BY THE COMPTROLLER GENERAL

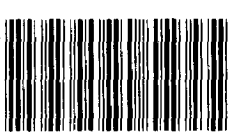
Report To The Chairman, Committee On Appropriations House Of Representatives

OF THE UNITED STATES

Adjustments Recommended In Army's Ammunition Procurement And Modernization Programs

The Army requested $1,158.4 million for 52 conventional ammunition items and $251.2 million for modernizing and expanding the Army's production base for ammunition for fiscal year 1981.

GAO concluded that the Army's ammunition request should be reduced by $134.1 million for 13 items and increased by $26.8 million for 19 other items, and the provision for industrial facilities should be reduced by $16.7 million.



LCD-80-62
JUNE 12, 1980

COMPTROLLER GENERAL OF THE UNITED STATES
WASHINGTON, D.C. 20548

B-198640

The Honorable Jamie L. Whitten
Chairman, Committee on Appropriations 00300
House of Representatives

Dear Mr. Chairman:

Your October 15, 1979, letter asked us to review the Army's justification for its fiscal year 1981 appropriation requests for the procurement of conventional ammunition and for the ammunition production base. 20

As requested, we evaluated the Army's fiscal year 1981 requests for (1) ammunition end-items involving the largest dollar amounts, (2) ammunition end-items being bought for the first time, and (3) projects for establishing, modernizing, and expanding the ammunition production base.

On March 12, 1980, we gave your office the requested fact sheets and questions for use during the Committee's appropriation hearings. This report provides additional information on the results of our review.

As arranged with your office, we are reviewing separately the Army's $121 million request for 4,300 Copperhead rounds. We will provide you the results of the Copperhead review before markup of the 1981 Defense appropriation bill.

This report contains recommendations to you on pages 17 and 31 for adjusting the Army's ammunition appropriation requests. It also contains recommendations to the Secretary of the Army on page 31.

As arranged with your office, copies of this report are being sent to the Chairmen, House Committees on Armed Services and Government Operations and the Senate Committees on Appropriations, Armed Services, and Governmental Affairs. Copies are also being sent to the Director, Office of Management and Budget, and the Secretaries of Defense and the Army. Copies will be made available to other interested parties upon request.

Sincerely yours,

Comptroller General
of the United States

COMPTROLLER GENERAL'S
REPORT TO
THE COMMITTEE ON APPROPRIATIONS
HOUSE OF REPRESENTATIVES

ADJUSTMENTS RECOMMENDED IN ARMY'S AMMUNITION PROCUREMENT AND MODERNIZATION PROGRAMS

D I G E S T

The Army's fiscal year 1981 ammunition budget request was $1,513.5 million, of which

--$1,158.4 million was for 46 conventional ammunition items and 6 miscellaneous items,

--$251.2 million was for 14 industrial facility projects to modernize and expand the ammunition production base, and

--$103.9 million was for other items not included in this review.

AMMUNITION

GAO concluded that $87.5 million requested for four conventional ammunition items should not be appropriated.

--The $26.3 million for 136,000 improved 81-mm. high explosive cartridges is premature. The round has not been released for operational testing because of high muzzle blast. In addition, the propellant increment containers crack and spill propellant at low temperatures or with rough handling. Because of these problems, it is unlikely that this round will be ready for procurement in fiscal year 1981. (See p. 5.)

--The $35.1 million for 96,000 improved M456 antitank cartridges should not be provided because of cavitation problems (air pockets in the explosive fill). The

Army is attempting to develop a new process to eliminate this problem.

Also, during recent tests several rounds with the new full frontal area impact switch exploded in midair, before reaching the target. Procurement funds should not be provided until these problems are solved. (See p. 6.)

--The $11.8 million for 30,000 additional ground-emplaced mine scattering system mines is premature because (1) type classification slippage has delayed the fiscal year 1980 contract award until July 1980, (2) the dispenser and mines have some remaining deficiencies, (3) only limited additional operational capability will be achieved with the planned fiscal year 1981 buys, and (4) more cost-effective automated production lines are under consideration and may be available for fiscal year 1982 procurement. (See p. 9.)

--The $14.3 million for 588,000 additional M739 point detonating fuzes should not be provided because of a large backlog in production. (See p. 14.)

GAO identified 28 other items which should be funded at levels other than the amounts the Army requested.

Since the budget submission, the Army has determined that it needs an additional $30.5 million to produce the quantities shown in the budget for 19 items. Because GAO is recommending reductions of $3.7 million for two of these items, the net increase is $26.8 million.

The Army also found that it overstated the amounts needed for several other items, and GAO identified additional reductions. These reductions were due to inventories for some items exceeding requirements and the Army's decision to use existing cartridges rather than to buy new ones.

For these reasons, GAO concluded that the requests for nine items should be reduced by $46.6 million. (See app. I.)

MODERNIZATION AND EXPANSION

After reviewing all 14 modernization and expansion projects with estimated costs of $251.2 million, GAO concludes that:

--It is premature for the Congress to provide the $11.6 million to expand the production capacity for the Bushmaster ammunition. (See p. 21.)

--It is premature for the Congress to provide the $2.5 million for the application of radar to ballistics acceptance testing. (See p. 23.)

--Less funding is needed for repairing the nitrocellulose line and for modernizing the smoke mix facility for M18 grenades because both include equipment which is not needed during fiscal year 1981. Both projects should be reduced by $0.4 million each or a total of $0.8 million. (See pp. 24 and 25.)

In addition, an additional reduction of $1.8 million should be made because the 1980 project to load, assemble, and pack center core propellant charges is now estimated at $1.8 million less than the amount provided by the Congress for this purpose. This amount could be used to fund part of the 1981 modernization and expansion program. (See p. 27.)

GAO identified some issues concerning the estimated costs for completing the new Mississippi Army Ammunition Plant, which the Committee should be aware of when making funding decisions. (See p. 26.)

RECOMMENDATIONS

GAO recommends that the Committee

--reduce the Army's conventional ammunition request for 13 items by $134.1 million,

--increase the Army's conventional ammunition request for 19 other items by $26.8 million, and

--reduce the Army's request for the modernization and expansion program by $16.7 million. (See pp. 17 and 31.)

GAO recommends that the Secretary of the Army

--reassess the use of existing buildings at Crane and other ammunition production plants for future modernization and expansion projects as alternatives to constructing new buildings and

--develop a means for comparing operating cost data for the three former Navy plants with the data at the Army's other ammunition production plants. (See p. 31.)

AGENCY COMMENTS

GAO obtained oral comments on this report from representatives of the Army's Deputy Chief of Staff for Research, Development and Acquisition. They generally agreed with GAO's findings and conclusions and with GAO's adjustments to 26 of 32 ammunition items.

Although they generally agreed with GAO's findings on the other six items, they did not agree that funds should not be provided. Specifically, they said

--both the M456 high explosive antitank cartridges and the ground-emplaced mine scattering system have been type classified and therefore are ready for procurement;

--the fiscal year 1981 program is required for the point detonating fuze in order to retain two contractors to produce this fuze; and

--although inventories exceed requirements for ground-burst simulators, 20-mm. cartridges, and 7.62-mm. cartridges, the fiscal year 1981 program is needed for production continuity and support of workload requirements at the production plants. (See p. 17.)

Army representatives agreed with GAO's recommendations relating to the modernization and expansion projects, except for the recommended reductions for Bushmaster ammunition and the smoke mix facility for M18 grenades. They said that the Army's proposed 5-year defense plan through fiscal year 1986 shows a substantial increase in Bushmaster ammunition procurements, and as a result, the revised plan will support a second source.

With respect to the smoke mix facility, the Army representatives said that the mixer is needed for planned current production. As indicated in the report, current production of this powder far exceeds 5-year defense plan buys and the aggregate mobilization requirements. The Army's justification for the project clearly shows that it is for a backup capability. (See p. 32.)

Contents

ABBREVIATIONS

GAO	General Accounting Office
GEMSS	ground-emplaced mine scattering system
ARBAT	application of radar to ballistics acceptance testing

CHAPTER 1

INTRODUCTION

The Army's fiscal year 1981 request, Procurement of Ammunition, Army Appropriations, was $1,513.5 million, of which

--$1,110.4 million was for 46 conventional ammunition items;

--$324.3 million was for ammunition production base support;

--$30.8 million was for 2 atomic materiel items; and

--$48 million was for 6 miscellaneous categories, such as ammunition components for special tests, renovation of field stock, and prove-out of industrial facilities.

The $1,110.4 million ammunition request is planned to provide annual peacetime training needs for U.S. Active and Reserve Forces and U.S. war reserve stocks for use during a war. The amounts requested range from a low of $0.4 million for 2.91 million .45 caliber ball cartridges to a high of $154.6 million for 1.154 million 155-mm. propelling charges. The ammunition production base support request consist of the following.

Purpose	Amount requested (millions)
Provision of industrial facilities	$283.2
Layaway of industrial facilities	13.3
Manufacturing technology program	21.5
Military adaptation of commercial items	.3
Depot maintenance plant equipment	6.0
Total	$324.3

As shown above, most of the funds requested for the production base support was for the provision of industrial facilities. This budget line item included

--$199.5 million for two projects for expanding the Army's ammunition production base,

--$16.6 million for seven projects for modernizing the Army's ammunition production base,

--$16.5 million for two projects for initial production facilities,

--$18.6 million for omnibus engineering and projects under $900,000 each, and

--$32 million for production support and equipment replacement.

