GAO

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National Security and
International Affairs Division

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January 12, 1995

The Honorable Togo West
Secretary of the Army

Dear Mr. Secretary:

As you know, we are reviewing test results and operations of the Army's prototype chemical weapons incinerator on Johnston Island. Although, our review is not complete, we have found that the current life-cycle budget estimate is understated and is likely to increase because of operational unknowns. The Army is also continuing to purchase dunnage incinerator equipment[1] that may not be needed. We believe these issues should be considered by the Army's System Acquisition Review Council in its upcoming review of the U.S. Chemical Stockpile Disposal Program.

RESULTS IN BRIEF

The Army currently estimates that it will cost $11 billion to complete destruction of the U.S. chemical weapon stockpile. This amount represents an increase of over $2 billion from the Army's December 1993 cost estimate of $8.6 billion. However, the Army's revised operating schedules, used to support the $11-billion estimate, do not fully reflect the results of its operational verification tests or full-scale operations at its prototype facility on Johnston Island. Consequently, the revised estimate for M55 rocket destruction is understated by $113 million. When these costs are projected to destroying all weapons in the entire stockpile, including rockets, the estimate could be understated by as much as $348 million. We have previously reported our concern about the Army's optimism in developing schedule and cost estimates for its chemical weapon

[1]The dunnage incinerator is used for the destruction of incineration by-products such as munition pallets and charcoal filters from agent filtration systems.

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destruction program. (See the encl. for a synopsis of these reports).

Moreover, to expedite the permit approval process, the Army plans to spend about $17.7 million to procure dunnage incineration equipment which has not been fully tested and for which alternative options are being considered.

COST GROWTH IN LIFE-CYCLE ESTIMATE CONTINUES AND CURRENT ESTIMATE IS UNDERSTATED

Since 1985, the program cost estimates have increased from $1.7 billion to $11 billion. Our analysis shows that the current schedule and cost estimates are understated because they are based on (1) 24 hour per day operations that have not yet been demonstrated and (2) insufficient operational testing data from the prototype facility on Johnston Island.

In January 1993, we reported[2] on cost, schedule, and performance issues and recommended that the Army extend its operational verification testing program to include a period of 24 hour per day operations. However, the Army responded that such an extension was not necessary during the testing period because of its plan to start full-scale disposal of M55 rockets in late 1993. The Army also stated that the data from such sustained operations would be used to refine designs, schedules, and costs of the Johnston Island and continental U.S. facilities.

Although the Army planned to begin 24 hour per day operations at the Johnston Island facility in late 1993 during the full-scale destruction of M55 rockets, recurring equipment problems prevented the Army from achieving such sustained operations. Management control weaknesses, concerns about staff qualifications, and a 10-week downtime period caused by damage from Hurricane John also impeded continuous operations. After a 30-day ramp-up period, the Army scheduled continuous operations, but the facility averaged only 8 hours of operation per day. Nonetheless, the Army's schedule and cost estimates for Johnston Island and all future facilities still assume 24 hour per day operations.

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[2]Chemical Weapons Destruction: Issues Affecting Program Cost, Schedule, and Performance (GAO/NSIAD-93-50, Jan. 21, 1993)

As a result, the Army has developed some procedural and design changes to resolve processing and equipment problems. Some of these changes will be demonstrated during operations at the Utah facility rather than the facility at Johnston Island. Consequently, it may be a year or more before the Army knows whether the changes are effective.

To develop the $11-billion cost estimate, the Army used data from operational verification tests at Johnston Island completed in March 1993. Based on the results of these tests, the Army reduced the average hourly munition destruction rates by 26 percent. However, the revised rates are based on destruction experience of short duration, do not include downtime associated with some equipment critical to the rocket destruction process, and do not reflect rocket destruction rates demonstrated during full-scale operations from January to August 1994. For example, the estimated peak destruction rate of 33 M55 rockets per hour was reduced to 24 rockets per hour. However, this revised rate is based on the final 10 days of operational verification testing instead of the final 40 days used by the Army's oversight contractor in its evaluation report. Also, the revised rate does not include downtime associated with the deactivation furnace system, which is used to destroy rocket explosive component parts. Moreover, the destruction rate of 24 rockets per hour is significantly greater than the average of 7 rockets per hour demonstrated from January to August 1994, during full-scale disposal operations.

