 590).

[10] Public Law 106-79 (House Conference Report No. 106-371, page 257).

[11] The Keystone Center is a nonprofit, public policy and educational organization and is headquartered in Keystone, Colorado. The Center identifies issues of public importance that it can constructively address through its process of education and consensus building.

Disposal, the Product Manager for Nonstockpile Chemical Materiel, and the Project Manager for Alternative Technologies and Approaches.

- The Assistant Secretary of the Army (Installations and Environment) and FEMA share management responsibilities for the Chemical Stockpile Emergency Preparedness Project. The U.S. Army Soldier and Biological Chemical Command manages on-post Army activities for the Assistant Secretary of the Army, while FEMA manages the off-post portion of the program in the civilian communities.
- The Under Secretary of Defense (Acquisition and Technology) oversees the Assembled Chemical Weapons Assessment Program. The Program Manager for Assembled Chemical Weapons Assessment manages daily operations.

The management structure for the program is discussed in more detail in chapter 4.

International Efforts to Eliminate Chemical Agents and Weapons

In 1993, the United States, Russia, and more than 150 nations signed the U.N.-sponsored Convention on the Prohibition of the Development, Production, Stockpiling and the Use of Chemical Weapons and on Their Destruction, commonly referred to as the Chemical Weapons Convention. In October 1996, the 65th nation ratified the Chemical Weapons Convention, making the convention effective on April 29, 1997.[12] On April 24, 1997, the Senate ratified the convention, committing the United States to dispose of its unitary chemical weapons,[13] binary chemical warfare materiel, recovered chemical warfare materiel, and former chemical weapons production facilities by April 29, 2007. The Army classifies unitary chemical weapons as chemical stockpile weapons and classifies binary chemical warfare materiel, recovered chemical warfare materiel, former chemical weapons production facilities, and miscellaneous chemical warfare materiel as nonstockpile chemical materiel.[14] If a country is unable to meet the convention's disposal schedule, the convention's Organization for the Prohibition of Chemical

[12] The Chemical Weapons Convention became effective 180 days after the 65th nation ratified the convention.

[13] A unitary chemical weapon is a munition containing a single lethal chemical agent.

[14] Chemical warfare materiel buried before January 1, 1977, is excluded from treaty requirements as long as it remains buried. Once the materiel is unearthed, intentionally or accidentally, it must be destroyed under treaty requirements.

Weapons may grant an extension, although in no case may the deadline be extended past April 29, 2012.

Our Prior Concerns With the Chemical Demilitarization Program

Since its beginning, the Chemical Demilitarization Program has been beset by controversy over disposal methods, delays of 2 to 3 years more than the Army anticipated in obtaining needed federal and state environmental permits and other approvals, and increasing costs. In prior reports, we expressed concern about the Army's lack of progress and the rising cost of the program. For example, in 1991 we reported that continued problems in the program indicated that increased costs and additional time to destroy the chemical stockpile should be expected and recommended that the Army determine whether faster and less costly technologies were available to destroy the stockpile.[15] In a 1994 report on the nonstockpile program, we concluded that the Army's plans for disposing of nonstockpile chemical warfare materiel were not final and that its costs were likely to change.[16] In 1997, we reported that the program cost and schedule were largely driven by the degree to which DOD and the affected states and communities agreed with the proposed method to dispose of the chemical weapons and materiel.[17] In July 1999, we reported that, although sizable unliquidated obligations were reported for the program from prior years, program funds did not appear to be available for other uses.[18] In addition, we reported that these unliquidated obligations were caused by a number of factors, such as delays in obtaining environmental permits and technical delays. See related GAO products at the end of this report.

Our objectives, scope, and methodology are described in appendix I.

[15] *Chemical Weapons: Stockpile Destruction Cost Growth and Schedule Slippages Are Likely to Continue* (GAO/NSIAD-92-18, Nov. 20, 1991).

[16] *Chemical Weapons Disposal: Plans for Nonstockpile Chemical Warfare Materiel Can Be Improved* (GAO/NSIAD-95-55, Dec. 20, 1994).

[17] *Chemical Weapons and Materiel: Key Factors Affecting Disposal Costs and Schedule* (GAO/NSIAD-97-18, Feb. 10, 1997).

[18] *Chemical Demilitarization: Funding Status of the Chemical Demilitarization Program* (GAO/NSIAD-99-232R, July 29, 1999).

Most Chemical Weapons and Materiel Could Be Destroyed Before the Convention's 2007 Deadline

The Army has destroyed approximately 17.7 percent of the original chemical weapons stockpile and could destroy 90 percent of its stockpile of chemical agents and munitions and most of its nonstockpile chemical warfare materiel[1] before the Chemical Weapons Convention's 2007 deadline, given its recent progress and projected plans. The Army has disposal operations under way at two stockpile sites and has started construction of disposal facilities for future destruction operations at five other sites—these seven sites store 90 percent of the chemical stockpile. However, because of the additional time required to develop and select disposal methods that are acceptable to the state regulatory agencies and local communities in Kentucky and Colorado, which store the remaining 10 percent of the original stockpile, the Army will not meet the 2007 deadline at these sites. In addition, the disposal of some nonstockpile items may exceed the 2007 deadline because of delays in the testing of and obtaining permits for key disposal systems for recovered chemical warfare materiel and because of possible delays in the demolition of a former chemical weapons production facility. Given past program experience, these types of delays are likely to occur and will add to program costs. The Army estimates that the program will cost $14.9 billion; it has spent approximately $6.2 billion and estimates that the program will cost another $8.7 billion. To identify opportunities to reduce the cost of the program, officials have developed and implemented several cost-reduction initiatives associated with contracting for the stockpile disposal facilities and increasing the public awareness and acceptance of the program.

[1] Because nonstockpile chemical materiel includes a large variety of items, such as recovered weapons and former production facilities, the Army is unable to assign percentages to the total amount of nonstockpile materiel destroyed.

Ninety Percent of the Chemical Stockpile Could Be Destroyed Before the Convention's 2007 Deadline

In prior reports, we have expressed concern about the Army's lack of progress in destroying the stockpile of chemical agents and munitions. Despite these early delays, the Army is now making progress toward establishing the capabilities needed to destroy the stockpile. Absent unanticipated delays, the Army could destroy about 90 percent of the stockpile before the convention's 2007 deadline.[2] However, because of the additional time required to research, develop, test, and verify new disposal methods that may be environmentally acceptable to the state regulatory agencies and local communities in Kentucky and Colorado, destruction activities at these locations, which store the remaining 10 percent of the stockpile, are not likely to start before the 2007 deadline.

[2] There are ongoing legal challenges in Utah, Alabama, Oregon, and Arkansas that have the potential to stop operations and construction activities in those states. However, litigation has not forced delays to the program. The Army has successfully defended these civil actions and is confident that it will continue to rebut legal challenges to the program.

The Army Has Made Progress in the Destruction of the Chemical Stockpile

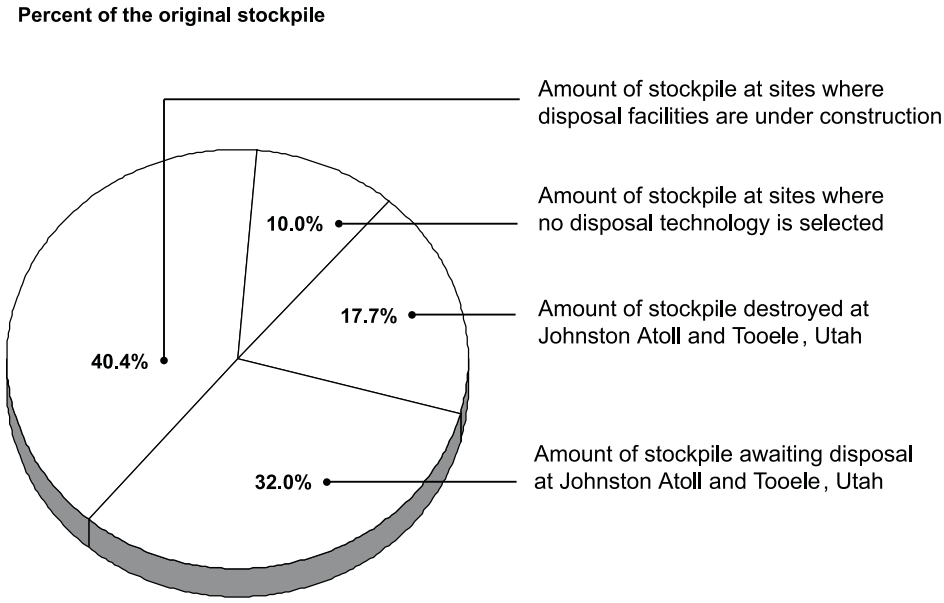
Since the Army formally announced its stockpile disposal project in 1988, it has disposal operations under way at two sites and has started construction of disposal facilities for future operations at five other sites. It is now operating stockpile disposal facilities at Johnston Atoll and Tooele, Utah, which together stored 49.7 percent of the total original stockpile.[3] Of this amount, 5,572 tons (17.7 percent of the original stockpile) of chemical agents have been destroyed, and another 10,075 tons (32 percent of the original stockpile) are scheduled for disposal at the two sites.[4] In addition, the Army has started to build chemical weapons disposal facilities at Aberdeen, Maryland; Anniston, Alabama; Newport, Indiana; Pine Bluff, Arkansas; and Umatilla, Oregon.[5] As shown in figure 3, these sites stored 40.4 percent of the total original stockpile.

[3] Recently, a former contractor employee of the Tooele Chemical Agent Disposal Facility, Utah, came forward as a prospective witness in an ongoing administrative challenge to the facility's environmental permit. In press releases, he made numerous allegations concerning the information provided in the permit application and the role of the Army, its contractors, and state officials in the permit approval process. However, at the time of this report, these concerns were still under review by DOD and the state of Utah. The petitioners in the ongoing challenge in Utah have removed the former contractor employee from the witness list, so he will not testify any further in the proceeding. Although this proceeding has the potential to stop operations at Tooele, program officials have expressed confidence that the concerns will be proven false.

[4] As the Army destroys chemical agents stored at Johnston Atoll and Tooele, Utah, these percentages will change.

[5] The proposed disposal facilities in Maryland and Indiana will pilot test alternative technologies selected under the Alternative Technologies and Approaches Project.

Figure 3: Status of the Army's Efforts to Destroy Its Chemical Stockpile (as of Jan. 31, 2000)



Note: Percentages do not total 100 due to rounding.

Source: Program office for chemical demilitarization.