SCOPE OF REVIEW

We evaluated the Army's fiscal year 1981 requests for (1) ammunition end-items involving the largest dollar amounts, (2) ammunition end-items being bought for the first time, and (3) projects for establishing, modernizing, and expanding the ammunition production base.

Because of time constraints, we limited our review primarily to the justifications for the items and the status and results of the testing program for the newer items. As in the past, we did not review and validate the Army's computations of the requirements for the specific items, but we did ascertain whether the latest computations were used. Also, because of time constraints, we were unable to make detailed reviews of all conventional ammunition items in the appropriation request. We did, however, evaluate the justifications for the facility projects and the conventional ammunition items, except the Copperhead (the Army's 155-mm. laser guided projectile). As arranged with the Committee, we are continuing our review of Copperhead and will provide the results of our evaluation separately.

We interviewed officials and obtained documents from the Departments of Defense and the Army at the following locations.

--Office of the Under Secretary of Defense for Research and Engineering, Washington, D.C.

--Headquarters, Department of the Army, Washington, D.C.

--U.S. Army Munitions Production Base Modernization Agency (formerly the Office of the Project Manager for Munitions Production Base Modernization and Expansion), Dover, New Jersey.

--U.S. Army Armament Materiel Readiness Command, Rock Island, Illinois.

--U.S. Army Armament Research and Development Command, Dover, New Jersey.

--U.S. Army Operational Test and Evaluation Agency, Alexandria, Virginia.

--U.S. Army Material Systems Analysis Agency, Aberdeen, Maryland.

--U.S. Army Test and Evaluation Command, Aberdeen, Maryland.

--Project Manager for Fighting Vehicle Systems, Warren, Michigan.

--Project Manager for Viper, Huntsville, Alabama.

--Mississippi Army Ammunition Plant, Bay St. Louis, Mississippi.

--Indiana Army Ammunition Plant, Charlestown, Indiana.

--Crane Army Ammunition Activity, Crane, Indiana.

--Radford Army Ammunition Plant, Radford, Virginia.

CHAPTER 2

AMMUNITION ITEMS

The Army's fiscal year 1981 appropriation request was $1,158.4 million for the procurement of 46 conventional ammunition items and 6 miscellaneous items. We examined the Army's justifications for these items and concluded that the Army's fiscal year 1981 ammunition program should be reduced by $134.1 million for 13 items and increased by $26.8 million for 19 other items for the following reasons:

--The $73.2 million requested for three items is premature until various issues are resolved.

--The deferment of $14.3 million for one item will eliminate production backlog and maintain active production for a longer period.

--The $8.1 million for three items is unnecessary at this time because inventory exceeds requirements.

--An estimated $1.9 million for one item will not be needed because the Army now plans to repack items in inventory rather than procuring new ammunition.

--The Army revised its cost estimates for many items resulting in increases for some and decreases for others. In addition to the above adjustments, the amounts increased by $26.8 million for 19 items and decreased by $36.6 million for 8 others.

PREMATURE PROCUREMENTS

The Army's fiscal year 1981 ammunition program included premature requests for the following items:

--$26.3 million for improved 81-mm. high explosive cartridges.

--$35.1 million for 105-mm. high explosive antitank cartridges.

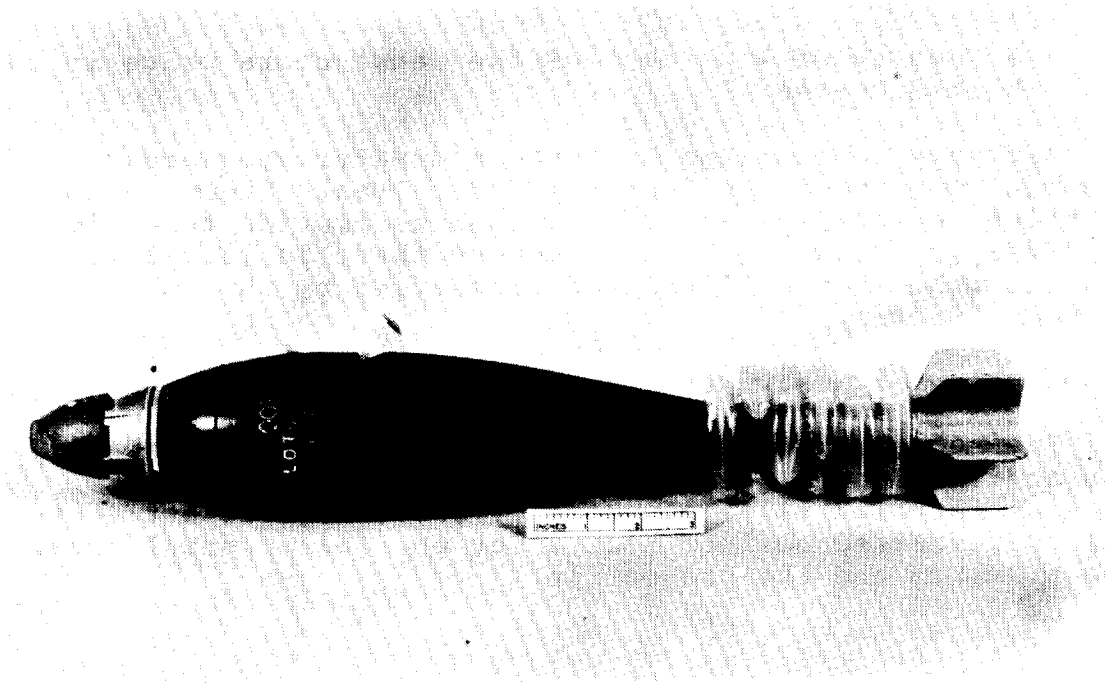
--$11.8 million for a new ground-emplaced mine scattering system (GEMSS).

The Army's procurement policy states that, generally, an item will not be scheduled for procurement in a fiscal year

unless it is scheduled for type classification by the end of the first quarter of the same fiscal year (December 1980 for the fiscal year 1981 program). The above items are scheduled for type classification by the end of December 1980; however, there are issues which must be resolved prior to procurement irrespective of whether the type classification dates are met.

Improved 81-mm. high explosive cartridges

The budget included $26.3 million for 136,000 improved XM821 mortar rounds manufactured in the United Kingdom. Although similar to the Army's current cartridge, the XM821 offers greater lethality (12 percent) and increased range (5,600 versus 4,800 meters), but costs about $65 more per round than the Army's current cartridge. Increased range is obtained by using five or six propellant increments. Unfortunately, the U.S. M29A1 mortar can only accommodate four propellant increments safely. Thus, the point of added range is moot, unless the Army procures different mortars.



COURTESY OF THE ARMY

XM821 81-MM. MORTAR

Previous hot and cold temperature firing problems presented in our report 1/ on the 1980 ammunition program have apparently been resolved. However, now there is a new problem. The XM821 has not been released for operational testing because of high muzzle blast. The blast is greater than allowed by the Surgeon General and intolerable even with double ear protection. If the XM821 is released for operational testing and if it passes, additional tests will be conducted to determine firing rates and other parameters. If all goes well, the round might be type classified by December 1980. However, Army officials doubt that they can meet this deadline. In addition to the blast problem, the propellant increment containers crack and spill propellant at low temperatures or with rough handling.

The Army has considered developing its own production capability for this round. The United Kingdom will provide a license agreement under the following conditions:

--An initial buy of up to 2 million cartridges from United Kingdom production.

--A license fee of 100,000 pounds sterling.

--A royalty of 7 percent of the manufacture price in the United States.

Although we continue to support greater standardization of ammunition among the North Atlantic Treaty Organization countries, we believe it is premature to provide funds for the XM821 in fiscal year 1981 because there is little likelihood that the item will be type classified by the end of December 1980.

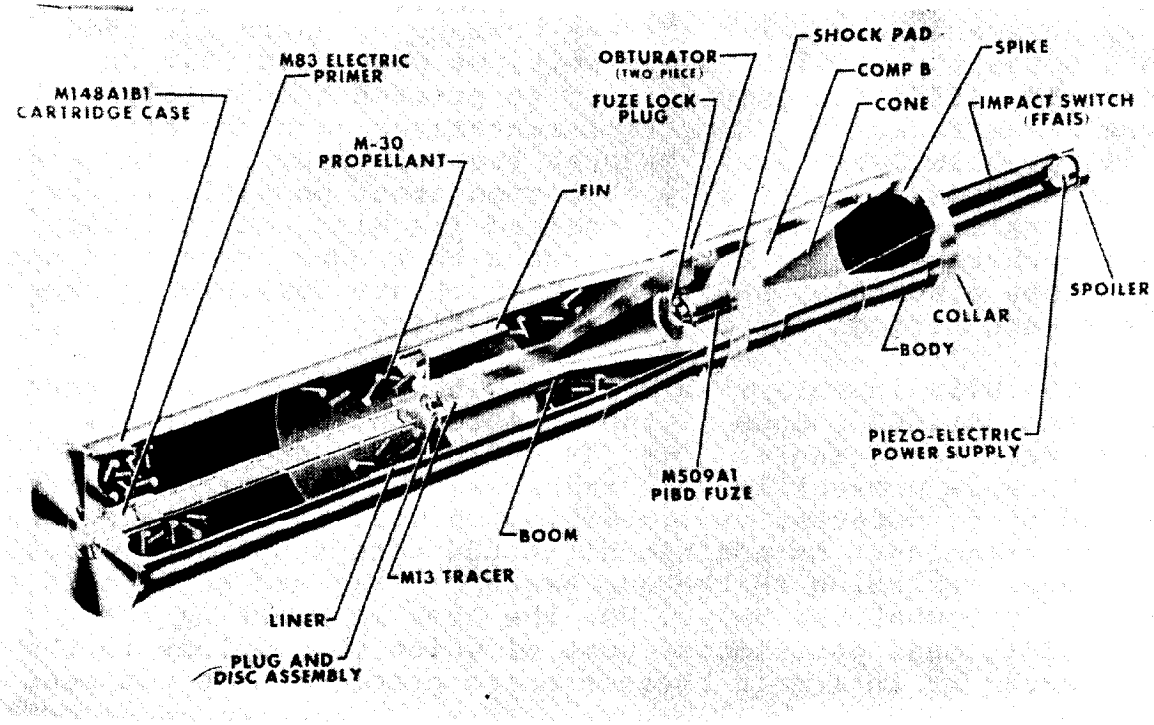
105-mm. high explosive antitank cartridges

The request included $35.1 million for 96,000 improved M456 antitank cartridges. The most recent cost estimate, however, is $41.7 million. Most of the change is attributable to increased cost estimates for the full frontal area impact switch and the projectile.