By considering all equipment downtime and 40 days of testing, we calculate that the rocket destruction rate would be reduced to 14 per hour, or a 58-percent decrease in the original destruction rate. According to Army calculations, such a rate change would extend the rocket destruction schedule by about 73 weeks. This would increase the current cost estimate by about $113 million. We are continuing to evaluate the impact of destruction rate shortfalls on other munition types; however, if the 58-percent decrease is applied to all munition types, including rockets, we estimate that costs could increase by as much as $348 million.

Program officials consider the current $11-billion budget estimate to be a medium to high risk because of uncertainties about (1) staff levels needed to achieve the desired operating schedules, (2) the reliability of equipment to operate 24 hours per day, and (3) the timely approval of environmental permits. However, they told us

that additional downtime was added to various parts of the revised operating schedule, and in their view, the schedule was very achievable. For example, although the schedules assume 6 days of operations per week, the Army is staffing and planning to operate the plants 7 days per week, which gives the Army 1 day of free downtime per week. Moreover, because of ramp-up periods, trial burn restrictions, and time needed for staff to overcome learning curves, the Army's schedules assume the plants will operate at less than the planned rate over 90 percent of the time.

OPERATIONAL EFFECTIVENESS AND NEED FOR THE DUNNAGE INCINERATOR QUESTIONABLE

The dunnage incinerator was originally intended to destroy nearly all nonprocess by-products of chemical weapons incineration. Two by-products of concern to the U.S. Environmental Protection Agency (EPA) are agent contaminated wood and agent contaminated charcoal from the filtration system. Initial efforts to demonstrate effective operations disclosed design deficiencies that caused unacceptable combustion flare-ups and substantially increased kiln temperatures. Because of these problems, required trial burns originally scheduled for the spring of 1993, were delayed until early December 1994, and the Army began considering design changes to the incineration system and alternative waste management procedures.

In early December 1994, the Army completed trial burns of the dunnage incinerator using contaminated wood. Preliminary findings from EPA indicated that agent destruction standards were met. However, the trial burn did not test the incinerator's ability to burn contaminated charcoal, which could be a significant source of waste for the dunnage incinerator. According to an EPA official who oversaw the trial burn, if the Army plans to burn charcoal, an additional trial burn would be required. The Army does not have a near-term plan to conduct such a test.

Because use of the dunnage incinerator was delayed, the Army has adopted some alternative waste disposal practices and is considering others that will substantially reduce and possibly eliminate the need for dunnage incineration equipment at future disposal sites. For example, the Army sends decontaminated protective clothing to commercial hazardous waste treatment, storage, and disposal facilities. Other alternatives include (1) mulching or reusing nonagent-contaminated wood pallets and (2) pulverization of charcoal

filters followed by incineration in one of the other furnaces. Army officials told us alternative disposal practices are being considered for all waste by-products originally planned for destruction within the dunnage incineration system. According to program officials, a report discussing disposal alternatives, which was to be released in August 1994, is still under management review.

In spite of these efforts, the Army continues to plan to spend about $17.7 million for acquisition and installation of dunnage incineration equipment at four future disposal plants to be constructed in Oregon, Arkansas, Colorado, and Kentucky. The next procurement contract for dunnage incinerator equipment is scheduled to be awarded in August 1995 for the Oregon site.