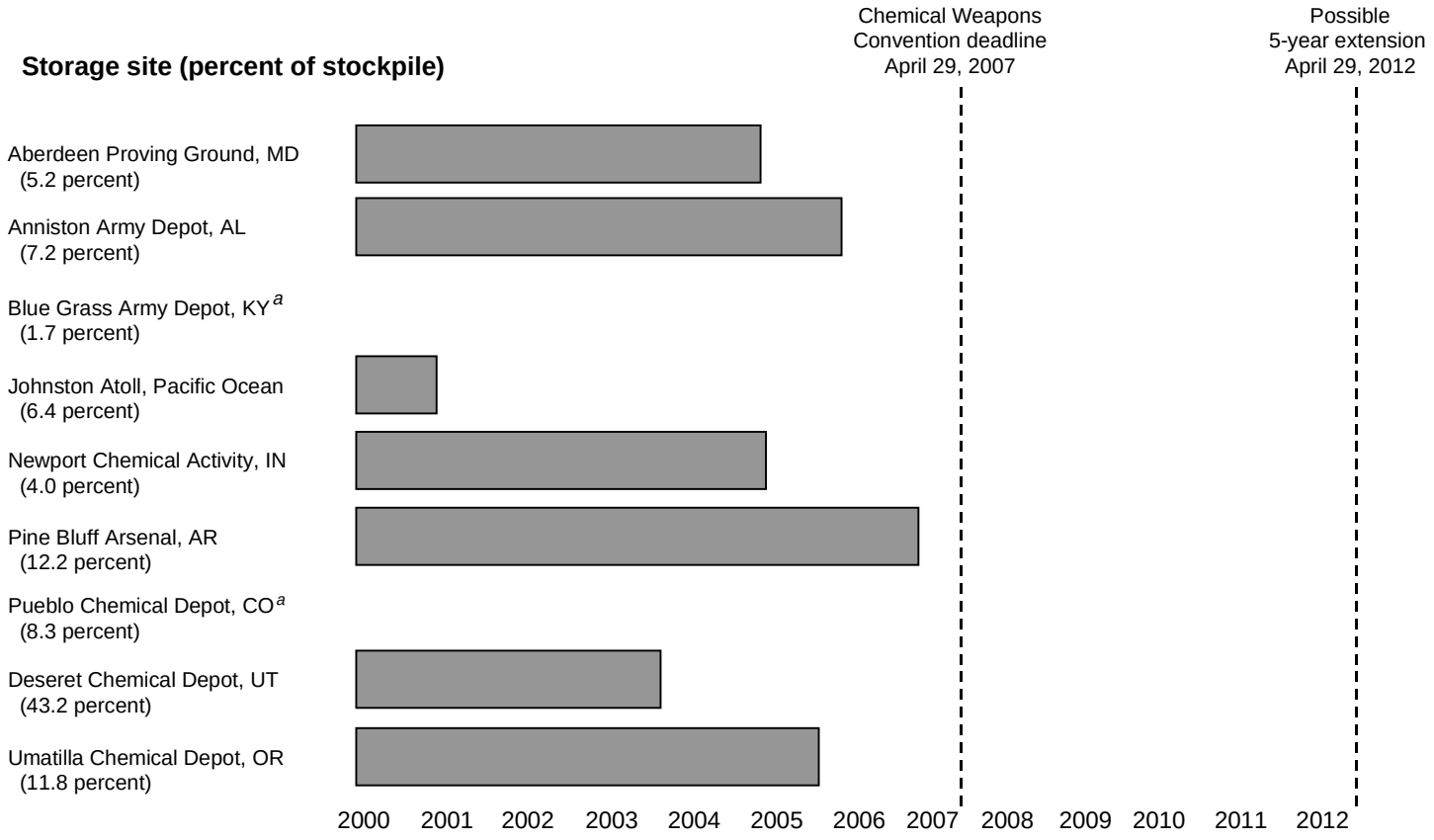
Significant actions in the implementation of disposal operations for 90 percent of the stockpile have been completed. Such actions include the selection of a disposal method and the granting of environmental permits by state and local governments. The disposal method for the remaining 10 percent of the stockpile stored in Kentucky and Colorado has not yet been selected because the 1997 Defense Appropriations Act requires an examination of alternative disposal methods under the Assembled Chemical Weapons Assessment Program.

Disposal Operations at Seven of Nine Stockpile Sites Could Be Completed Before the 2007 Deadline

The Army's most recent schedule shows that disposal operations are expected to be completed at seven of the nine stockpile sites with at least 5 months to spare, most sites have at least 18 months to spare, before the 2007 deadline. However, the schedules for completion at the Maryland and Indiana sites, which are pilot testing alternative disposal technologies, are more uncertain because of the need to further test the alternatives proposed for these locations. For the remaining two sites in Kentucky and Colorado, disposal methods have not yet been selected because the 1997 Defense Appropriations Act requires an examination of alternative disposal methods under the Assembled Chemical Weapons Assessment Program. Figure 4 depicts the Army's current disposal schedules for these sites.[6]

[6] Although program officials are revising the estimated completion dates shown in figure 4, the revisions were not completed at the time of our review.

Figure 4: Schedules for Disposal Operations at the Nine Chemical Stockpile Sites (as of May 11, 1999)



[a]Schedule execution is on hold because the 1997 Defense Appropriations Act requires an examination of alternative disposal methods under the Assembled Chemical Weapons Assessment Program.

Source: Chemical Stockpile Disposal Schedule, Program Manager for Chemical Demilitarization, May 11, 1999.

As part of the Alternative Technologies and Approaches Project, Aberdeen, Maryland, and Newport, Indiana, have pilot projects to investigate, develop, and support the testing of disposal technologies based on chemical neutralization processes. The Army has started site preparation and construction activities for the full-scale pilot facilities at both locations, but the schedules for testing the technologies at these sites are based primarily on research, modeling, and input from engineers and scientists and not on full-scale operations. It is premature to assume that operations at these sites will successfully demonstrate the technologies

without some initial delays associated with the design and operation of the pilot plant. Until the pilot tests are completed, the schedules for these sites remain uncertain, and the sites may not have as long a period before the 2007 deadline as shown in figure 4.

On February 2, 2000, officials from the Assembled Chemical Weapons Assessment Program provided schedules showing that disposal operations at Blue Grass, Kentucky, and Pueblo, Colorado, will not start until after the 2007 deadline because of the time required to validate and certify the alternative technologies and obtain environmental permits. However, program officials are optimistic that operations could be completed within the possible 5-year extension to the deadline. Two other reviews of the program also concluded that the two sites would not meet the 2007 deadline. In August 1999, a National Research Council brief by the Chairman of the Assembled Chemical Weapons Committee concluded that disposal operations using an alternative technology in Kentucky and Colorado would not be completed by December 2007. In September 1999, an Arthur Andersen, Limited Liability Partnership, consulting report prepared for the office of the Deputy Assistant Secretary of the Army for Chemical Demilitarization concluded that the estimated completion dates for these sites ranged between May 2011 and December 2015, well beyond the 2007 deadline.[7]

The protocol for selecting an alternative technology for the destruction of assembled chemical munitions stored in Kentucky or Colorado has not yet been determined and remains under study. If a technology other than incineration is selected for these sites, the 1999 Defense Authorization Act requires the Under Secretary of Defense for Acquisition and Technology to certify in writing to the Congress that the alternative is (1) as safe and cost-effective for disposing of assembled chemical munitions as incineration, (2) capable of the destruction of such munitions on or before the later date of the completion of destruction if incineration were used or the convention's deadline, and (3) capable of satisfying federal and state environmental and safety laws. DOD and Army officials were assessing these three conditions and identifying the criteria for making the certification. At the same time, the Congress directed that DOD make available, and DOD actually committed, funds in fiscal year 2000 to award

[7] *Schedule and Cost Risk Assessment of the Alternative Technologies in the Assembled Chemical Weapons Assessment,* Arthur Andersen, Limited Liability Partnership (Sept. 17, 1999).

contracts to evaluate and demonstrate three additional technologies for the Assembled Chemical Weapons Assessment Program. Program officials were also determining whether the Under Secretary of Defense could issue the required certification before demonstrating the three additional technologies.

It is unlikely that an alternative technology can be validated, certified, and implemented in Colorado and Kentucky in time to meet the convention's 2007 deadline. In addition, insufficient time remains for the Departments of Defense and the Army to meet the 2007 deadline at these two sites using the baseline incineration process. According to the Army's 1998 annual report on the program, to meet the destruction schedule required by the convention, authority to proceed with the baseline incineration process in Colorado and Kentucky was required before June 30, 1999.[8] Even so, DOD and Army officials were discussing whether to grant such authority for both Colorado and Kentucky. These officials were preparing two notices of intent announcing the preparation of separate environmental impact statements for the disposal of the stockpile in Colorado. One environmental impact statement will focus on whether to pilot test alternative technologies in Colorado or at two other sites. The other environmental impact statement is to be specific to Colorado and will focus on which disposal method—the baseline incineration process, a modified incineration process, or an alternative technology—should be used in Colorado. Some program officials believe it may still be possible to meet the 2007 deadline by using a modified incineration process to destroy the stockpile in Colorado. However, according to state officials, the Army would have great difficulty in obtaining environmental permits for any type of chemical agent incineration in Colorado or Kentucky. Each state has requirements for obtaining environmental permits that could prevent or slow the implementation of incineration in the two states.

[8] *Annual Status Report on the Disposal of Chemical Weapons and Materiel for Fiscal Year 1998,* Department of the Army (Sept. 30, 1998).

Significant Obstacles Could Prevent the Nonstockpile Product From Meeting the Convention's 2007 Deadline

The Army has made progress in destroying most caterories of its nonstockpile chemical materiel as required by the Chemical Weapons Convention.[9] However, the disposal operations for some recovered chemical warfare materiel may exceed the convention's 2007 deadline because the Army needs more time to develop and prove the proposed disposal methods will be safe and effective and will be accepted by state and local communities. Further, the demolition of a section of a former chemical weapons production facility in Indiana may exceed the 2007 deadline because the chemical stockpile stored there must be destroyed before demolition of the facility can begin. Any slippage in the stockpile disposal schedule, which is considered optimistic by some involved in the program, will cause demolition operations of the facility to extend past the deadline.

The Army Has Made Progress in the Disposal of Nonstockpile Chemical Materiel

The Army has destroyed a large portion of its nonstockpile chemical warfare materiel. Table 2 summarizes the status of the Army's efforts to destroy binary chemical warfare materiel, miscellaneous chemical warfare materiel, recovered chemical warfare materiel, and former chemical weapons production facilities.

[9] The Chemical Weapons Convention does not require the disposal of chemical warfare material buried before January 1, 1977, as long as it remains buried.

Table 2: Status of the Army's Efforts to Destroy Its Nonstockpile Chemical Materiel (as of Feb. 23, 2000)

Category	Location	Inventory	Percent destroyed
Binary chemical warfare materiel			
	Aberdeen, MD	1 metric ton	94
	Pine Bluff, AR	161 metric tons	0
	Tooele, UT	427 metric tons	100
	Umatilla, OR	30 metric tons	100
Miscellaneous chemical warfare materiel			
	Aberdeen, MD	1,765 ton containers	98
	Blue Grass, KY	25 items	100
	Pine Bluff, AR	477 items	86
		4,375 ton containers	0
	Tooele, UT	1,895 items	85
		944 ton containers	100
	Umatilla, OR	9,744 items	100
	Various locations (eight)	6 metric tons of samples	0
Recovered chemical warfare materiel			
	Aberdeen, MD	11 munitions	0
	Camp Bullis, TX	8 bottles	0
	Dugway, UT	41 munitions	0
	Fort Richardson, AK	7 containers with chemical training items	0
	Johnson Atoll	75 containers with chemical training items	39
	Pine Bluff, AR	1,250 munitions	0
		5,299 chemical training set components	0
	Redstone, AL	1 container with training items and 1 bottle	0
	Tooele, UT	575 bottles and 578 vials	0
Former chemical weapons production facilities[a]			
	Aberdeen, MD	Former pilot plant	100
	Newport, IN	Nerve agent facility	8
	Pine Bluff, AR	Chemical facility	100
		Binary weapons facility	0

[a]Former production facilities managed by the Product Manager for Nonstockpile Chemical Materiel.

Source: Product office for nonstockpile chemical materiel.

Change in the Proposed Disposal Method Could Delay Disposal of Some Recovered Chemical Warfare Materiel

The disposal of some recovered chemical warfare materiel could exceed the convention's 2007 deadline because of technical issues and cost increases associated with key disposal methods. In addition, the Army has experienced delays in obtaining state permits and approvals to test and implement these methods. Because of these factors, program officials are considering alternative disposal methods to replace the problematic systems.

Until recently, the Army was developing four types of integrated transportable destruction systems for nonstockpile materiel. These systems and their status are briefly described in table 3. Each system was expected to use a neutralization process, through which the chemical agent would be mixed with chemicals that would convert the agent into waste compounds. This waste would be much less hazardous than the chemical agent and would be sent to commercial treatment, storage, and disposal facilities that specialize in the treatment of hazardous industrial waste.

Table 3: Nonstockpile Transportable Treatment Systems

System	Description	Status
Rapid Response System	System is designed to safely destroy nonexplosively configured chemical warfare materiel, primarily chemical training sets, by accessing the agent and neutralizing it in a sealed environment.	Full-scale prototype designed, assembled, and scheduled to be operational in fiscal year 2001.
Munitions Management Device-Version 1	System provides the capability to receive, contain, access, monitor, and treat range-recovered or buried, nonexplosively configured chemical warfare materiel weighing up to 500 pounds.	Full-scale prototype designed and assembled but on hold pending program decision on alternative disposal methods.
Munitions Management Device-Version 2	System provides the capability to safely destroy explosively configured chemical warfare materiel by accessing the agent and neutralizing it in a sealed environment. It is designed to process nonexplosively configured munitions and bulk items and to fully contain any potential explosion resulting from operations.	Full-scale system in design and explosive containment chamber tested but on hold pending program decision on alternative disposal methods.
Explosive Destruction System	System is designed to destroy explosively configured chemical warfare munitions that are unsafe for transport. Materiel is placed in the system and detonated, and the chemical agent is neutralized. The first phase system is expected to safely contain up to 1 pound dynamite-equivalent explosion. The second phase system is expected to contain up to 31 pounds of explosive materiel.	First phase system in testing and scheduled to be operational in fiscal year 2002. Second phase system in design and the operational date not yet determined.