1/"Army's FY 1980 Programs for Procuring Conventional Ammunition, Modernization, and Expansion" (LCD-79-416, June 15, 1979).

The improved M456 round is equipped with a full frontal area impact switch and an improved fuze. It will be designated M456A2 upon type classification. The primary barrier to type classification was an airburst problem. During recent tests, several projectiles with the full frontal area impact switch exploded in midair, before reaching the target. The cause has not been identified. The U.S. Army Training and Doctrine Command indicated it did not want the M456A2 in its present configuration if there is a single airburst during future tests. The Army planned to produce during July and August 1980 5,000 cartridges for testing and evaluation to permit type classification in December 1980.

To meet the July and August 1980 production schedules, the Army needs assemblies with the switches delivered by the end of June 1980. However, our review disclosed that the contractor producing the switches could only guarantee such delivery if the Army pays additional costs of premium pay, engineering, and travel expenses and appoints a resident member to a materials review board at the contractor's plant.



COURTESY OF THE ARMY

CARTRIDGE 105MM HEAT-T M456A2

The Army has combined first article acceptance tests for these assemblies with initial production tests of the July and August 1980 production cartridges to provide greater assurance the cartridges would be type classified in December 1980.

In addition to the airburst problem, the Army has been working on a new melt-pour process for over 2 years to eliminate air pockets and cracks--commonly called cavitation--in the explosive fill. Cavitation is a serious problem because it can result in the round exploding in the gun barrel. The new melt-pour process has to be installed and ready-to-go for test round production during July 1980. However, in March 1980 the Army was still attempting to resolve differences between its proposed process and that of the ammunition plant operating contractor in order to procure/fabricate the necessary equipment. Apparently, two of three projectiles poured under the Army process had excess cavitation.

It appeared that much had to be done in a relatively short time period to meet the scheduled December 1980 type classification date and that the Army was taking measures to assure that type classification would occur in December 1980. However, when we met with Army representatives at the U.S. Army Armament Materiel Readiness Command on March 27, 1980, to discuss the results of our work, we were told that on March 19, 1980, the Army decided to proceed immediately with type classification. Army representatives said the airburst problem "went away" because the U.S. Army Training and Doctrine Command, initially concerned about possible injury to troops in front of tanks, changed its mind and concluded that airbursts are no more hazardous to troops forward of the tank than discarding sabot rounds which are designed to drop off a main part of the projectile in flight.

The M456 inventory is fraught with problems. Less than half the 391,502 rounds in the inventory at September 30, 1979, were serviceable. Over 76,000 rounds were unserviceable because projectile wall thickness did not meet standards or had other defects, and these rounds will be downloaded for use in training. An additional 96,000 were suspended because of rounds exploding in the gun barrel. They are being held for emergency combat use only. Now the Army is planning to produce additional cartridges, some of which may explode in the gun barrel or in midair because basic problems have not been solved.

Several studies have questioned the overall effectiveness of this type of antitank round against future armored threats. The Army is developing a new multipurpose round,

the XM815, which will replace the M456A2. According to the Army, the XM815 will eliminate the deficiencies and limitations in the present design. Its type classification date has not been determined.

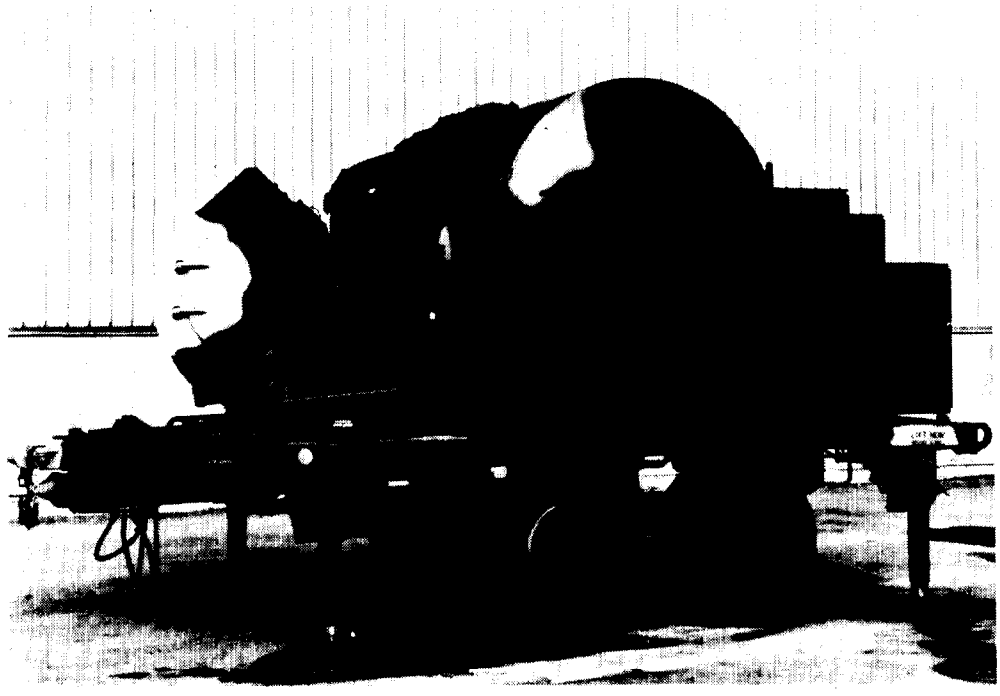
Given the high combat consumption requirements for tank rounds, we can understand the Army's desire to get more tank cartridges into inventory. However, tests have not demonstrated that quality problems have been resolved, and therefore, the problems may continue. Recent Army actions such as declaring the airburst problem as a non-problem, combining first article acceptance tests with initial production tests, and accelerating attempts to correct the cavitation problem may only result in adding yet more marginal quality cartridges to an existing marginal quality inventory. An alternative approach would be to continue resolving the technical problems with this round and defer further procurements until an orderly resolution of the problems has been accomplished.

GEMSS mines

The $11.8 million requested for GEMSS in fiscal year 1981 is to procure 10,000 XM74 antipersonnel mines and 20,000 XM75 antitank/antivehicle mines for use with the GEMSS XM128 towed dispenser. The dispenser is mounted on a trailer and is towed by a truck or armored personnel carrier.

This is the third budget submission for funds to procure this system. In fiscal year 1979, the Army's request included $7.6 million for 11,000 mines and 6 dispensers. Following the budget submission, the Army rescheduled the system's type classification date from the first to the fourth quarter of fiscal year 1979. Because of the delayed type classification date caused by performance deficiencies and system reliability concerns, procurement funds were not provided in fiscal year 1979.

In fiscal year 1980, the Army requested and obtained $11.6 million to procure 12,000 XM74/XM75 mines and 12 mine dispensers. We reviewed this request and found that design modifications to the dispenser intended to correct earlier deficiencies had not been fully tested; however, the Army provided preliminary results of actions taken to correct the problems and maintained that unless unforeseen problems occurred, GEMSS would be type classified by December 31, 1979. At that time this system appeared ready for procurement funds.