Army officials told us their acquisition plans remain unchanged because modifying environmental permit applications to reflect the use of commercial disposal facilities or other alternative waste management practices, such as mulching, would significantly delay reviews and approvals of the permits, which are necessary before construction contracts can be awarded. They also said that stateside facilities do not have the same hazardous waste storage capacities as Johnston Island, and state environmental regulators will likely require the Army to have a proven system in place to handle incineration by-products.

While we agree that changing the permit application to reflect various alternative waste management practices could delay final permit approval and start of construction, the Army's strategy could result in acquisition of unneeded equipment. Also, it may be premature to designate the dunnage incinerator as a "proven system" because its ability to effectively destroy contaminated charcoal has not been demonstrated. Furthermore, if it is necessary to redesign the dunnage incinerator equipment after final permit approval, the Army would be required to submit a major permit modification, which in turn would extend the review schedule and increase costs by necessitating additional reviews by permitting agencies and possibly a public hearing.

RECOMMENDATIONS

Because cost estimates to destroy the U.S. chemical weapons stockpile continue to increase and the current $11-billion estimate is understated, we recommend that you direct the following actions be taken:

-- develop revised program cost estimates and schedules that accurately reflect actual experience demonstrated during sustained 24 hour per day operations, and

-- postpone acquisition of dunnage incineration equipment until alternative waste management practices are fully evaluated, and the operational effectiveness and need for the current equipment are demonstrated.

SCOPE AND METHODOLOGY

At the Army's Chemical Demilitarization and Remediation Activity in the Edgewood Area of Aberdeen Proving Ground, Maryland, we interviewed program management officials and analyzed documentation on the daily operations of the Johnston Island facility. Our review, which began in October 1993, is ongoing. We discussed our findings with Army program management officials and have included their comments where appropriate.

We are sending a copy of this letter to the Chairman and Ranking Minority Member of the Subcommittee on National Economic Growth, Natural Resources, and Regulatory Affairs, House Committee on Government Reform and Oversight. We are also sending copies to the Chairmen and Ranking Minority Members of the Senate Committee on Armed Services, the House Committee on National Security, and the House and Senate Committees on Appropriations; and to the Secretary of Defense. If you or your staff have any questions, please call me on (202) 512-8412.

Sincerely yours,

Donna M. Heivilin
Director, Defense Management
and NASA Issues

Enclosure

Synopses of Related GAO Reports

Report title	Principal findings
Chemical Weapons: Obstacles to the Army's Plan to Destroy Obsolete U.S. Stockpile (GAO/NSIAD-90-155, May 24,1990)	Life-cycle costs had doubled from $1.7 billion to $3.4 billion and would likely continue to increase. The Army's construction schedule did not allow state agencies sufficient time to review applications and issue required environmental permits. Obstacles in obtaining environmental permits would likely delay construction at future sites.
Chemical Weapons: Stockpile Destruction Delayed at the Army's Prototype Disposal Facility (GAO/NSIAD-90-222, July 30, 1990)	Statutory requirements and technical and contractor staffing problems combined to delay start-up of the prototype facility by 32 months. As a result, construction was delayed at three follow-on facilities. Further delays were cited as a possibility if, as in past experience, the Army experienced additional slippage in operational start-up activities.
Chemical Weapons: Stockpile Destruction Cost Growth and Schedule Slippage Are Likely to Continue (GAO/NSIAD-92-18, Nov. 20, 1991)	Life-cycle costs increased from $3.4 billion to $6.5 billion, and more time and money would likely be needed to complete the disposal program. Destruction schedules were based on disposal rates that almost doubled the rate demonstrated during the initial test phase.
Chemical Weapons Destruction: Issues Affecting Program Cost, Schedule, and Performance (GAO/NSIAD-93-50, Jan. 21, 1993)	Destruction rates improved from the first to second test phase, but were only 70 percent of the planned rate. The Army could not demonstrate the desired destruction rate due to unplanned and unscheduled maintenance downtime that occurred almost daily. We recommended that program schedules and costs be revised to reflect actual experience gained from operations.

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