Source: Product office for nonstockpile chemical materiel.

Nonstockpile officials stated that the research and development of the four treatment systems described in table 3 have reached the point where the

Army must decide whether it wants to complete development and make the systems available for deployment in the field. In the case of the two munitions management devices, the Army has experienced technical problems and cost overruns. In addition, it experienced delays in obtaining state permits and approvals to test the prototype for the munitions management device (version 1). The required permits to test the system had not been approved as of February 2, 2000.

Because of the problems and delays, nonstockpile product officials were considering alternative disposal methods to replace the two munitions management devices. For example, they were deliberating over the possibility of destroying recovered chemical warfare materiel stored in Oregon and Colorado in stockpile disposal facilities[10] and disposing of the recovered materiel stored in Maryland and Arkansas in neutralization-based disposal facilities specially designed for nonstockpile materiel. However, officials still need more time to prove that the alternatives will safely and effectively destroy recovered chemical materiel. Environmental issues similar to those affecting the testing of the prototype munitions management devices are also likely to affect the Army's ability to obtain the environmental approvals and permits for the alternatives. Consequently, until the alternatives for disposing of the recovered chemical warfare materiel are proven and accepted by the state and local communities, this portion of the nonstockpile product is at risk of exceeding the 2007 deadline.

Destruction of Former Production Facility in Indiana May Not Meet the Convention's 2007 Deadline

A portion of a former production facility at Newport, Indiana, classified as a nonstockpile requirement, may not be destroyed before the convention's 2007 deadline because the chemical stockpile agent stored there must be destroyed before destruction of the facility can begin. The weapons were scheduled to be destroyed by December 2004. Although nonstockpile program officials were confident that their schedule provides sufficient time to complete demolition of the facility before the 2007 deadline,

[10] The legislation originally authorizing the program, codified at 50 U.S.C. 1521, provided that the chemical stockpile disposal facilities may not be used for a purpose other than the destruction of the stockpile of lethal chemical agents and munitions that existed on November 8, 1985. The 2000 Defense Authorization Act (sec. 141) acknowledged this prohibition but further provided that this prohibition does not apply to items designated by the Secretary of Defense as lethal chemical agents, munitions, or related materials after November 8, 1985, if the state in which a disposal facility is located issues the appropriate permit or permits for the destruction of such items.

slippages in the disposal of the chemical stockpile could extend nonstockpile operations past the deadline. As previously discussed, the Newport, Indiana, stockpile schedule is at risk because the Army needs more time to demonstrate whether the proposed alternative technology—developed by the Alternative Technologies and Approaches Project but not yet proven in full-scale operations—will safely and effectively destroy the stockpile. In addition, state officials believe the disposal schedule is too ambitious because it is based on processing 600 containers filed with nerve agent during pilot testing, more than they believe is realistic in the time allowed. State officials said the Army's schedule for the pilot test phase might not allow sufficient time for program participants to fully evaluate the new technology before full-scale operations are scheduled to start.

Program Costs Will Likely Exceed $14.9 Billion Estimate

The Chemical Demilitarization Program has a long-standing history of experiencing significant cost growth. The Army estimates that the program will cost $14.9 billion;[11] it has spent approximately $6.2 billion. However, the $14.9 billion cost estimate does not include the costs associated with the schedule slippages likely in Kentucky and Colorado and in the Nonstockpile Chemical Materiel Product. Army officials said that they were revising their cost estimates. However, the Army will likely need more time to develop a reliable baseline to estimate the cost for the closure and remediation of the chemical stockpile disposal facilities, adjacent areas, and miscellaneous materiel contaminated during disposal operations.[12] At the same time, program officials have initiated some actions to contain costs.

[11] An additional $8.6 billion that is estimated to be needed to recover buried chemical warfare materiel is no longer included in the life cycle cost estimate for this program because the Army believes it is possible but not probable that it will incur the cost to dispose of this buried materiel. In addition, the responsibility for managing, processing, and treating this buried materiel is divided among several defense organizations. For example, military commands and installation commanders are responsible for managing burial sites on DOD installations, and the U.S. Army Corps of Engineers is responsible for managing burial sites no longer owned by DOD. The office for the Nonstockpile Chemical Materiel Product is responsible for processing and destroying the materiel after it is recovered from a burial site or test range.

[12] Remediation of chemical stockpile disposal facilities is not required by the Chemical Weapons Convention.

The Army Estimates the Program Will Cost $14.9 Billion

As shown in table 4, the Army estimates that the program will cost $14.9 billion;[13] the Congress has appropriated nearly $6.2 billion through fiscal year 1999. Since 1985, the Army's cost estimate for the Chemical Stockpile Disposal Project, the largest portion of the program, has increased significantly from the initial $1.7 billion estimate to nearly $10 billion. The major reasons for the cost increases in the stockpile project include (1) overly optimistic program assumptions and estimates by program officials, (2) enhancements to respond to concerns for maximizing the safety of the public and environment, (3) technical problems resulting in lower than expected disposal rates, and (4) additional legislative and program requirements. In 1997, we reported that until the disposal methods for nonstockpile materiel were developed and proven and accepted by state and local communities, the Army would not be able to predict the cost of the nonstockpile product with any degree of accuracy.[14]

[13] Program officials are revising this cost estimate; however, the revisions were not complete at the time of our review.

[14] *Chemical Weapons and Materiel* (GAO/NSIAD-97-18, Feb. 10, 1997).

Table 4: Working Life Cycle Cost Estimates and Appropriated Funds for the Chemical Demilitarization Program

Dollars in millions

Program element	Estimated cost[a]	Appropriated funds[b]
Program Office for Chemical Demilitarization	$851.2	$189.8
Chemical Stockpile Disposal Project[c]	9,984.4	4,734.9
Chemical Stockpile Emergency Preparedness Project	1,237.3	645.3
Nonstockpile Chemical Materiel Product	1,383.6	309.1
Alternative Technologies and Approaches Project	1,122.8	235.1
Assembled Chemical Weapons Assessment Program	370.3	76.7
Total	**$14,949.6**	**$6,190.9**

[a]Estimated program costs as of May 11, 1999.

[b]Appropriations during fiscal years 1988-99.

[c]The estimated cost of the Chemical Stockpile Disposal Project includes the cost of constructing and operating baseline incineration facilities at Blue Grass, Kentucky, and Pueblo, Colorado.

Source: Our analysis of data provided by the program offices for chemical demilitarization and assembled chemical weapons assessment.

The working life cycle cost estimate for the Chemical Demilitarization Program shown in table 4 does not include the costs associated with schedule slippages likely in the disposal of the chemical stockpile stored in Kentucky and Colorado and the nonstockpile materiel. The cost estimates are based on the assumption that the disposal of the chemical stockpile and nonstockpile materiel would be completed before the 2007 deadline, which we believe is unlikely. Historically, schedule delays increase direct costs such as labor, emergency preparedness, and management of the program. In addition, until disposal methods for the stockpile stored in Kentucky and Colorado have been selected, proven to be safe and cost-effective, and accepted by the affected states and localities, the Army will be unable to accurately estimate disposal costs for these sites. Similarly, the cost of destroying recovered chemical warfare materiel will be uncertain until the product manager has demonstrated disposal methods for nonstockpile items and the methods have received permits and have been accepted by the affected states and localities. The cost estimate shown in table 4 for the Nonstockpile Chemical Materiel Product does not included possible costs after the 2007 deadline.

The Army also needs additional time to develop a reliable baseline to estimate the costs for the closure and remediation of the chemical stockpile disposal facilities, adjacent areas, and miscellaneous materiel contaminated during disposal operations.[15] According to program officials, these costs may increase because of uncertainties regarding remediation requirements and standards for these facilities and other materiel, such as personal protection suits worn by the workers and miscellaneous equipment, contaminated during disposal operations. Individual states will establish the environmental requirements for remediating these facilities and nearby areas. Consequently, the environmental requirements and standards to use in estimating the cost to remediate these facilities have not yet been fully determined. Furthermore, because no stockpile disposal facility has yet to be remediated, the Army lacks real time experience on which to estimate these costs.

The Army Has Management Initiatives Under Way to Control Cost Growth

In response to the National Defense Authorization Act for Fiscal Year 1996, the program office for chemical demilitarization has developed and implemented several cost-reduction initiatives.[16] Because the majority of Chemical Stockpile Disposal Project costs are in the contracts for the construction and operation of the disposal facilities, the program office implemented a management approach that includes in-depth reviews of the contracts. According to program officials, these reviews may provide the office with a better understanding of the contractor's approach to planning, enhance performance analyses and forecasting, and produce cost savings during negotiations with contractors. Additionally, the chemical demilitarization office expects cost savings to accrue through implementation of programmatic lessons learned, where opportunities to reduce costs are routinely investigated and applied as the program moves forward.

[15] The closure and remediation of the chemical stockpile disposal facilities are not required by the Chemical Weapons Convention. However, 50 U.S.C. 1521 requires that when disposal facilities are no longer needed for the purposes for which they were constructed that they be disposed of in accordance with applicable laws and regulations and mutual agreements between the Secretary of the Army and the governor of the state in which the facility is located. In addition, the environmental permits issued for the individual sites require closure of the facilities in accordance with permit-specific requirements.

[16] Public Law 104-106 (sec. 152) required the Secretary of Defense to conduct an assessment of the Chemical Demilitarization Program and of measures that could be taken to reduce significantly the total cost of the program.

To increase public awareness and trust, the program office for chemical demilitarization has hosted periodic environmental forums on the Chemical Demilitarization Program. These forums have allowed the public to exchange information with officials from various organizations associated with the program and were intended to increase public awareness and gain acceptance of the program and thereby reduce costs associated with extended environmental permit schedules and litigation actions. Similarly, to increase public awareness and acceptance, the program office for assembled chemical weapons assessment has convened, with the assistance of the Keystone Center, the Dialogue on Assembled Chemical Weapons Assessment. The Dialogue includes representatives of the affected communities, national citizens groups, state regulatory agencies, Native American tribes, the Environmental Protection Agency, and the Departments of the Defense and the Army and has participated in the Army's decision-making process for the program.

Conclusions

The Army could destroy 90 percent of its stockpile of chemical agents and munitions and most of its nonstockpile chemical warfare materiel before the Chemical Weapons Convention's 2007 deadline, given its recent progress and projected plans. However, because of the additional time required to develop and select disposal methods that are acceptable to the state regulatory agencies and local communities in Kentucky and Colorado, the Army will not meet the 2007 deadline at these sites. These sites store 10 percent of the original stockpile. In addition, the disposal of some nonstockpile items may exceed the 2007 deadline because of technical problems with key disposal systems for recovered chemical warfare materiel and because of possible delays in demolition of a former chemical weapons production facility in Indiana. Given past program experience, these types of delays are likely to occur and will add to program costs.

The Army Has Not Adequately Managed the Liquidation of Program Funds

The Army has experienced problems in recent years in managing its liquidations of program funds. Concerns over the financial management of the Chemical Demilitarization Program surfaced following a February 1999 review by the Office of the Under Secretary of the Defense (Comptroller), which suggested that significant portions of prior years' obligations remained unliquidated and could be used for other purposes. In July 1999, we reported that sizable unliquidated obligations existed for the program from prior years. During this review, we examined the transactions for which most of these obligations were recorded, a type of interagency order known as a military interdepartmental purchase request.[1] We found that the program had more than $3.1 billion in budget authority from fiscal years 1993-98 appropriations as of September 30, 1999, of which a reported $498 million (16.1 percent) was unliquidated.[2] Some unliquidated obligations exist because of the lack of management attention and fragmented structure for tracking and managing liquidations; procedural delays in reporting liquidation transactions in the defense financial system, auditing and liquidating obligated funds on completed contracts, and deobligating excess funds; and delays in executing the program schedule.