COURTESY OF THE ARMY

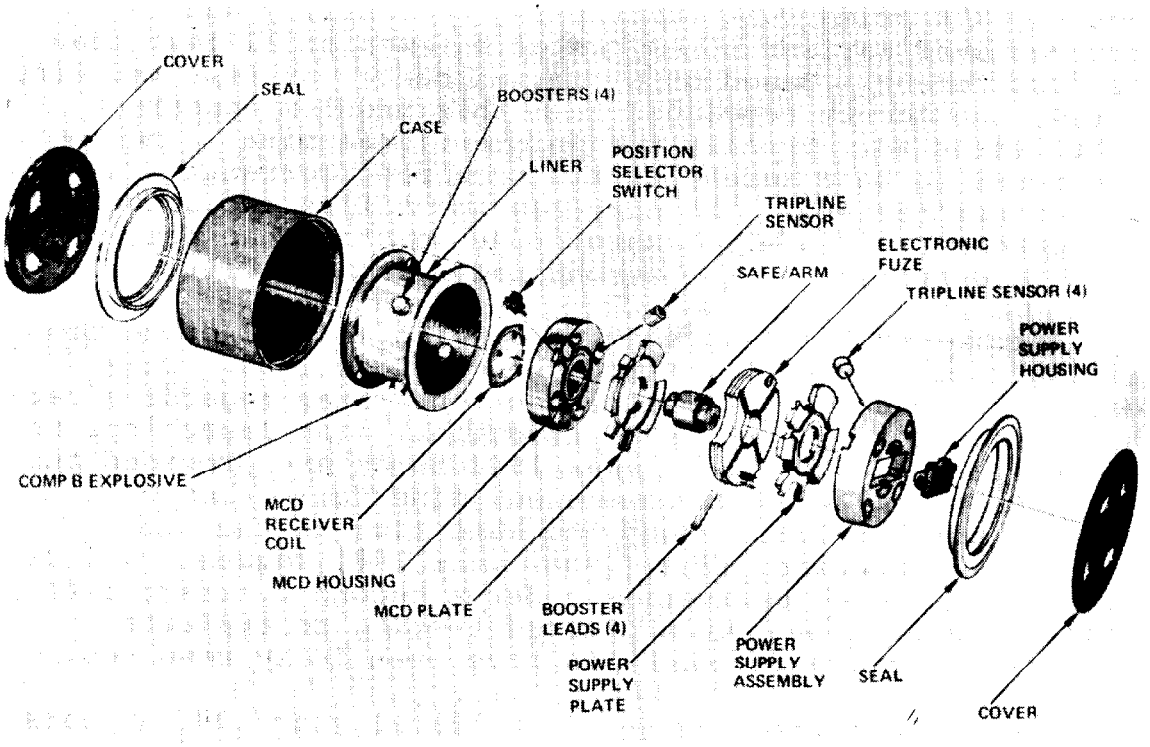
XM128 MINE DISPENSER

Since this system also appeared in the fiscal year 1981 request and because of its history of problems, we again reviewed the Army's request for GEMSS procurement funds. The Army type classified GEMSS as standard on April 11, 1980. Now that type classification has been approved, the Army plans to proceed with the fiscal year 1980 ammunition program. The Army believes the first production contract for GEMSS mines and dispensers can be awarded in July 1980. However, our review disclosed that

--GEMSS dispenser and mines have some remaining deficiencies,

--currently planned low-mine procurements will provide limited operational capability, and

--an automated mine production facility under consideration to be used for a planned fiscal year 1982 procurement may increase available production rates, reduce costs, and provide competition.



COURTESY OF THE ARMY

M74 ANTIPERSONNEL MINE

Operational testing, which is designed to provide data on a system's military utility, operational effectiveness, and operational suitability, was conducted during June through August 1979. This testing showed that (1) the dispenser mine counting system was not dependable, (2) the dispenser system reliability was marginal, (3) the dispenser operational availability was low, and (4) dispenser malfunctions caused some mines to be launched unintentionally.

The Army has taken action to correct the deficiencies found during operational testing and has conducted limited follow-on testing. The Army's Material Systems Analysis Agency evaluated GEMSS Development/Operational Testing II and follow-on testing. A report on this evaluation was completed in February 1980. The evaluation recognizes the marginal reliability and low availability of the dispenser but concluded that they were adequate and that the stated user requirements were not realistic. In addition, the Agency believed that improved maintenance manuals will increase the dispenser availability. The evaluation noted

that the M74 prime fuze functioning reliability had been improved over earlier mines tested but was still less than the requirement. Based on a limited number of improved mines tested, the Agency concluded that this problem appeared to be corrected. Finally the unintentional mine launchings, were found to be a safety hazard requiring corrective action and further testing. The Army has identified two solutions to overcome this safety hazard. One solution has been rejected and testing on the second began in March 1980.

A combined followup evaluation with initial production testing is scheduled for March through July 1982. This testing is to determine whether actions taken regarding certain deficiencies, such as unintentional mine launchings have been corrected. If fiscal year 1981 funds are provided and contracts are awarded as scheduled, mine deliveries will begin in October 1981, about the same time as the fiscal year 1980 deliveries. The fiscal year 1981 request will result in GEMSS mine deliveries under a second contract 5 to 6 months before the Army's planned testing to evaluate whether all system deficiencies have been fully resolved.

The 30,000 mines requested in fiscal year 1981 appears to be a limited procurement relative to the planned dispenser procurements and projected mine requirements for use with the dispensers. The following shows the Army's planned procurement of dispensers and mines through 1985.

Planned Procurement

	1980	1981	1982	1983	1984	1985	Total
Mines	12,000	30,000	30,000	30,000	30,000	30,000	162,000
Dispensers	12	0	30	60	54	70	235

Army representatives told us that a study made by the Army's Concepts Analysis Agency indicated that 4,400 mines should be available for each deployed dispenser. Although the planned procurements for fiscal years 1980 and 1981 will provide the projected required mines for 10 of 12 funded dispensers, over the 6-year period, the Army plans to procure only enough mines for 37 dispensers. Using the Army's projection, 1,034,000 mines are needed for the 235 dispensers to be procured. Over the 6-year period the Army plans, however, to procure only 162,000, or about 16 percent, of the mines required for the 235 dispensers.

It appears that if the Army fully believes that GEMSS is an effective way to lay mine fields and the Concepts

Analysis Agency study reflects actual requirements, then the 1981 procurement will provide an insignificant number of mines relative to the total required.

The Army told us that a technical data package deliverable under the fiscal year 1980 GEMSS procurement contract could be used for competitive procurement of a production facility and mines in fiscal year 1982. A facility for GEMSS was funded in fiscal year 1978 but was not executed. The Army's justification for the project at that time was that an automated facility would reduce unit costs and increase production rates. In fiscal year 1979, the Army requested $2.2 million to expand the proposed fiscal year 1978 project, which was not provided by the Congress.

Currently GEMSS mines are being produced by sole-source contractors using limited automated equipment. The planned fiscal year 1981 buys will also be sole-source contracts. A production facility for GEMSS is not currently included in the Army's 5-year plan to modernize and expand the ammunition production facilities. However, a project is under consideration to introduce competition, increase production capability, and reduce cost.

A second buy of GEMSS mines appears premature in fiscal year 1981 because (1) type classification slippage has delayed the fiscal year 1980 contract award until July 1980, (2) the dispenser and mines have some remaining deficiencies, (3) only limited additional operational capability will be achieved with the fiscal year 1981 planned procurements, and (4) more cost-effective automated production lines are under consideration and may be available for a fiscal year 1982 procurement.

On April 22, 1980, Army representatives said that the Army has revised its procurement plans for both the dispenser and mines and that the Army now plans to procure 114 dispensers and 274,000 mines between fiscal years 1980 and 1985 as shown below.

	1980	1981	1982	1983	1984	1985	Total
Mines	12,000	30,000	67,000	55,000	56,000	54,000	274,000
Dispensers	7	0	29	24	0	54	114

Because the Army recently made this decision, we were unable to review the Army's revised plans.

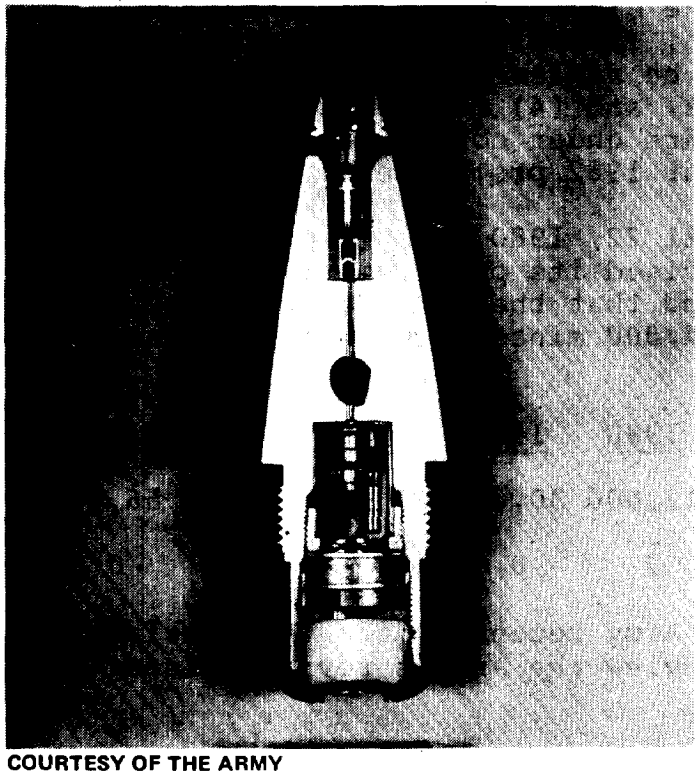
PRODUCTION BACKLOG

The Army's budget request includes $14.3 million for 588,000 M739 point detonating fuzes. The most recent cost estimate, however, is $15.1 million. The Army wants to maintain production on this fuze to keep the production base active.

The inventory is nearing the quantity needed for a balanced position with projectile assets. In fact, unless the requirements change, at the end of the fiscal year 1982 program, the point detonating fuze inventory will exceed the requirement. At such time it will be necessary to cut back on fuze production.

As of September 30, 1979, the Army, Marine Corps, and foreign military sales programs had 4,276,000 undelivered fuzes. None of the Army's 1,364,000 fuzes in its fiscal year 1979 program nor 1,259,000 fuzes from fiscal year 1978 and prior years were delivered. The Army is projecting production at 200,000 a month (far above the minimum sustaining rate) for about a 1-year period. This will eliminate much of the backlog.