Several recent factors have affected and will continue to affect the reduction of the unliquidated obligations. The Army can liquidate some of

[1] These interagency orders are used by the program offices (ordering agency) to obtain goods and services from another agency (the servicing agency), such as the U.S. Army Corps of Engineers or the U.S. Army Soldier and Biological and Chemical Command, that has the capability or expertise necessary to perform the needed work. The servicing agency in turn typically awards contracts to third parties, uses its existing contracts, or uses its own resources to fill the order. The orders are made on either a reimbursable order basis or by advancing funds of the ordering agency. For reimbursable orders, the ordering agency obligates funds upon acceptance of the order by the servicing agency. These obligations are liquidated as the servicing agency bills the ordering agency for the work performed under the contract or as the servicing agency completes the work itself and payments are made. For direct orders, once the servicing agency accepts the order, funds from the ordering agency are obligated and advanced for the resulting contract or for the work done by the servicing agency. The obligation is liquidated as payments are made to the contractor or the servicing agency as work is performed.

[2] Federal agencies must have budget authority prior to incurring obligations. Obligations are the amounts of orders placed, contracts awarded, services received, and similar transactions during a given period that will require disbursements (payments) during the same or future period. As services are rendered or goods delivered, an agency makes the required disbursements to liquidate the obligation. Appropriation laws usually make budget authority available for one or more fiscal years but do not require agencies to liquidate obligations during the specific years the budget authority is available. The liquidation can occur after the appropriation has expired, but must occur prior to closing the account—5 years after the appropriation has expired.

its obligations as soon as construction and procurement are under way at the chemical stockpile sites that recently obtained environmental permits. In addition, congressional reductions in the administration's budget requests for fiscal years 1999 and 2000 will likely reduce the future buildup of unliquidated obligations. At the time of our review, the Army had begun to improve its management of appropriated funds and liquidations of obligations for the Chemical Demilitarization Program, but these improvements have not been consistently and systematically implemented across all program elements, and it is too early to tell their effect.

Prior Reviews Report Weaknesses in the Management of Program Funds

Concerns over the financial management of the program surfaced following a review by the Office of the Under Secretary of the Defense (Comptroller), which suggested that significant portions of prior years' obligations remained unliquidated and could be used for other purposes. In July 1999, we reported that there were sizable unliquidated obligations reported for the program from prior years.

The financial management issue of the program surfaced in February 1999, following a quick program review summarized in internal memorandums prepared by an official in the Office of the Under Secretary of the Defense (Comptroller). The memorandums suggested that significant portions of prior years' obligations remained unliquidated and could be reprogrammed to other uses. On July 26, 1999, the office issued a more comprehensive report,[3] stating that 26 percent of the Chemical Demilitarization Program's appropriations were unexpended. The report also notes that delays in executing the program resulted in the accumulation of funds that were out of phase with the specific time when the contracted work was actually performed, resulting in the accumulation of unliquidated obligations. Consequently, the funds were not available for other immediate defense priorities and programs. The report also identified procedural delays in reporting financial transactions in the defense financial system and programmatic delays in executing the program schedule because of permit, technical, and contractual issues that contributed to the program's unliquidated obligations.

[3] *Chemical Demilitarization Program, Program Funding Execution Assessment*, Office of the Under Secretary of Defense (Comptroller) (July 26, 1999).

In July 1999, we reported that sizable unliquidated obligations existed for the Chemical Demilitarization Program from prior years, but the unused funds did not appear to be available for other uses.[4] Our review of $382.1 million (62.6 percent) of the reported $610.5 million in unliquidated obligations for fiscal years 1992-98 showed that $150.6 million (39.4 percent of our sample) had already been spent but was not recorded in accounting records or included in financial reports prepared by the Defense Finance and Accounting Service (DFAS). Further, the remaining $231.5 million in unliquidated obligations in our sample was scheduled to be liquidated by November 2000. In addition, we reported that these obligations were unliquidated because of several factors, such as delays in obtaining environmental permits and technical delays. At the same time, we identified a number of factors, including states' approvals of environmental permits to start construction of chemical stockpile disposal facilities and congressional deferments in the administration's budget request for the program, that have affected or will affect the reduction of unliquidated obligations.

About 16.1 Percent of Prior Years' Obligations Were Unliquidated

As of September 30, 1999, the Chemical Demilitarization Program had more than $3.1 billion in budget authority from fiscal years 1993-98, of which $38.9 million was no longer obligated for specific program areas. (See table 5.) Nearly this entire amount was obligated previously for program requirements that were completed for less cost than initially estimated and was deobligated and reclassified as program reserve. Most of these unobligated funds are no longer available because their authorized periods for obligation expired.[5] At the same time, the program office had a reported $498 million (16.1 percent) in unliquidated obligations from fiscal years 1993-98.

[4] *Chemical Demilitarization* (GAO/NSIAD-99-232R, July 29, 1999).

[5] Under the chemical demilitarization appropriations, operations and maintenance funds are available for obligation for 1 year, research and development funds are available for obligation for 2 years, and procurement funds are available for obligation for 3 years. Military construction appropriations associated with the program are available for obligation for 5 years.

Table 5: Reported Budget Authority and Unobligated, Obligated, and Unliquidated Obligations for the Chemical Demilitarization Program for Fiscal Years 1993-98 (as of Sept. 30, 1999)

Dollars in millions

Summary by funding category	Budget authority	Unobligated	Obligated	Unliquidated obligations
Operations and maintenance[a]	$1,560.8	$6.7	$1,554.1	$65.0
Procurement	968.3	1.9	966.4	339.6
Research and development[a]	266.2	0.2	265.9	20.1
Military construction	334.9	30.1	304.9	73.3
Total	**$3,130.2**	**$38.9**	**$3,091.3**	**$498.0**

Note: Numbers may not total due to rounding and are not intended to total horizontally.

[a]The budget authority for fiscal years 1993 and 1994 operations and maintenance funds and fiscal year 1993 research and development funds are not included in the table because these accounts have been closed.

Source: Our analysis of detailed transaction data provided by the U.S. Army Corps of Engineers and FEMA and DFAS data provided by the program offices for the chemical demilitarization and assembled chemical weapons assessment.

In addition, the program office reported that it had $804 million in budget authority in fiscal year 1999 funds. Of this amount, $70.7 million was unobligated and $381.3 million in obligations was unliquidated. However, it is important to note that the budget authority for fiscal year 1999 is relatively recent and that some of the funds are still available for obligation and liquidation and may continue to be available for several years depending on the type of fund. The budget authority for 1999 research and development funds under the chemical demilitarization appropriation is available for obligation during fiscal year 2000, 1999 procurement funds are available for obligation for fiscal years 2000 and 2001, and 1999 military construction funds are available for obligation for fiscal years 2000 through 2003. The obligations incurred under each of these chemical demilitarization appropriation subdivisions may be liquidated up to 5 years following the end of the funds' periods of availability for obligation before the fund account is closed.

Assessment Indicates That Most Unliquidated Obligations Were Accounted For

During this review, we focused our analysis on the unliquidated obligations for fiscal years 1993-98. On the basis of our analysis of 428 military interdepartmental purchase requests with $495.1 million in unliquidated obligations (or 99.4 percent of the total reported unliquidated obligations), we determined that $63.1 million (12.7 percent) in payments had been made but was not recorded in the accounting records or financial reports prepared by DFAS.[6] (See table 6.) Of the remaining $432 million in unliquidated obligations, most was for work completed but not yet billed by the contractor or verified by the Defense Contract Audit Agency (DCAA), or for work being done but not yet completed. Included in this amount is $10.4 million that program officials could not explain the reasons for the unliquidated balances.

[6] The $63.1 million includes a negative $1.1 million in corrections to the funding data and represents 12.7 percent of the total reported $498 million in unliquidated obligations for fiscal years 1993-98.

Table 6: Unliquidated Obligations for 428 Military Interdepartmental Purchase Requests for Fiscal Years 1993-98 (as of Sept. 30, 1999)

Dollars in millions

			Unrecorded liquidated obligations[b]		Adjusted unliquidated obligations	
Summary by funding category	**Number of purchase requests reviewed**	**Reported unliquidated obligations[a]**	**Amount**	**Percent**	**Amount**	**Percent**
Operations and maintenance	240	$62.6	$5.3	8.5	$57.2	91.5
Procurement	97	339.5	52.6	15.5	286.9	84.5
Research and development	76	19.7	5.2	26.4	14.5	73.6
Military construction[c]	15	73.3			73.3	100.0
Total	**428**	**$495.1**	**$63.1**	**12.7**	**$432.0**	**87.3**

Note: Numbers may not total due to rounding and are not intended to total horizontally.

[a]Reported by the U.S. Army Corps of Engineers, DFAS, and FEMA.

[b]Includes a negative $1.1 million in corrections to the funding data.

[c]Military construction appropriations are provided directly to the U.S. Army Corps of Engineers, which distributes funds through funding authorization documents for specific projects. The Corps of Engineers provided obligation and liquidation data for construction projects during fiscal years 1993-98.

Source: Our analysis of detailed transaction data provided by the U.S. Army Corps of Engineers and FEMA, and DFAS data provided by the program offices for the chemical demilitarization and assembled chemical weapons assessment.

As shown in table 6, 240 purchase requests included a reported $62.6 million in unliquidated operations and maintenance obligations. Of this amount, $5.3 million had been liquidated, according to documents provided by the program office and its contractors, but not yet recorded as liquidated in DFAS accounting data and financial reports. Of the remaining $57.2 million in unliquidated obligations, program officials identified $32.3 million for work that had been completed, but they were awaiting other actions such as final billing by the contractor or audit by DCAA. Another $18.6 million of the $57.2 million is obligated for ongoing purchase requests, for which most of the obligations are scheduled to be liquidated between now and January 2001. Program officials were unable to explain the reasons for $6.3 million of the unliquidated obligations.

In addition, 97 purchase requests included a reported $339.5 million in unliquidated procurement obligations. Of this amount, $52.6 million had been liquidated, according to documents provided by the program office

and its contractors, but not recorded as liquidated in DFAS financial data. Of the remaining $286.9 million in unliquidated obligations, program officials identified $2.7 million for work that had been completed, but they were awaiting other actions such as final billing by the contractor or audit by the DCAA. Another $283.5 million is obligated for ongoing purchase requests, for which most of the obligations are scheduled to be liquidated between now and the end of 2001. Program officials were unable to explain the reasons for almost $700,000 in unliquidated obligations.

Further, 76 purchase requests included a reported $19.7 million in unliquidated research and development obligations. Of this amount, $5.2 million had been liquidated, according to documents provided by the program office and its contractors, but not recorded as liquidated in DFAS financial data. Of the remaining $14.5 million in unliquidated obligations, program officials identified $1.3 million for work that had been completed, but they were awaiting other actions such as final billing or audit. Another $9.7 million of the $14.5 million was obligated for ongoing purchase requests, for which most of the obligations are scheduled to be liquidated before June 2000. Program officials were unable to explain the reasons for $3.5 million of the unliquidated obligations.

Last, we found $73.3 million in unliquidated military construction obligations managed by the U.S. Army Corps of Engineers. The Corps of Engineers uses integrated financial systems to manage and account for obligations and liquidations. Unlike the separately located, nonintegrated financial systems used by the program offices for chemical demilitarization and assembled chemical weapons assessment, the Corps of Engineers system contains real-time obligation and liquidation data. The $73.3 million in obligations will be liquidated as specialized government-furnished equipment is delivered and installed and the ongoing construction efforts are completed. The construction of the disposal facilities in Alabama and Oregon is scheduled to be completed in the first quarter of fiscal year 2001, and the disposal facility in Arkansas is expected to be completed in the first quarter of fiscal year 2002.

Reasons for Some Unliquidated Obligations

Some unliquidated obligations are due to the lack of management attention and the decentralized organizational structure for managing program activities and tracking liquidations; procedural delays in reporting liquidation transactions in DFAS accounting data and financial reports; procedural delays in auditing and liquidating obligated balances on

completed contracts; and delays in executing the program schedule because of permit, technical, and contractual issues.

Management Delays

Contributing to unliquidated balances have been delays due to the lack of management attention and decentralized organizational structure for managing program activities and tracking liquidations.