The Army can keep the fuze production base active by lowering production to the minimum sustaining rate of two



COURTESY OF THE ARMY

M739 POINT DETONATING FUZE

producers for delivery of the approximately 4.2 million fuzes in the funded programs. This would provide a uniform level of production through September 1982. Readiness should not be affected since the inventory is relatively high and the production base would be in a good position to accelerate production.

INVENTORY EXCEEDS REQUIREMENTS

Because inventory exceeds requirements, the Army's request of $8.1 million should not be funded for the following:

--$3.3 million for ground-burst simulators.

--$3.1 million for 20-mm. cartridges.

--$1.7 million for 7.62-mm. cartridges.

Ground-burst simulators

The Army's request includes $6.9 million for 1,441,000 simulators, of which $3.3 million is for 464,000 ground-burst simulators. The projected inventory position is 1,633,000 ground-burst simulators at the end of the fiscal year 1980 program. This quantity exceeds the 550,000 inventory objective and the 984,000 projected training consumption for 1981 and 1982.

Army officials stated that although inventory exceeds requirements, the fiscal year 1981 program is needed to keep the production base active. However, the Army recently deleted the fiscal year 1982 program which will necessitate a downturn in production.

20-mm. cartridges

The Army requested $3.2 million for 997,000 training type 20-mm. cartridges. It is by far the smallest program in recent years. The major portion, $3.1 million, is for 951,000 cartridges to be used in the Vulcan weapon system.

The projected inventory position after the fiscal year 1980 program is 3,213,000 cartridges. This quantity exceeds the 1,406,000 inventory objective and projected 1981 training of 467,000 cartridges.

Army officials stated that the fiscal year 1981 program is needed to maintain the minimum production rate (1,000,000 cartridges a month). However, the projected production

schedule for all services is below the minimum rate. Army officials did not have estimates of unit costs at varying production levels below the minimum rate.

7.62-mm. rifle grenade cartridges

The Army requested $24.7 million for a variety of 7.62-mm. cartridges. The current estimate has increased to $27.7 million.

The request included $1.8 million for 7.62-mm. rifle grenade cartridges (the current estimate for the rifle grenades is $1.7 million). The projected inventory position of 15,149,000 rifle grenades after the fiscal year 1980 program is more than enough to meet 1981 training requirements of 8,933,000 grenades and the 4,517,000 grenade inventory objective.

Army officials at the U.S. Army Armament Materiel Readiness Command agreed that the fiscal year 1981 rifle grenade program should not be funded.

USE OF EXISTING CARTRIDGES

The Army requested $33.4 million for a variety of .50 caliber cartridges. The current estimate has increased to $38.1 million.

The request included $2.3 million for 1,524,000 linked armor piercing incendiary-tracer cartridges (the current estimate is $2.4 million). However, the Army recently decided to link existing unlinked cartridges rather than to procure new ones. Based on fiscal year 1980 costs, the linking will cost $406,908. However, an Army depot estimates the linking can be done for $310,896.

The $2.3 million request for 1,524,000 armor piercing incendiary-tracer cartridges should be decreased to $400,000 because of the decision to use existing cartridges.

REVISED COST ESTIMATES

During our review the Army revised its cost estimates for many items primarily because of more recent contract data and inflation indices. In total, the estimated amounts increased by $30.5 million for 19 items. Because $3.7 million of the increases are offset by deleting the 7.62-mm. rifle grenade cartridges and relinking .50 caliber cartridges, the net increase was $26.8 million. The amount decreased by $40.2

million for eight other items. The specific items and the amounts of increases or decreases are shown in appendix I.

Some revisions were substantial. For example, the 155-mm. propelling charge estimate was reduced by $16.3 million because the original estimate was increased without adequate support. The 155-mm. improved conventional munition estimate was reduced by $9.7 million largely because of decreased projectile and load, assemble and pack costs, and greater use of Government-furnished material.

Since we received the revised estimates during the final days of our review, we were unable to determine the validity of the changes. However, we had no basis for questioning these revised cost estimates.

CONCLUSION

We believe (1) it is premature for the Congress to provide funds for three ammunition items, (2) there is no need to procure five ammunition items during fiscal year 1981, and (3) the funds needed for several other items are different than the amounts requested to produce the quantities shown in the budget. (See app. I.)

RECOMMENDATION

We recommend that the Committee reduce the Army's ammunition appropriation request by $134.1 million for 13 items and increase the amounts by $26.8 million for 19 other items as shown in appendix I.

AGENCY COMMENTS

In April 1980 we met with Army representatives from the Office of the Deputy Chief of Staff for Research, Development, and Acquisition to discuss the contents of this report. Army representatives generally agreed with our findings and with our adjustments to 26 of the 32 items. These items represented reductions of $66.5 million and all of the recommended $26.8 million in increases.

Although Army representatives generally agreed with our findings on the other six items, they cited the following reasons why the requested funds should be provided for the fiscal year 1981 program:

--Both the M456 high explosive antitank cartridges and GEMSS have been type classified and are ready for procurement.

--The fiscal year 1981 program is required for the point denotating fuze in order to retain two contractors to produce this fuze.

--Although inventories exceed requirements for the ground-burst simulators, 20-mm. cartridges, and 7.62-mm. cartridges, the fiscal year 1981 program is required to ensure production continuity and to support workload requirements at the production plants.

Army representatives said that cavitation and crack problems are common to all projectiles using poured explosives, and not just the M456 high explosive antitank cartridges. They also said that the cavitation problem with the M456 is no more serious than with other projectiles. While we agree that cavitation is a problem with other projectiles, our review disclosed that the problem is much more serious with the M456. For example, the production process used to produce M456 test rounds at Milan resulted in a 20-percent rejection rate, which is too high for a production line. The U.S. Army Armament Research and Development Command has developed a new melt-pour process which is supposed to eliminate the cavitation problem. However, as previously stated, two of three sample projectiles produced using this improved process were rejected because of excessive cavitation. This cavitation was confirmed by X-rays and visual inspection. We believe that further procurements should not proceed until the new melt-pour process is fully developed, installed, and proven.

Regarding the inadvertent mine launching with GEMSS, Army representatives said that testing was conducted to demonstrate that the proposed fix was workable. They said that a dispenser will be modified and tested this summer by the U.S. Army Test and Evaluation Command. With respect to the more cost-effective automated production line, Army representatives said that it is an unfunded fiscal year 1982 expansion project and that it could be executed rapidly if required. We believe that the unresolved inadvertent mine launching problem should be resolved before further procurements of the mines. Independent tests of production rounds are required in order to demonstrate that the problem is resolved, and initial production tests are not planned until this summer.

With respect to the Army comments on the point detonating fuze, we believe that the Army can stretch out the 1980 and prior year programs to eliminate the backlog and still maintain the production lines at two contractor plants. Our review disclosed that a large part of the backlog is with one contractor and that the Army has identified 384,000 of 688,000

in the fiscal year 1980 program to this same contractor. The contractor will have to produce fuzes well above the minimum sustaining rate in order to reduce the backlog. Our review disclosed that the Army can stretch the deliveries and operate two contractors at the minimum sustaining rate through the fiscal year 1981 funded delivery period. This will eliminate the need to drop below the minimum sustaining rate in the future.

With respect to the ground-burst simulators, 20-mm. cartridges, and 7.62-mm. cartridges, Army representatives agreed that the projected inventory at the end of the fiscal year 1980 program is sufficient to satisfy fiscal year 1981 requirements. They said that it is better to continue production lines and stockpile inventories in support of future training needs than pay costs to shut down production lines and then reopen them in later years. We believe that these items should not be produced until they are needed. The requested funds could better be used to meet other higher priority Defense needs.

In addition to the above comments on specific items, Army representatives said they have identified other needs for the funds which would result from our recommendations for reductions. Since the decision was recently made to use the funds for other items, we were unable to review the need for them.

CHAPTER 3

AMMUNITION PLANT MODERNIZATION AND EXPANSION PROGRAM

The Army requested $251.2 million in fiscal year 1981 for 14 projects to modernize and expand the ammunition production base. The deemphasis on modernization projects noted in our report on the fiscal year 1980 program continues. Although six modernization-type projects are in the fiscal year 1981 request, they account for only about 6 percent of the total funds requested. By far the largest project is $185.8 million to continue constructing the new Mississippi Army Ammunition Plant. The Army expects to complete this plant with the fiscal year 1981 funds. Upon completion, it will provide an integrated facility to manufacture 120,000 155-mm. M483A1 projectiles a month.

The Army intends to use the remaining $65.4 million in fiscal year 1981 for

- --establishing initial production facilities for the XM211 propellant charge and the XM825 white phosphorous smoke projectile;
- --expanding the production capacities for the XM797 kinetic energy training round, Bushmaster 25-mm. ammunition, and the 8-inch M650 rocket propellant;
- --modernizing manufacturing facilities for M549 rocket propellant, repacking explosive ignitor powder, mixing powder for M18 grenades, and loading, filling, and pressing M18 grenades;
- --repairing a damaged nitrocellulose facility, building a container distribution facility, and providing improved equipment for ballistic testing; and
- --omnibus funds for future project designs.

We reviewed all 14 projects in the proposed fiscal year 1981 program and found them to be generally justified. However, we believe both the Army and the Congress should carefully examine certain issues on some of the projects. These projects and the major issues are listed below.