Lack of Management Attention

The lack of attention to tracking and managing liquidations has contributed to the accumulation of unliquidated obligations. According to DOD and Army officials, the program office for chemical demilitarization has historically prioritized the management and timely obligation of appropriations and given much less attention to tracking and managing liquidations and deobligating excess funds. Despite beginning to track and liquidate obligations more aggressively, program officials still could not readily provide us the obligation and liquidation status for some purchase requests or determine whether the unliquidated obligations were for completed or ongoing efforts. Instead, program officials generally had to obtain liquidation data from performing entities, such as other government agencies and outside contractors, and in many cases testimonial data was the best data they could provide. Some officials said they did not systematically receive financial reports with liquidation data. Additionally, they gave little priority to deobligating unliquidated balances associated with completed or closed contracts. This lack of attention is partially reflected in the inability of program officials to explain the status of $10.4 million in unliquidated obligations across all funding categories except for military construction.

Decentralized Organizational Structure

Different organizations are responsible for various elements of the Chemical Demilitarization Program. For example, the U.S. Army Corps of Engineers is responsible for managing military construction funds and most of the program's procurement funds. FEMA and the U.S. Army Soldier and Biological Chemical Command share responsibility for managing funds appropriated for the Chemical Stockpile Emergency Preparedness Project.[7] FEMA is responsible for off-post emergency preparedness activities and the Soldier and Biological Chemical Command is responsible for on-post activities. In addition, the Program Manager for Assembled Chemical

[7] In our July 1999 report on the program, we found that FEMA had not reported its liquidation transactions in a timely manner to the Army. However, the agency had corrected this reporting deficiency by the time of this review.

Weapons Assessment manages the Assembled Chemical Weapons Assessment Program funding, and the Program Manager for Chemical Demilitarization manages the execution of funds appropriated for the chemical stockpile, nonstockpile, and alternative technologies and approaches projects. Within the program office for chemical demilitarization, project managers are responsible for the execution of funds provided to their respective projects. Within this decentralized organizational structure, these program elements manage their obligations and liquidations as separate operating entities, and in some cases, there was confusion as to which program element or organization was accountable for tracking and managing the unliquidated obligations.

Procedural Delays

Procedural delays have accounted for the accumulation of some of the unliquidated obligations. Some liquidation transactions were not reported in accounting records and financial reports prepared by DFAS in a timely way, and program officials have been reluctant to deobligate unliquidated excess funds on completed contracts until DCAA validates labor rates and other contract costs.

Accounting and Procedural Delays

According to program officials, processing and reporting liquidation data have taken 90 to 120 days before the data were included in accounting records and financial reports prepared by DFAS. For example, contractors have taken several weeks to validate and process liquidations by their subcontractors and report them to the program office, which has its own processes and procedures to complete before reporting to DFAS. Furthermore, DFAS requires time to input and report its liquidation data to its financial system. We recently reported that DOD's payment and accounting processes are complex, generally involving separate functions carried out by individual offices using different systems.[8] These processes can contribute significantly to delays in reporting the liquidation of obligations to responsible program officials.

Contract Closure Delays

According to Army officials, DCAA has taken several months to review and approve costs associated with completed contracts. Program officials have generally waited until DCAA validated labor rates and other contract costs. These audits may adjust labor rates or other costs, requiring additional payments from the remaining obligated funds.

Program Delays

Contributing to the unliquidated balances have been delays in executing the program schedule because of environmental permit, technical, and contractual issues.

Environmental Permit Delays

Program officials found that the time required to actually gain environmental permit approvals, particularly in Oregon, Alabama, and Arkansas, exceeded estimates. The additional time was mainly attributable to a variety of both internally and externally driven requirements. For example, satisfying safety and environmental design changes resulting from programmatic lessons learned, new state and federal regulatory requirements, and new interpretations of existing regulatory requirements in some cases significantly extended the projected schedules. Although funds were obligated to support the three sites based on initial permit issuance projections, the program office could not liquidate some obligations until after construction began, which was contingent on the issuance of the environmental permits.

[8] *Financial Management: Differences in Army and Air Force Disbursing and Accounting Records* (GAO/AIMD-00-20, Mar. 7, 2000).

Technical Delays

According to program officials, lessons learned from ongoing disposal operations at Johnston Atoll and Utah resulted in technical and design changes for future facilities that required additional time and resources. While these changes were being incorporated, liquidation of obligated funds proved to be slower than program officials expected.

Contractual Delays

According to program officials, the award of several construction and procurement contracts has been delayed due to protests by losing bidders. For example, the award of the construction contract for the disposal facility in Arkansas was delayed a year due in part to a bid protest. Accordingly, obligations for this contract could not be liquidated until resolution of the protest.

Recent Factors Reducing Unliquidated Obligations

Recently, approvals of environmental permits by state regulatory agencies at five chemical stockpile disposal sites resulted in initiation of construction activities and procurement actions and greater disbursement of obligated funds. Additionally, actions by the Congress and the Office of the Under Secretary of the Defense (Comptroller) to reduce the funding requested for the program decreased the amount of funds available for obligation and better aligned funding with the program's execution. This action decreases the likelihood that these funds will be obligated far in advance of when they are needed.

The Army's recent receipt of the required environmental permits and approvals by the state regulatory agencies at five chemical stockpile disposal sites has resulted in initiation of construction activities and procurement actions and greater pay-out of obligated funds. The environmental permits for the construction of the disposal facilities in Oregon and Alabama were approved in 1997. The execution of these construction projects has allowed and will continue to allow the program office to liquidate construction and procurement obligations for these locations. In addition, the environmental permits were approved in 1999 for the construction of disposal facilities in Arkansas, Indiana, and Maryland, which should allow the program office to liquidate construction and procurement obligations for these locations.

Congressional actions to reduce the funding requested for the program have decreased and are expected to continue to decrease the program's unliquidated balances. In the DOD and military construction appropriations acts for fiscal year 1999, the Congress appropriated

$78 million less than the administration requested for operations and maintenance, procurement, and research and development activities and appropriated $50.5 million less than requested for military construction projects. Similarly, in the fiscal year 2000 DOD and military construction appropriations acts, the Congress appropriated $140 million less than the administration requested for operations and maintenance, procurement, and research and development activities and appropriated $93 million less than requested for military construction projects. These actions reduced the amount of funds available for obligation and better aligned funding with the program's execution, decreasing the likelihood that these funds will be obligated far in advance of when they are needed.

In their review of the Army's fiscal year 2001 budget request for the Chemical Demilitarization Program, the Office of the Under Secretary of the Defense (Comptroller) recommended, and the Deputy Secretary of Defense approved, reductions to the Army's budget request for fiscal year 2001 to better align funding in the year it would be executed.[9] For example, because of the delays in the Alternative Technologies and Approaches Project, DOD reduced the Army's budget request for construction funds by $25 million for the Maryland site. It concluded that the contractor would be unable to execute construction work scheduled for fiscal year 2001. Similarly, DOD reduced fiscal year 2001 funding for equipment installation at Newport, Indiana, by $7.2 million because of the delays in the Alternative Technologies and Approaches Project. Further, DOD reduced the Army's request for the Assembled Chemical Weapons Assessment Program by $42 million because of expected delays in executing the program during fiscal year 2001.[10]

[9] *Chemical Agents and Munitions Destruction*, Office of the Under Secretary of Defense (Comptroller), (PBD 204, Dec. 6, 1999).

[10] We did not have sufficient time to examine the administration's fiscal year 2001 budget request for the Chemical Demilitarization Program, which was issued on February 7, 2000, and assess the potential impacts of DOD's reductions in the Army's budget request for the program.

Financial Improvements Have Not Been Consistently and Systematically Implemented Across All Program Elements

Although the Army has started to improve its management of obligations and liquidations of obligated funds for the Chemical Demilitarization Program, these improvements have not been consistently and systematically implemented across all program elements. These inconsistencies are due in part to the decentralized financial management structure of the program.

In July 1999, the Program Manager for Chemical Demilitarization mandated monthly reporting of obligations, disbursements, and planned and actual cost information by the managers for chemical stockpile, nonstockpile, and the alternative technologies and approaches projects. The manager also reminded all project managers of the importance of effective funds management, including the management of cost as well as schedule and technical performance. Consequently, officials started examining the unliquidated obligations and deobligating those determined as no longer needed. In addition, they started working with their contractors and other defense agencies to expedite the reporting of financial transactions and developing methods for capturing and reporting obligations, liquidations, and accrual data.

While these are positive steps, the program office has not fully implemented these improvements for the timely capturing and reporting of obligations, liquidations, and accruals and could not explain $10.4 million in unliquidated obligations. The program office did not have an independent, integrated system to track obligations, liquidations, and accrual data and has relied mostly upon data in accounting records or financial reports prepared by DFAS. For example, the Chemical Stockpile Emergency Preparedness Project and the Assembled Chemical Weapons Assessment Program were not included in the Chemical Demilitarization Program Manager's monthly reporting requirement because the U.S. Army Soldier and Biological Chemical Command manages the funds for the two programs. Further, the managers for the chemical stockpile, nonstockpile, and alternative technologies and approaches projects have implemented different systems to comply with the program manager's mandate for a monthly reporting of obligations, liquidations, and planned and actual cost information.

Conclusions

Although program officials have acted and are acting to improve the financial management of the program, problems remain. No systematic approach exists across all program elements to help ensure the consistent,

effective execution and expenditure of funds appropriated for the program, and a relatively small amount of unliquidated obligations remain unexplained. Some unliquidated obligations exist because of the lack of management attention and decentralized structure for tracking liquidations. Other unliquidated obligations exist because of procedural delays in reporting financial transactions in the defense financial system, in auditing and liquidating obligated balances on completed contracts, and in deobligating excess funds, and delays in executing the program schedule. Several recent factors, including the recently approved environmental permits and congressional actions to reduce funding for the program, have decreased and will likely reduce the future buildup of unliquidated obligations. However, because the improvements in its financial management have not been consistently and systematically implemented, the Army cannot ensure that its unliquidated obligations will receive consistent attention to bring about a better alignment of funds with the execution of the program on an ongoing basis. In response to a draft of this report, the Army has recently initiated actions to address our concerns over the financial management of the program. Given the long-standing nature of these concerns, management oversight is essential to the effective implementation of the Army's actions.

Recommendations

We recommend that the Secretary of Defense monitor the Army's actions to

- develop a systematic approach for ensuring the timely, effective expenditure of funds appropriated for all elements of the Chemical Demilitarization Program and
- direct program officials to account for the $10.4 million in unliquidated obligations that officials could not give an explanation for, or explain why the funds had not been liquidated.

Agency Comments and Our Evaluation

In its written comments on our draft report, DOD agreed with our recommendations to develop a systematic approach for ensuring the timely, effective expenditure of funds appropriated for all elements of the Chemical Demilitarization Program and direct program officials to account for the $10.4 million in unliquidated obligations that they could not explain. However, DOD disagreed that the Secretary of Defense should direct the Secretary of the Army to implement the recommendations because the Program Manager for Chemical Demilitarization had already initiated implementation actions. We are encouraged by the Program Manager's

actions, which once completed should address the concerns raised in our draft report. Given these actions and the long-standing nature of our concerns, we modified our recommendations to call for the Secretary of the Defense to monitor the Army's actions to ensure that it completes them fully and in a timely way and that appropriate results are obtained.

FEMA concurred with the recommended principle of a systematic approach for ensuring the timely, effective expenditure of funds and elaborated on its actions implementing the principle behind the recommendation. Because the recommendation to explain the $10.4 million in unliquidated obligations pertains to the Army, FEMA had no comment on that recommendation.

Program Management Has Been Hindered by Complex Structure and Ineffective Coordination

Effective management of the Chemical Demilitarization Program has been hindered by its complex management structure and ineffective coordination among program offices and with state and local officials. Several changes in the organization and structure of the program during 1997-99, including some changes to implement legislative requirements, divided the management roles, responsibilities, and accountability among several different levels within the Departments of Defense and the Army. In addition, accountability for program performance has been unclear, and coordination and communication among certain program elements and state and local officials have been inadequate. Further, officials of the Departments of Defense and the Army have not agreed on whether or when management roles, responsibilities, and accountability should be consolidated for destruction of the chemical stockpiles at Blue Grass, Kentucky, and Pueblo, Colorado. Consequently, state and local officials have raised concerns that no single office is accountable for achieving the desired results of the program's various elements. In addition, the Congress has expressed concern about the management of the program.