Project number	Description	Amount requested (millions)	Remarks
5812855	Expand Bushmaster ammunition production facilities	$11.6	Expansion project is premature
0815093	Application of radar to ballistic acceptance testing (ARBAT)	2.5	Premature, will not expand or modernize production base
5812160	Repair damaged nitrocellulose line	2.6	Includes equipment not needed at this time
5810283	Modernize smoke mix facility for M18 grenade	1.6	Includes equipment not needed at this time
5813142	Complete Mississippi Army Ammunition Plant	185.8	Additional funds may be needed to complete the facility

We also reviewed the $21.4 million fiscal year 1980 project 5802694 for the load, assemble, and pack of center core propellant charges to determine the status of the Army's actions on our prior recommendation concerning this project.

PROJECT 5812855

This $11.6 million project will provide an alternative production capability in the United States for Bushmaster ammunition. The Bushmaster gun/ammunition is the primary armament on the Army's new Infantry Fighting/Cavalry Fighting Vehicle System. This system was approved for full-scale production in December 1979. In January 1980 the Army awarded a 3-year ammunition production contract to Ford Aerospace and Communication Corporation. Ford is currently producing this ammunition under a licensing agreement with Oerlikon of Switzerland. The second and third year procurements under this contract depend on the availability of funds. In fiscal year 1980 $28.9 million was provided for the first year buy, and in fiscal year 1981 the Army is requesting $51.1 million to procure 1,149,000 rounds.

We believe this project is premature because:

--A technical data package required under the current production contract will not be available for Government acceptance until October 1981, and when available could be used to elicit competition.

--Various product improvement programs under consideration and a funded manufacturing methods and technology project intended to (1) reduce the ammunition production cost, (2) increase performance of the ammunition, and (3) assure the producibility of the sabot for the armor piercing round, are not fully reflected in this project's scope of work and its estimated cost.

--The risks involved in this project appear high because of assumptions made regarding the equipment available from prospective bidders, and a validated technical data package.

The Army's only justification for the project is to provide future competition to the existing supplier. The available production capacity when this project is completed is expected to be 826,000 rounds a month. The 5-year defense plan buys through fiscal year 1985 do not exceed 317,000 rounds a month. The Army is assuming that this project will result in an average cost reduction of $3.60 a round. Considering the quantities to be procured, this reduction would return the investment in this project in about 1 year based on the projected fiscal year 1983 planned buys when competitive procurement is expected. This reduced cost may be achievable even without this project. The current producer (Ford Aerospace and Communications Corporation) is required to deliver a technical data package in October 1981 for Government acceptance. Upon acceptance of this data, according to the Army, companies in Europe could be invited to compete for production of this ammunition. This may provide the competition the Army desires. However, the Army believes that the current European production capability is limited, and due to higher off-shore production costs foreign competition would not be as effective as domestic in reducing unit costs.

Concerns about the cost of this ammunition and the absence of a full-range tracer resulted in several product improvement programs being currently considered for funding. In addition, a manufacturing methods and technology project

was funded in fiscal year 1979 because the Army anticipated that the sabot for the armor piercing round would be difficult to mass produce. The product improvement programs being considered involve changing the current method for producing casings and shell metal parts, replacing the armor piercing tungsten penetrator with depleted uranium, and extending the tracer range as requested by the Army's Infantry Training School to achieve the full effectiveness of the ammunition. The manufacturing methods and technology project is scheduled to be completed in January 1981.

A complete production line for Bushmaster ammunition is estimated to cost $40 million. The $11.6 million requested under this project is to provide equipment which the Army believes it will have to supply to the winning bidder. The Army anticipates that the remaining equipment will be provided by the prospective bidders or be obtained from available Government equipment. The equipment needed to produce the fuze, however, is known because the Army intends to use the current producer.

The Army could not fully assure us that (1) prospective bidders will have all the supplementary equipment needed to produce the ammunition, (2) the current subcontractors will not be the suppliers to the winner of this facility contract resulting in limited competition, and (3) following this award the Army will not be required to provide additional equipment to Ford Aerospace to enable it to be competitive. Further, the Government accepted technical data package for this round will not be available until October 1981. Although the Army believes that the current data package, which primarily consists of ammunition round drawings and performance requirements, will be adequate for competitive procurement of this project, the validation process could result in changes to equipment packages.

PROJECT 0815093

This $2.5 million project provides for modernization of existing prototype equipment used for ammunition ballistics testing. The equipment, commonly referred to as ARBAT (application of radar to ballistics acceptance testing), once modernized will be installed at Jefferson Proving Grounds. The equipment will provide almost instantaneous tracking data on ammunition submitted for acceptance testing.

We believe funding this project in 1981 under this program is premature because the existing prototype has not been fully tested and changes to the existing prototype are anticipated but have not yet been designed.

The ARBAT effort began in 1970 under the Army's manufacturing methods and technology program. Since that time about $5.2 million has been provided. The Army plans to continue these efforts with a planned $550,000 in additional funding. The additional funding under the technology program will be used to (1) conduct additional testing scheduled for completion in October 1980 to determine this system's capability to track certain ammunition at long ranges, low angles, and high velocities, (2) develop performance specifications for new circuitry because the existing ARBAT contains electronic circuits which are now considered obsolete, and (3) design new circuitry, if required.

The only written justification we could obtain for this fiscal year 1981 project dated July 1979, indicates that the $2.5 million will be used to procure a second ARBAT. However, this project's scope has been revised because the existing prototype must be updated and tested first. Specifically, this project will provide funds to develop a technical data package, build new circuitry, install circuitry in the existing prototype, and install the equipment at Jefferson Proving Grounds.

Under the current proposal the funds requested for this project will be provided to the Army's Test and Evaluation Command. The Production Base Modernization Agency intends to monitor this project's execution. We understand the relationship between the production of ammunition and its testing However, we believe it is an unwise precedent to use production base modernization/expansion funds for projects which might be worthwhile but do not directly improve or expand the Army's ability to manufacture ammunition.

PROJECT 5812160

This $2.6 million project will provide funds to restore one of two dual nitrocellulose production lines housed in one building at the Radford Army Ammunition Plant. Both lines were damaged when a centrifuge on one line exploded on November 2, 1978. The second line was returned to operation within several weeks. This was achieved in part through borrowing a centrifuge stored at the Badger Army Ammunition Plant to replace one which sustained minor damage on the second line.

The estimated $2.6 million project includes $0.7 million to repair structural damage to the building housing the equip ment and $1.9 million to (1) repair the centrifuge which sustained minor damage, (2) replace or repair other equipment, and (3) provide improved methods and devices for monitoring the nitrating process. About $388,000 of the equipment costs

will be used to replace the borrowed centrifuge. The centrifuge and other equipment stored at Badger were procured under a fiscal year 1972 project; however, funds to construct a production building to house the equipment have not been provided.

The Army intends to replace the centrifuge because future nitrocellulose expansion projects are planned. No projects to expand the capability to produce nitrocellulose are included in the Army's current fiscal year 1981-85 Modernization/ Expansion Master Plan. However, a revised draft plan includes a project at the Sunflower Army Ammunition Plant to construct a nitrocellulose facility. The Army told us that the equipment stored at Badger will be used as part of the Sunflower project.

We believe that replacement of the Badger centrifuge is not required because (1) a building to house the equipment has not been provided and (2) a project is not planned until fiscal year 1983 to expand the nitrocellulose production. We commend the Army for taking action quickly through use of available equipment to restore the Radford facility.

PROJECT 5810283

This $1.6 million project is to complete modernization of an existing facility used for mixing powders for several smoke grenades. Only one of these, the M18, is currently being procured. This modernization effort was initiated under the Army's manufacturing methods and technology program. A modern mixer procured from a contractor in Europe and tested under this program is being used on the proposed production line. This line, with only one mixer has a capacity of 1.4 million pounds of powder a month. This capacity far exceeds the 5-year defense plan buys and exceeds the aggregate mobilization requirements for this powder.

Under the project the Army intends to procure a second mixer from Europe estimated to cost $385,000. This second mixer would add production capacity to this line but is primarily needed as a backup. The Army is concerned that in the event the existing mixer becomes inoperative, spare parts from Europe will not be readily available. We found that the powder being produced can be stored indefinitely and that the Army believes spare parts may require several weeks to procure. We also found that the Army has not conducted a spare part analysis to compare with the cost to procure a second mixer.

We believe the second mixer for this facility should not be procured until a full evaluation of the need is completed.

PROJECT 5813142

This $185.8 million project will provide financing for the fifth phase of a multiyear program for constructing an ammunition plant at Bay St. Louis, Mississippi. On completion, the plant will be able to produce metal parts for the 155-mm. M483A1 projectile and for the M42/M46 grenades it carries as cargo. It will also be able to fuze, load, assemble, and pack the grenade bodies and insert them into the projectile.

The Army believes that this will be the final funding request for this project. The current request would fund the grenade metal parts building ($19.8 million) and equipment ($64.8 million); the equipment to load, assemble, and pack the projectile ($39 million); and the projectile metal parts production equipment ($10.8 million). The balance of the funds ($51.4 million) will provide for various support facilities, including an administration building, storage igloos, vehicle maintenance building, flammable storage, and railroad spurs. An additional $15 million to prove out the facility will be funded partly by $8.6 million in fiscal year 1981 prove-out funds and partly through Army ammunition procurements. Prove-out is expected to be completed in December 1983.