Complex Management Structure

As the program has been expanded beyond its original single purpose of destroying the stockpile to encompass a broader range of missions, to include compliance with the Chemical Weapons Convention, the organization and structure of the Chemical Demilitarization Program have changed and become increasingly complex. At times, these changes have resulted in the fragmentation of the responsibilities for management and oversight of the program. For example, several different levels within the Departments of Defense and the Army now share oversight and management responsibilities.

Evolution of the Management Structure

As provided for in the original legislation establishing the Chemical Demilitarization Program, the Army, as executive agent for the program, established a Program Manager for Chemical Demilitarization who was responsible for management of the destruction of the stockpile. This Program Manager reported directly to the Assistant Secretary of the Army (Installations and Environment). Once the estimated cost of the program reached a certain dollar amount, as required by statute,[1] the Army formally designated it to be a major defense acquisition program subject to

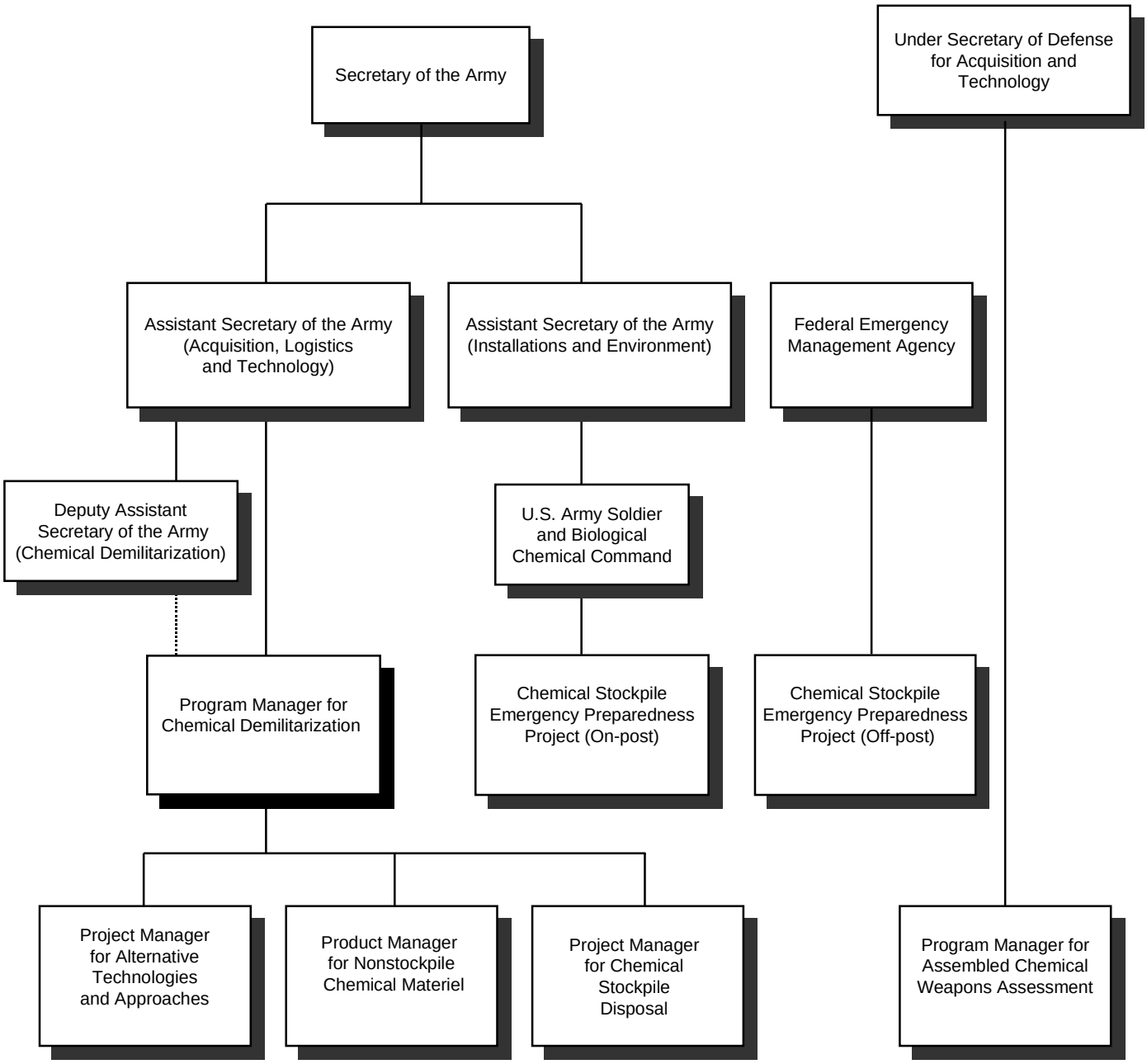
[1] 10 U.S.C. 2430.

congressional reporting requirements and Office of the Secretary of Defense review and approval of various milestones. So that this major defense acquisition program could be managed in the acquisition chain in accordance with the DOD Directive 5000 series, program responsibility was transferred to the Assistant Secretary of the Army (Acquisition, Logistics and Technology) from the Assistant Secretary of the Army (Installations and Environment). To support the enhanced oversight role of the Office of the Secretary of Defense, an office was established in the office of the Assistant to the Secretary of Defense (Nuclear, Chemical, and Biological Defense Programs) to provide oversight responsibility for the Chemical Demilitarization Program regarding policy guidance, budget authority, and annual reporting requirements. The Program Manager continued to report directly to the Assistant Secretary of the Army (Acquisition, Logistics and Technology) in his capacity as the Army Acquisition Executive and the Program Manager remained responsible for executing the existing elements of the program, except for the Chemical Stockpile Emergency Preparedness Project. Under a memorandum of understanding, the responsibility for the latter project resides with the Assistant Secretary of the Army (Installations and Environment) in conjunction with FEMA.

Current Structure Has Three Separate Lines of Authority

There are three different lines of authority within the Departments of Defense and the Army for elements of the Chemical Demilitarization Program (see fig. 5). This structure resulted from congressional and DOD actions affecting various elements of the program. For example, the Congress wanted greater emphasis on the management of efforts to research and develop alternative technologies for destroying assembled chemical weapons. To achieve that goal, it directed that these research and development efforts be conducted separately from the baseline incineration activities. DOD, as part of its downsizing theOffice of the Secretary of Defense, devolved management responsibilities to the Army. In addition, to improve the management of the Chemical Stockpile Emergency Preparedness Project, the Army and FEMA changed the management structure for the project.

Figure 5: Organization Structure for the Chemical Demilitarization Program



Source: Our analysis of data provided by the program offices for chemical demilitarization and assembled chemical weapons assessment.

The current organization has created a complex management structure and separated responsibilities. For example:

- In the 1997 Defense Appropriations Act (sec. 8065),[2] the Congress required the Under Secretary of Defense (Acquisition and Technology) to designate a program manager who was not, nor had been, in direct or immediate control of the baseline reverse assembly incineration demilitarization program to carry out a new pilot program. In response to the act, DOD established the office of the Program Manager for Assembled Chemical Weapons Assessment, independent of the Program Manager for Chemical Demilitarization, to implement the pilot program. The purpose of this legislation was to separate this pilot program from the baseline incineration activities. Achievement of that goal also meant that two program offices would share responsibilities associated with disposal activities in Kentucky and Colorado. As discussed later, ineffective coordination between these offices has hindered the program management.
- A 1998 Defense Reform Initiative downsized the Office of the Secretary of Defense and resulted in the devolvement of the DOD office overseeing the Chemical Demilitarization Program from DOD to the Army. Consequently, the Office of the Deputy Assistant Secretary of the Army (Chemical Demilitarization) was formed in February 1998 from a consolidation of the existing DOD oversight office and the Army staff office that assisted the Army Assistant Secretary in performing his chemical weapons demilitarization functions. While this devolvement resulted in a consolidation of staff offices in the Army Secretariat, it still did not clear up the existing ambiguity in responsibilities, lines of authority, and accountability. For example, the responsibility of the Deputy Assistant Secretary of the Army (Chemical Demilitarization) is limited to oversight of the stockpile, nonstockpile, and alternative technologies and approaches projects. While this office reports directly to the Assistant Secretary of the Army (Acquisition, Logistics and Technology), it has no direct management control of the Program Manager for Chemical Demilitarization, who also reports directly to the Assistant Secretary. During our review, we received conflicting descriptions and inconsistent organizational charts concerning the relationship and responsibilities of the offices of the Deputy Assistant Secretary of the Army (Chemical Demilitarization) and the Program Manager for Chemical Demilitarization. This indicates some amount of

[2] Omnibus Consolidated Appropriations Act, 1997 (P.L. 104-208).

confusion among those involved in the program regarding who is accountable.

DOD, as part of the devolvement, planned to consolidate within the Army Secretariat management responsibility for the Assembled Chemical Weapons Assessment Program. For example, as noted in the transition plan for the reform initiative, program oversight for the Assembled Chemical Weapons Assessment Program was to be delegated to the Assistant Secretary of the Army (Acquisition, Logistics and Technology) and the Program Manager for Assembled Chemical Weapons Assessment was to report directly to the Assistant Secretary. The Under Secretary of Defense (Acquisition and Technology) was to evaluate and certify the effectiveness of the alternative technologies as required by legislation. However, in the Conference Report accompanying the 1999 Defense Authorization Act,[3] the conferees agreed that the Program Manager for Assembled Chemical Weapons Assessment should continue to report directly to the Under Secretary of Defense (Acquisition and Technology) rather than the Assistant Secretary of the Army (Acquisition, Logistics and Technology).

- In 1997, the Secretary of the Army and the Director of FEMA entered into a memorandum of agreement that revised the management structure of the Chemical Stockpile Emergency Preparedness Project in an effort to streamline and improve the management of the program. Under the agreement, FEMA assumed full responsibility and authority for off-post project activities, and the U.S. Army Soldier and Biological Chemical Command assumed responsibility for the on-post portion of the project. As a result of the agreement, the Assistant Secretary of the Army (Installations and Environment) assumed oversight responsibilities for the project. In addition, the Chemical Stockpile Emergency Preparedness Project was removed from the offices of the Program Manager for Chemical Demilitarization and the Assistant Secretary of the Army (Acquisition, Logistics and Technology).

[3] House Conference Report No. 105-736, page 481.

Unclear Accountability for Program Results and Inadequate Coordination and Communication

The Chemical Demilitarization Program has a complex structure that separates management roles, responsibilities, and accountability for achieving program results. In addition, effective management of the program has been hindered further by ineffective coordination among program offices and with state and local officials. Consequently, accountability for program performance is unclear, and state and local officials have expressed concern about conflicting information and the lack of a single office to be clearly accountable for the execution of the program. We also found instances where coordination and communication among project managers for the program were inadequate. In addition, the Congress has expressed concern about the management of the program.

State and Local Concerns Over Conflicting Information

In order to comply with congressional direction, program managers for chemical demilitarization and assembled chemical weapons assessment currently share responsibilities associated with disposal of the chemical stockpile at Blue Grass, Kentucky, and Pueblo, Colorado. For example, the Program Manager for Chemical Demilitarization is responsible for the destruction of the chemical stockpile, and at the same time, the Program Manager for Assembled Chemical Weapons Assessment is responsible for developing and testing alternative technologies for disposing of the assembled chemical weapons at these sites. However, the activities of these offices have not always been effectively coordinated. This has led to difficulties in presenting a clear, coordinated message to affected state and local officials regarding the overall program goals for these sites. According to several state and local officials, spokespersons for these two programs have made conflicting and inconsistent statements about the possible disposal methods for the chemical stockpile stored in Kentucky and Colorado. Consequently, this confusion has created the public perception of the program at these two sites that DOD lacks a single vision for destroying the chemical stockpile in a judicious manner.

The lack of coordination will pose even greater problems in the future in implementing the decisions selecting the most appropriate disposal method to use in Kentucky and Colorado. Specifically, if an alternative technology is selected for use at these sites, views differ on which program office should manage the disposal operations after the pilot project starts. Specifically:

- Some program officials believe that the Program Manager for Chemical Demilitarization should assume responsibility for disposal operations

after the method of destruction is selected for use in Kentucky and Colorado. As provided for in the original legislation establishing the Chemical Demilitarization Program, the Army established the office of the Program Manager for Chemical Demilitarization and made it responsible for management of the destruction of the stockpile. Officials believed that this office would be more skilled at managing the construction and operation of these disposal facilities based on its experience at other stockpile sites. Also, it would match the management structure being employed in Aberdeen, Maryland, and Newport, Indiana, where the Program Manager for Chemical Demilitarization has overall responsibility for implementing the pilot projects to test alternative technologies for disposing of chemical agents in bulk containers.