The current estimate to complete the Mississippi plant is $416.4 million. This estimated cost to complete this plant has increased from an earlier estimate of $397 million primarily due to more current inflation indices. The Army is taking actions to insure this facility will be completed within the $416.4 million estimate. These actions include evaluating lower cost alternatives for support facilities to offset potential cost increases. Several alternatives which may result in an estimated $6.8 million savings are:

--Modifying an industrial waste treatment plant.

--Using a pre-engineered building for administrative offices.

--Using commercial locomotive maintenance shops rather than constructing shops dedicated to the new plant.

Army officials told us that savings in these areas could provide funds to offset potential increases in equipment costs. We were assured that any alternatives considered and actually implemented will not impact on the production capability of the completed Mississippi facility.

One major potential cost growth area relates to future planned equipment procurements. The Mississippi plant operating contractor estimates that $261.5 million is required to procure all the equipment needed for the plant. This estimate is about $17.2 million above the current Army estimate of $244.3 million. The Army has not concurred with the contractor's equipment estimate since it (1) is based on an inflation rate above those approved by the Office of Management and Budget and (2) has not been validated. However, if the equipment actually costs this amount and the estimated construction cost of $172.2 million is not reduced, the total cost to complete this facility will be $433.7 million.

In prior reports we recommended that the facilities for various ammunition components be balanced to insure complete round capability. The Army intends to achieve this at the Mississippi plant for 120,000 M483A1 projectiles a month. The facility will provide production facilities for projectile metal parts and cargo metal parts and for loading, assembling, and packing the projectile. The remaining production base for this round and for the M509E1 8-inch projectile which carries the same M42/M46 grenade cargo is also generally balanced. We found, however, the production capacity for the M223 grenade fuze is about 8 million below that for the grenades. This shortfall is equal to 75 percent of the grenade capacity to be available at Mississippi. The Army's modernization/expansion plan includes two projects in fiscal years 1982 and 1983 estimated to cost $38.4 million to obtain the required M223 production capacity.

In January 1979 the Army provided criteria for assigning priorities to facility projects. As interpreted by the Production Base Manager, these criteria assign the highest priority to initial production facilities and expansion of the production base to meet planned procurements. A third, lower priority is assigned to the modernization of existing facilities. A still lower priority is assigned to expanding existing facilities to meet the Army's 90 day acquisition objective. The lowest priority is assigned to projects which expand facilities to meet the Army mobilization requirements. Department of Army instructions specifically exempted the fiscal year 1981 Mississippi effort from this priority system because it was previously justified under the old Defense guidance and was already under construction.

PROJECT 5802694

This project funded in fiscal year 1980 for $21.4 million is now estimated to cost $19.6 million. This project will provide a new building at an estimated construction cost of $9.9 million and production equipment to load, assemble, and pack center core propellant charges at the Indiana

Army Ammunition Plant. The completed facility will produce two 155-mm. charges--the M203 and M119--and the 8-inch M188 charges. An initial production facility to produce these charges is expected to be completed in an existing building at the Crane Army Ammunition Activity in September 1980.

In our report 1/ on the Army's fiscal year 1980 program, we concluded that an adequate, modern facility to load, assemble, and pack center core propellant charges is justified. We also stated in our previous report that this project should not be executed until the Army further evaluates

--the equipment requirements planned for the Indiana facility and

--the feasibility of expanding the Crane production capacity in lieu of building a new facility at Indiana.

Since our last report, the Army determined that (1) some major production equipment modules originally planned for the expansion project are not required and (2) Indiana remains the most cost-effective location for the expansion project.

A value engineering study completed in September 1979 concluded that two propellant bag load modules could be replaced with less expensive equipment. The unneeded load modules result in estimated savings of $1.1 million and is part of the $1.8 million reduced project cost.

In January 1980 the Production Base Modernization Agency completed a position paper based on an engineering and cost analysis comparing the Crane and Indiana sites. This paper contains a recommendation that the expansion project be executed at Indiana as planned because this alternative appeared less costly. This recommendation was based primarily on an economic analysis which considered such things as new construction costs at Indiana, building modification at Crane, the 5-year defense plan buys, and procurements beyond 5 years. We reviewed the Agency's analysis and preliminary designs prepared for Crane. We found that two significant assumptions made regarding certain costs at Crane were questionable.

The Agency's estimated cost to expand and operate the facility at Crane closely approximate the cost to construct

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1/"Army's FY 1980 Programs For Procuring Conventional Ammunition, Modernization, and Expansion" (LCD-79-416, June 15, 1979).

and operate a new facility at Indiana over the first 5 years. This is primarily because of the Agency's first assumption that less costly automated production on the initial production facility cannot continue while the expansion project is being executed. This initial production facility shut-down period was estimated to be 13 months. During this time propellant charge production would continue using labor intensive, more costly, handlines at Indiana. We found, however, that this assumed shut-down period could be avoided because a separate building at Crane is available for the expansion project. This is based on our review of the Crane facilities preliminary designs and discussions with Army personnel. The use of this separate building which is in close proximity to the initial production facility would allow production to continue on the automated equipment.

Further the Agency's estimated cost at Crane beyond 5 years exceeds the cost at Indiana. This is primarily because of the Agency's second assumption that the available one-shift and total capacities at Crane would be below that if both the Crane initial production facility is maintained and the expansion project is placed in a new building at Indiana. The capacities for the alternatives evaluated by the Agency are below shown.

Alternatives Evaluated by the Production Base Modernization Agency

	Crane (note a)		Indiana		Total	
	One shift	Three shifts	One shift	Three shifts	One shift	Three shifts
Maintaining initial production facility at Crane and placing expansion project at Indiana	42,000	105,000	84,000	210,000	126,000	315,000
Expanding initial production facility at Crane	84,000	210,000	-	-	84,000	210,000

a/The 42,000 and 105,000 capacities will be available when the initial production facility is completed. The expansion project would include additional equipment to balance the facility and increase its capacity to 84,000 and 210,000 charges per month.

Because of projected procurements, this assumed one-shift capacity at Crane would result in a multishift operation which is generally more costly. Further, the Agency assumed that a lower capacity at Crane would require the use of costly handlines which are available at Indiana. We found, however, that if two buildings at Crane were used, the two alternative sites would have the same capacity. Therefore, there would be no incremental cost attributable to the Crane alternative based on limited production capability.

Further, we found that the Agency made the assumption that labor rates and labor-hours at both Indiana and Crane are identical. This assumption was made because comparable cost data for the three former Navy plants and the Army ammunition plants were not available.

A major concern expressed in our prior report was that a safety study was not conducted to support the Army's position that for safety reasons the expansion project could not be located at Crane. In response to our concern the Agency placed a contract to develop preliminary designs for placing the expansion project at Crane. After completion of these designs the Agency found that, to obtain a formal safety study, final designs are required. Concurrently with this effort the economic analysis was prepared and included in the position paper. Because of the Agency's conclusion that Indiana is a more cost-effective location for the expansion facility over an extended period, no further design work was conducted. Since no final design was prepared, a formal safety approval cannot be obtained and the cost of correcting any safety problems remains unknown.

A final factor mentioned by Agency officials is that because of the need to prepare a final design for Crane, to get formal safety approval, and to obtain construction authorization, this project to modify the building at Crane could not be executed until fiscal year 1982.

We remain convinced that locating this facility at Crane would be at least as cost effective as locating it at Indiana. However, we are concerned about the additional time it would now take to change this project's location and the Army's ability to proceed with its planned procurements in the least costly way. Changing sites now could delay the project, and this delay could affect readiness without any substantial savings. In view of this we believe

--full consideration should be given to the existing buildings at Crane for future year's projects and

--operating cost data should be developed that is comparable between Crane and other ammunition plants in the production base.

CONCLUSIONS

We believe that (1) it is premature for the Congress to provide funds for expanding the Bushmaster ammunition production facilities and for providing funds for ARBAT, (2) the Army does not need all equipment requested in the projects for repairing the nitrocellulose line at Radford and modernizing the smoke mix facility for M18 grenades, and (3) unless the Army can find other cost saving alternatives, there may be a need for additional funds beyond the fiscal year 1981 request to complete the Mississippi plant.

We also believe that the Army still has not adequately evaluated the feasibility of expanding the production capacity at Crane to load, assemble, and pack center core propellant charges.

RECOMMENDATIONS TO THE SECRETARY OF THE ARMY

We recommend that the Secretary reassess the use of existing buildings at Crane and other ammunition production plants for future modernization and expansion projects as alternatives to constructing new buildings at the plants.

We also recommend that the Army develop a means for comparing operating cost data for the three former Navy ammunition plants (i.e., Crane, Hawthorne, and McAlester) with the data at the Army's other ammunition plants. This cost data base is needed to permit cost comparisons between the various ammunition production locations.

RECOMMENDATIONS TO THE HOUSE COMMITTEE ON APPROPRIATIONS

We recommend that the Committee reduce the Army's fiscal year 1981 request for modernizing and expanding the ammunition production base as follows:

--Defer the $11.6 million expansion project for Bushmaster ammunition and $2.5 million for ARBAT because these projects are premature.

--Reduce by $388,000 the project for repairing the nitrocellulose line and by $385,000 the project for modernizing the smoke mix facility for M18 grenades because both projects include equipment which is not needed during fiscal year 1981.

In addition, we recommend that the Committee reduce the Army's fiscal year 1981 request by $1.8 million which is the amount available from a reduction in the estimated cost for the 1980 project to load, assemble, and pack center core propellant charges.

AGENCY COMMENTS

We discussed this report with Army representatives and they generally agreed with our findings, conclusions, and recommendations relating to the modernization and expansion projects. They did not, however, agree with our recommendation that no funds be provided for expanding the production facilities for Bushmaster ammunition. The officials said the 5-year defense plan currently being prepared shows a substantial increase in Bushmaster ammunition procurements, and as a result, the planned procurements will support a second source. Because the decision was made recently, we were unable to review the Army's decision.

Army representatives also did not agree with our recommended reduction of $0.4 million for the smoke mix facility for M18 grenades. They said that the equipment is needed for planned production. However, as stated earlier, the equipment would add some production capacity but the equipment is primarily needed as a backup. A second mixer should not be procured until a full evaluation of the need is completed.

APPENDIX I

GAO ADJUSTMENTS TO THE ARMY'S AMMUNITION REQUEST

Budget line number	Item nonmenclature	Army request	GAO adjustments	Revised estimates	Remarks
		----------(millions)----------			
3	Cartridge, 5.56-mm., blank	$ 7.6	$ 1.0	$ 8.6	Revised Army estimate
4	Cartridge, 7.62-mm., all types	24.7	1.3	26.0	Increased Army estimate offset by deleting rifle grenade cartidge
6	Cartridge, Caliber .45, ball	0.4	0.2	0.6	Revised Army estimate
8	Cartridge, Caliber .50, all types	33.4	2.7	36.1	Increased Army estimate offset by relinking rather than procuring API-T
9	Cartridge, Caliber .50, blank	5.1	-	5.1	No comment
10	Cartridge, 14.5-mm., all types	1.5	-	1.5	No comment
11	Cartridge, 20-mm., all types	3.2	-3.1	0.1	Inventory exceeds requirements
12	Cartridge, 25-mm., TP-T	13.0	1.7	14.7	Revised Army estimate
13	Cartridge, 25-mm., HEIT-T	18.0	3.7	21.7	Revised Army estimate
14	Cartridge, 25-mm., APDS-T	20.1	1.8	21.9	Revised Army estimate
15	Cartridge, 25-mm., HPT	2.4	-	2.4	No comment
16	Cartridge, HEIT for DIVAD Gun	5.1	1.1	6.2	Revised Army estimate
17	Cartridge, AP for DIVAD Gun	1.7	1.4	3.1	Revised Army estimate
18	Cartridge, TP-T for DIVAD Gun	2.3	1.1	3.4	Revised Army estimate
19	Cartridge, 40-mm., practice, low velocity	2.5	0.3	2.8	Revised Army estimate
22	Cartridge, 81-mm., practice, training	6.6	-0.1	6.5	Revised Army estimate
24	Cartridge, 81-mm., (improved), HE, w/fuze (UK)	26.3	-26.3	-	Premature buy
26	Cartridge, 4.2 inch, illum, w/fuze	29.5	-0.1	29.4	Revised Army estimate
27	Cartridge, 105-mm., HEAT-T, f/tank gun	35.1	-35.1	-	Premature buy
28	Cartridge, 105-mm., TP-T, f/tank gun	55.6	1.3	56.9	Revised Army estimate

APPENDIX I

Budget line number	Item nomenclature	Army request	GAO adjustments	Revised estimates	Remarks
		(millions)			
29	Cartridge, 105-mm., DS-TP	$ 36.4	$ 4.2	$ 40.6	Revised Army estimate
30	Cartridge, 105-mm., APFSDS-T	21.8	-	21.8	No comment
35	Projectile, 155-mm., HE, ICM (DP)	136.2	-9.7	126.5	Revised Army estimate
37	Projectile, 155-mm., HE, ADAM	49.7	-4.6	45.1	Revised Army estimate
38	Projectile, 155-mm., HE, RAAMS	61.5	-	61.5	No comment
39	Projectile, 155-mm., HE, Copperhead	121.0	-	121.0	GAO is continuing its review and may recommend adjustments in a separate report
40	Charge, propelling, 155-mm., white and red bags	154.6	-16.3	138.3	Revised Army estimate
41	Projectile, 155-mm., training	12.8	-	12.8	No comment
44	Projectile, 8 inch, HE, RAP	18.1	-	18.1	No comment
45	Charge, propelling, 8 inch, white bag	13.5	-	13.5	No comment
46	Electronic Time Fuze setter	3.8	-	3.8	No comment
47	Fuze, Electronic, Time	42.6	2.3	44.9	Revised Army estimate
49	Fuze, proximity	47.6	-5.8	41.8	Revised Army estimate
50	Fuze for training (155-mm. & 8 inch)	1.0	1.2	2.2	Revised Army estimate
51	Fuze, point detonating	14.3	-14.3	-	Production backlog
52	Fuze, mechanical time	24.3	-3.2	21.1	Revised Army estimate
53	Fuze, hand grenade, practice, all types	4.7	0.1	4.8	Revised Army estimate
56	GEMSS	11.8	-11.8	-	Premature buy

APPENDIX I

Budget line number	Item nomenclature	Army request	GAO adjustments	Revised estimates	Remarks
		(millions)			
57	Demolition munitions (XM268)	$ 2.5	$ -	$ 2.5	No comment
58	Viper Rocket Tactical Round	14.0	-	14.0	No comment
59	Viper-Tracer bullet trainer	1.1	-	1.1	No comment
60	Viper-Rocket, trainer round	2.5	-	2.5	No comment
63	Hand grenades, all types	5.3	-	5.3	No comment
64	Grenade, smoke, screening	7.5	0.4	7.9	Revised Army estimate
65	Signals, all types	0.8	-	0.8	No comment
66	Simulators, all types	6.9	-3.7	3.2	Inventory of ground-burst simulator exceeds requirements and Army estimates decreased by $0.4 million
67	Components for special tests	1.5	-	1.5	No comment
68	Components for renovation of field stock	19.2	0.9	20.1	Revised Army estimate
69	Components for prove-out	17.4	-	17.4	No comment
70	Spares and repair parts	0.2	-	0.2	No comment
71	Items less than $900,000	7.0	0.1	7.1	Revised Army estimate
72	Weapon components in support of proof/acpt. testing	2.7	-	2.7	No comment
	Total	$1,158.4	-$107.3	$1,051.1	

APPENDIX II

GAO ADJUSTMENTS TO THE ARMY'S

MODERNIZATION AND EXPANSION PROGRAM REQUEST

Project number	Description	Budget request	GAO adjustment	Remarks
		-----(millions)------		
5810045	Initial production facility at Indiana for XM211 propellant charge	$ 4.9	$ -	No comment
5810201	Initial production facility at Pine Bluff Arsenal for the XM825 smoke projectile	.8	-	No comment
5812855	Expansion of Bushmaster ammunition production facilities	11.6	-11.6	Project is premature
5813175	Expansion project at Pine Bluff Arsenal to produce 105-mm. XM797 training round metal parts	13.7	-	No comment
5812116	Expansion project at Radford for the rocket grains used in M650 projectiles	.4	-	No comment
5813142	Mississippi Army Ammunition Plant	185.8	-	Additional funds may be required to complete the facility
5812049	Modernization of production methods to produce 155-mm. M549 rocket grains at Radford	4.2	-	No comment
5812117	Modernization of facilities at Indiana and equipment to process black powder and other ignitible powders	2.4	-	No comment
5810280	Modernization of Pine Bluff Arsenal facility to load powders into smoke grenades	1.0	-	No comment
5810283	Modernization of Pine Bluff Arsenal smoke mix facility for M18 grenades	1.6	-.385	Excessive equipment
5812160	Repair of damaged nitrocellulose line	2.6	-.388	Excessive equipment
5813046	Omnibus funds for future project designs	17.4	-	No comment
5813108	Container distribution facility at Iowa	2.3	-	No comment
0815093	Application of radar to ballistics acceptance testing (ARBAT)	2.5	-2.5	Premature project questionable inclusion in Modernization/ Expansion Program
Total (fiscal year 1981)		251.2	-14.87	
5802694	Fiscal year 1980 project to load, assemble, and pack center core propellant charges at Indiana	21.4	-1.8	Reduced project cost
Total		$272.6	-$16.7	

APPENDIX III

Congress of the United States
House of Representatives
Committee on Appropriations
Washington, D.C. 20515

October 15, 1979

The Honorable Elmer B. Staats
Comptroller General of the
United States
Washington, D. C. 20548

Dear Mr. Staats:

For several years now the Committee has had GAO review the Army's annual appropriation requests for the ammunition production base and for the procurement of ammunition end-items. These reviews have been very helpful to us in reaching decisions on appropriations for these activities. As discussed with your staff, we would like to have a similar review of the Army's FY 1981 ammunition program.

As in the past, the Committee is particularly interested in your evaluation of the requests for (1) ammunition end-items involving the largest dollar amounts, (2) ammunition end-items being bought for the first time during FY 1981, and (3) projects for establishing, modernizing and expanding the ammunition production base.

Last year your staff gave us some fact sheets and questions to ask the Army concerning specific items in the Army's request. These were very helpful and we would appreciate receiving similar information again this year. We request that you provide this information to my staff during early March 1980 so that it can be used

APPENDIX III

during hearings on the FY 1981 program. With respect to your report, we would appreciate receiving it about mid-May so that we can use it during markup of the Defense Appropriations Bill.

Sincerely yours,

Jamie Whitten

Chairman

(947391)

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