- Other program officials believe that the Program Manager for Assembled Chemical Weapons Assessment should continue to manage the program through the completion of the pilot-scale testing of alternative technologies for the disposal of assembled chemical weapons stored in Kentucky and Colorado. In section 142 of the 1999 Defense Authorization Act, the Congress directed that the Program Manager continue to manage the development and testing, including the demonstration and pilot-scale testing, of alternative technologies for the destruction of assembled chemical weapons. The Congress further directed the Program Manager to act independently of the Program Manager for Chemical Demilitarization. Program officials believed this could continue the enhanced communications the program office achieved with these states and local communities through the Dialogue initiative discussed previously and retain the expertise the office obtained on alternative technologies for destroying assembled chemical weapons.

DOD and the Army have not resolved issues related to future management roles and responsibilities should a full-scale pilot project start for demonstrating an alternative technology at Kentucky and Colorado be implemented. In any case, closer cooperation will be required between these program offices in the future. The adoption of any alternative disposal method for pilot-scale testing will depend on a certification to the Congress that the alternative is as safe and cost-effective as the baseline incineration process for disposing of assembled chemical weapons and will meet the destruction deadline.

Inadequate Coordination and Communication Among Project Managers

In some instances, coordination and communication among project managers for the program were inadequate. For example, as previously discussed, the Program Manager for Chemical Demilitarization's efforts to improve the office's management of funds had not been consistently and systematically implemented across all program elements. In another case, officials of the stockpile and nonstockpile projects in Arkansas had not coordinated their efforts to obtain environmental permits and approvals for their disposal operations. This could have a significant effect on the start of one or both disposal operations because the state of Arkansas has limited resources to review and approve permit changes that will be needed to begin operations. Although concerned that nonstockpile activities could delay the state's approval of permit changes, stockpile officials at the site did not know the status or schedule for nonstockpile activities. Additionally, some public outreach offices for the program did not have information related to emergency preparedness activities, such as information booklets and evacuation routes maps. According to outreach officials, they did not routinely provide emergency preparedness information to the public because those activities were managed by the U.S. Army Soldier and Biological Chemical Command and FEMA, not by the Program Manager for Chemical Demilitarization.

Congressional Concern About the Management of the Program

The Congress has expressed concern about the management of the Chemical Demilitarization Program. For example, in the 2000 Defense Appropriations Act, section 8159,[4] the Congress directed the Secretary of Defense to report on the management of the Chemical Demilitarization Program, including an assessment of the Assembled Chemical Weapons Assessment Program. Some in the Congress have also expressed concern that, in recent budget submissions, DOD included the budget for the Chemical Demilitarization Program as part of the Army's budget. In its report on the 2000 Defense Authorization Act,[5] the House Armed Services Committee reaffirmed its belief that, as required by the original statute establishing the program, chemical demilitarization funds should be set forth in a DOD-wide budget account, not in the budget accounts for any military department. This was to emphasize that destruction of the chemical stockpile is a national issue that affects all of DOD, not just a single military service. It stated that the Committee intended to keep

[4] Public Law 106-79.

[5] House Report No. 106-162, page 63.

chemical demilitarization funding separate to prevent these funds from being subject to internal service budget priorities and to avoid artificially inflating the budgets of any military department.

Conclusions

Effective management of the Chemical Demilitarization Program has been hindered by its complex management structure and ineffective coordination among program offices and with state and local officials. This has been the case particularly at the Kentucky and Colorado sites, which were not expected to meet the convention's 2007 deadline for destruction of their stockpiles. As the program's mission has been expanded, some fragmentation in the management roles, responsibilities, and accountability among various program participants has resulted. While the Department of the Army is now responsible for most elements of the mission to destroy the stockpile, in accordance with congressional direction, responsibility for the Assembled Chemical Weapons Assessment Program remains with a separate program manager that reports directly to the office of the Secretary of Defense. Regarding the future management of this program, officials of the Departments of Defense and the Army have not agreed on the most appropriate management structure for accomplishing the destruction of the chemical stockpile stored in Kentucky and Colorado. Without resolution, these issues leave the effectiveness of the program at risk.

Recommendations

We recommend that the Secretary of Defense direct the Secretary of the Army to clarify the management roles and responsibilities of program participants, assign accountability for achieving program goals and results, and establish procedures to improve coordination among the program's various elements and with state and local officials.

Agency Comments

Both DOD and FEMA concurred with the recommendation.

Objectives, Scope, and Methodology

The program to destroy chemical weapons has been controversial from its inception and has experienced delays, cost increases, and management weaknesses. Recently, concerns over the financial management of the Chemical Demilitarization Program surfaced following a review by the Office of the Under Secretary of Defense (Comptroller) which suggested that significant portions of prior years' appropriations remained unliquidated. Consequently, the National Defense Authorization Act for Fiscal Year 2000[1] provided that we review and assess the Chemical Demilitarization Program which was established by the Department of Defense (DOD) to destroy the U.S. stockpile of chemical agents and munitions. We were required by the act to report the results of our assessment to the congressional defense committees no later than March 1, 2000. Our assessment was to include a review of the program execution and financial management of all elements of the Chemical Demilitarization Program.[2] At the same time, the House Report 106-244 on DOD's Appropriations Act for Fiscal Year 2000 and a request from the Chairmen of the Subcommittees on Defense and Foreign Operations, Senate Committee on Appropriations, asked us to report on the management of the program. Accordingly, we assessed whether (1) the program will meet the Chemical Weapons Convention's time frames within the costs projected, (2) obligations and liquidations of funds appropriated for the program have been adequately managed, and (3) the management structure of the program allows for coordinated accountability of the program.

During our review, we interviewed officials and obtained data from DOD, including the offices of the Under Secretary of Defense (Comptroller), the Under Secretary of Defense for Acquisition and Technology, and the Deputy Assistant Secretary of Defense for Biological and Chemical Defense. Within the Department of the Army, we interviewed and obtained data from officials in the offices of the Assistant Secretary of the Army for Acquisition, Logistics and Technology; the Deputy Assistant Secretary of the Army for Chemical Demilitarization; and the Assistant Secretary of the Army for Installations and Environment. In addition, we met with and obtained data from representatives of the Program Manager for the Chemical Demilitarization Program, the Program Manager for Assembled

[1] Public Law 106-65 section 141.

[2] The act specified that the elements of the Chemical Demilitarization Program include the Chemical Stockpile Disposal Project, the Chemical Stockpile Emergency Preparedness Project, the Nonstockpile Chemical Materiel Product, the Alternative Technologies and Approaches Project, and the Assembled Chemical Weapons Assessment Program.

Chemical Weapons Assessment, and the U.S. Army Soldier and Biological Chemical Command. We also met with officials of the Department of State, the Federal Emergency Management Agency (FEMA), and the Army Audit Agency. Further, we conducted site visits and interviewed program officials at Anniston Army Depot, Alabama; Edgewood Chemical Activity, Maryland; Newport Chemical Depot, Indiana; Blue Grass Chemical Activity, Kentucky; Pine Bluff Arsenal, Arkansas; Pueblo Chemical Depot, Colorado; Deseret Chemical Depot, Utah; and Umatilla Chemical Depot, Oregon, and we interviewed the site manager for Johnston Atoll. We also met with officials of the U.S. Army Corps of Engineers in Anniston, Alabama; Newport, Indiana; Umatilla, Oregon; Pine Bluff, Arkansas; Huntsville, Alabama; and Washington, D.C. We visited county and city officials in Colorado and Kentucky; Assembled Chemical Weapons Assessment Program's Dialogue Group members in Colorado and Kentucky; state Citizens Advisory Commission members in Colorado, Indiana, Kentucky, and Maryland; and representatives of private sector environmental groups with interest in these issues. We also met with state environmental officials in Colorado, Indiana, Kentucky, Maryland, Oregon, and Utah to discuss and collect data on environmental and legal issues related to the disposal programs.

To determine whether the Chemical Demilitarization Program will meet the Chemical Weapons Convention's time frames within the costs projected, we reviewed and analyzed program cost and schedule data related to the program and its elements: the Chemical Stockpile Disposal Project, the Chemical Stockpile Emergency Preparedness Project, the Nonstockpile Chemical Materiel Product, the Alternative Technologies and Approaches Project, and the Assembled Chemical Weapons Assessment Program. We reviewed the Chemical Weapons Convention to determine disposal requirements and time frames. Further, we examined implementation plans and schedules, status reports, disposal rates and data, cost and schedule risk assessments, cost containment studies, and inventory data on the stockpile of chemical agents and munitions, binary chemical weapons, miscellaneous chemical warfare materiel, recovered chemical weapons, former production facilities, and suspected chemical burial sites. We compared the data to what the Army reported as destroyed and expected to be destroyed by the 2007 deadline.

To assess the risk of schedule slippages and cost increases, we interviewed program officials to (1) determine the reasons for differences between the Army's official schedules and cost positions, (2) identify potential problems that may affect current cost and schedule estimates, (3) assess the causes

of previous schedule slippages and cost increases, and (4) determine how state laws may impact the disposal schedule and cost. To assess the factors that have affected or may affect the program schedule and costs in the future, we reviewed (1) disposal rate data and lessons learned at Johnston Atoll and Tooele, Utah; (2) reasons for the public concerns about incineration of chemical agents; (3) the Army's efforts to obtain environmental permits; (4) the views of officials on current issues affecting the program; (5) obstacles in the environmental compliance and permit approval process; (6) the status of environmental permits; and (7) state environmental laws and regulations. We interviewed program officials, state environmental officials, citizen advisory commission members, and DOD and Army acquisition officials concerning the potential factors that may affect the Army's ability to meet the 2007 deadline and cost estimates. We did not assess the validity of individual cost estimates included in the Army's $14.9 billion life cycle cost estimate.

To determine whether obligations and liquidations of funds appropriated for the Chemical Demilitarization Program have been adequately managed, we reviewed the program's funding records and analyzed the budget authority, obligated and unobligated balances, and the unliquidated obligations for fiscal years 1993-99. These records and documents included all categories of funds for the program: operations and maintenance, procurement, research and development, and military construction. We focused our analysis on the status of unliquidated obligations for fiscal years 1993-98. We did not analyze prior-year appropriations no longer available for new obligations and that had been closed, and we did not focus on fiscal years 1999-2000 appropriations because insufficient time had elapsed for these funds to be obligated and liquidated.

Due to the large number of purchase requests during this period, we limited our review to a sample of purchase requests for which there were no disbursements, a negative balance, or an unliquidated obligation of $20,000 or more as of September 30, 1999. Our review included 428 military interdepartmental purchase requests with $495.1 million in unliquidated obligations, or 99.4 percent of the total reported $498 million in unliquidated obligations, for fiscal years 1993-98. To determine the requirements for these funds, primary causes for the unliquidated obligations, and actions that have affected or will reduce reported unliquidated balances, we conducted extensive interviews with program and site officials and contractor personnel and reviewed documents, status reports, and spending plans. We asked them to verify the amounts reported in the financial records and to provide supporting documents showing how

much had actually been spent if different from the reported amount. In some instances they could not provide us with documents to support the status of unliquidated obligations because the program does not have a systematic approach for monitoring and reporting funding. We established February 2, 2000, as a cutoff date for receiving further input from the Army on the status of unliquidated obligation balances.

To assess whether the management structure of the Chemical Demilitarization Program allows for coordinated accountability of the program, we assessed the organizational structure and lines of authority of the program. Specifically, we analyzed DOD and Army organization charts for the program, mission statements, roles and responsibilities guidance, and program objectives and reviewed contractor-prepared assessments, annual status reports, and other Army and DOD reports that addressed the organization and management of the program. Three different offices in the chain of command gave us three different organization charts for our review. Further, we analyzed the organization and evolution of the Chemical Demilitarization Program, with emphasis on the Assembled Chemical Weapons Assessment Program, since its inception to determine which office or offices were accountable for the programs during various time frames. Because we reported on the effectiveness of the Chemical Stockpile Emergency Preparedness Project in 1999 and 1996,[3] we did not assess the management structure and lines of authority of the project during this review.

To identify congressional direction and concerns regarding the Chemical Demilitarization Program, we reviewed pertinent legislation and legislative history on the Chemical Stockpile Disposal Project, the Chemical Stockpile Emergency Preparedness Project, the Nonstockpile Chemical Materiel Product, the Alternative Technologies and Approaches Project, and the Assembled Chemical Weapons Assessment Program.

To identify management alternatives for effective program organization and alignment, we reviewed literature on best business practices, government performance standards, and results-based management techniques. In addition, we interviewed DOD and Army officials to discuss

[3] *Chemical and Biological Defense: Chemical Stockpile Emergency Preparedness Program for Oregon and Washington* (GAO/NSIAD-00-13, Oct. 26, 1999) and *Chemical Weapons Stockpile: Emergency Preparedness in Alabama Is Hampered by Management Weaknesses* (GAO/NSIAD-96-150, July 23, 1996).

issues and concerns about the program's evolution and management and the organizational challenges the Army has experienced in the past and may continue to experience in the future. We also evaluated DOD and Army initiatives to improve program management. We interviewed state and local officials associated with the program to determine their understanding of management roles, responsibilities, and lines of authority for the program and their opinions on ways to improve or streamline the management structure and assign accountability for performance.

In performing this review, we used the same accounting records and financial reports DOD and the Army use to manage and monitor the Chemical Demilitarization Program. We did not independently determine the reliability of the reported financial information. However, our recent audit of the federal government's financial statements, including DOD's and the Army's statements, questioned the reliability of reported financial information because not all obligations and expenditures are recorded to specific financial accounts.

We performed our review from September 1999 through March 2000 in accordance with generally accepted government auditing standards.

Comments From the Department of Defense

DEPARTMENT OF THE ARMY
OFFICE OF THE ASSISTANT SECRETARY
ACQUISITION LOGISTICS AND TECHNOLOGY
103 ARMY PENTAGON
WASHINGTON DC 20310-0103

REPLY TO
ATTENTION OF

APR 10 2000

Mr. David R. Warren
Director, Defense Management Issues
National Security and International Affairs Division
U.S. General Accounting Office
Washington, D.C. 20548

Dear Mr. Warren:

This is the Department of Defense (DoD) response to the General Accounting Office (GAO) draft report, "CHEMICAL WEAPONS DISPOSAL: Improvements Needed in Program Accountability and Financial Management," dated February 29, 2000 (GAO Code 709447/OSD Case 1955).

We partially concur with the draft report recommendations. Detailed comments on the recommendations are included in the enclosure. Technical comments are provided separately. We appreciate the opportunity to comment on the GAO draft report.

Sincerely,

Gloria S. Patton
Deputy Assistant Secretary of the Army
Chemical Demilitarization

Enclosure

GAO DRAFT REPORT DATED FEBRUARY 29, 2000
(GAO CODE 709447) OSD CASE 1955

"CHEMICAL WEAPONS DISPOSAL: IMPROVEMENTS NEEDED IN PROGRAM ACCOUNTABILITY AND FINANCIAL MANAGEMENT"

DEPARTMENT OF DEFENSE COMMENTS TO THE GAO RECOMMENDATIONS

Now on p. 17.

RECOMMENDATION 1: The GAO recommends that the Secretary of Defense direct the Secretary of the Army to develop a systematic approach for ensuring the timely, effective expenditure of funds appropriated for all elements of the Chemical Demilitarization Program. (p. 16/GAO Draft Report)

DOD RESPONSE: The Department agrees that the Army must have a systemic approach for ensuring timely, effective expenditures of funds for all elements of the Chemical Demilitarization Program; however, there is no need for a direction from the Secretary of Defense to accomplish this objective. The Program Manager for Chemical Demilitarization (PMCD) has already initiated action to implement an Integrated Planning and Management System to manage programmatic cost, schedule and performance data for all elements of the PMCD program. This database will provide a centralized system that facilitates project analysis and execution and standardizes reporting by combining program definition/ requirements, funds management, project monitoring, and baseline change management. Additional emphasis has also been placed on contractors submitting prompt billing of costs, government payments and recordings of disbursements in the Defense Finance Accounting System (DFAS). PMCD has directed Project Managers to conduct monthly reviews on obligations, costs and disbursements. Full implementation of these procedures will provide a consistent and systematic approach for program funds management and significantly minimize unliquidated obligations.

Now on p. 17.

RECOMMENDATION 2: The GAO recommends that the Secretary of Defense direct the Secretary of the Army to direct program officials to account for the $10.4 million in unliquidated funds that officials could not give an explanation for, or explain why the funds have not been liquidated. (p. 16/GAO Draft Report)

-2-

DOD RESPONSE: We agree that there should be an accounting for the $10.4 million of unliquidated funds that were unaccounted for during the GAO audit; however, there is no need for a direction of the Secretary of Defense to accomplish this objective. GAO examined the status of unliquidated obligations (ULOs) as of September 30, 1999. Of the $498 million examined, task managers were not able to satisfy GAO's concerns regarding $10.4 million, or 2.1 percent, prior to the conclusion of their audit. As of March 1, 2000, PMCD's analysis reflects the following regarding the $10.4 million: $2.5 million disbursed; $1.4 million awaiting final audit; $2.4 million accrued, but not yet reflected in official DFAS accounting records; $2.8 million open for on-going contractual efforts; $0.5 million DFAS reporting error; and $0.3 million awaiting further information from performers. The remaining ULO of $0.5 million supports the Chemical Stockpile Emergency Preparedness Project (CSEPP). Of this amount, $0.1 million has been liquidated; $0.3 million is open for on-going contractual efforts; and $0.1 million is undergoing review for status from performers.

Now on p. 17.

RECOMMENDATION 3: The GAO recommends that the Secretary of Defense direct the Secretary of the Army to clarify the management roles and responsibilities of program participants, assign accountability for achieving program goals and results, and establish procedures to improve coordination among the program's various elements and with state and local officials. (p. 16/GAO Draft Report)

DOD RESPONSE: Concur with the finding as stated. The Program Manager for Chemical Demilitarization provides overall management and direction to three Project/Product Managers (Chemical Stockpile Disposal, Non-Stockpile Chemical Materiel and Alternative Technologies and Approaches). While the Secretary of Defense is responsible for destruction of the U.S. stockpile of lethal chemical agents and munitions, execution of this mission is somewhat fragmented due to the fact that PMCD; Project Manager for the CSEPP; and the Program Manager for Assembled Chemical Weapons Assessment are managed at different levels within DoD, in accordance with statutory requirements and DoD decisions regarding program management.

Comments From the Federal Emergency Management Agency

Federal Emergency Management Agency
Washington, D.C. 20472

MAR 30 2000

MEMORANDUM FOR: David R. Warren
Director
Defense Management Issues
U.S. General Accounting Office

FROM: Russell Walter
Director
Chemical and Radiological Preparedness Division
Preparedness Training and Exercises Directorate

SUBJECT: Draft Report on Chemical Weapons Disposal (GAO code 709447)

I received your letter dated February 29, 2000 addressed to Director James Lee Witt asking for our review and comments on your draft report on the chemical demilitarization program status. We reviewed the report and provide the following comments:

1. GAO Recommendation: The Secretary of Defense direct the Secretary of the Army to develop a systematic approach for ensuring the timely, effective expenditure of funds appropriated for all elements of the Chemical Demilitarization Program.

Response: Although this recommendation primarily concerns the Army, the Federal Emergency Management Agency (FEMA) concurs with the principle of a systematic approach for ensuring the timely, effective expenditure of funds to accomplish Congress's intent. FEMA is doing all acts necessary to ensure its element of the Demilitarization Program, the Chemical Stockpile Emergency Preparedness Program (CSEPP), systematically expends funds to accomplish its programmatic benchmarks. To this end, we are transitioning to a performance based, outcome-oriented budget process that emphasizes the Government Performance Results Act (GPRA) method. This transition includes promulgation of new budget guidance for Fiscal Year 2001 (FY01) that implements Cooperative Agreement controls. These controls require our State and local grantees to obligate and expend their funds in a timely manner. This guidance also includes quarterly performance reporting and spending plans requirements.

Within FEMA, we are establishing a billing protocol with the Office of Financial Management to ensure timely billing to the Department of the Army. This protocol will also include periodic CSEPP billing reviews.

2. GAO Recommendation: The Secretary of Defense direct the Secretary of the Army to direct program officials to account for the $10.4 million in unliquidated funds that officials could not give an explanation for, or explain why the funds have not been liquidated.

Response: FEMA has no comment on this recommendation in so far as it pertains to the Army. As for FEMA, we know of no CSEPP funds awarded to the Agency that lack explanations as to why the funds have not been liquidated.

3. GAO Recommendation: The Secretary of Defense direct the Secretary of the Army to clarify the management roles and responsibilities of program participants, assign accountability for achieving program goals and results, and establish procedures to improve coordination among the program's various elements and with state and local officials.

Response: To the extent that State and local preparedness is impacted by Chemical Demilitarization Program management, FEMA concurs with the recommended principles of clear roles and responsibilities, accountability, and coordination. Within its element, the three CSEPP offices of FEMA, of the Assistant Secretary of the Army (Installations and Environment), and of Soldier and Biological Chemical Command have delineated clear roles, responsibilities, and accountability through their Memorandum of Understanding signed in 1997. Furthermore, these three CSEPP offices are in daily contact and coordination on project issues.

In an effort to increase coordination and communication, Soldier and Biological Chemical Command has gone so far as to collocate a full-time liaison at FEMA Headquarters. This liaison effort has increased the level of cooperation and coordination exponentially. The three offices have also formed the Joint Army/FEMA CSEPP Team and alternately host monthly Team meetings to review and to coordinate project management. Thus, the coordination and relationships between the Army offices and FEMA have never been better and continue to improve.

As far as CSEPP coordination with State and local officials, the Army and FEMA sponsor three State Emergency Management Directors

meetings each year. State and local officials help create the agenda to ensure their issues and concerns are addressed. FEMA and the Army contact and coordinate site specific issues with the State Directors on a regular basis.

The Army and FEMA have also created Integrated Product Teams (IPTs) at each of the chemical stockpile sites to coordinate issues and to foster communications among the jurisdictions and agencies. These IPTs generally meet on a monthly basis. Thus, we believe CSEPP communicates and coordinates well with its State and local officials.

4. Additionally, we provide these comments in the interest of clarity or consistency:

a. Page 9, paragraph 1, line 2-3, should read, "FEMA manages the emergency preparedness . . ." vice "The agency manages emergency preparedness . . ."

b. Page 65, paragraph 3, line 6, strike "overall programmatic authority of the project. In addition, the Biological Chemical Command would be responsible . . ." and replace with the word "responsibility."

c. Page 68, paragraph 2, line 11, regarding public outreach efforts, FEMA has formulated a public outreach initiative to improve overall public awareness of evacuation procedures and other protective actions. To further this initiative, FEMA has coordinated and funded a CSEPP public awareness pilot program with Umatilla community officials. The pilot program's start is imminent.

Please call me at (202) 646-3030 if I can be of further assistance.

GAO Contacts and Staff Acknowledgments

GAO Contacts

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Acknowledgments

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Related GAO Products

Financial Management: Differences in Army and Air Force Disbursing and Accounting Records (GAO/AIMD-00-20, Mar. 7, 2000).

Chemical and Biological Defense: Chemical Stockpile Emergency Preparedness Program for Oregon and Washington (GAO/NSIAD-00-13, Oct. 26, 1999).

Chemical Demilitarization: Funding Status of the Chemical Demilitarization Program (GAO/NSIAD-99-232R, July 29, 1999).

Weapons of Mass Destruction: Effort to Reduce Russian Arsenals May Cost More, Achieve Less Than Planned (GAO/NSIAD-99-76, Apr. 13, 1999).

Financial Management: Problems in Accounting for Navy Transactions Impair Funds Control and Financial Reporting (GAO/AIMD-99-19, Jan. 19, 1999).

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Chemical Weapons: Stability of the U.S. Stockpile (GAO/NSIAD-95-67, Dec. 22, 1994).

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