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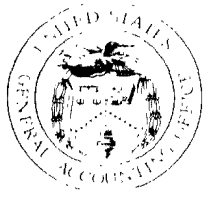
Report to the Chairmen, Subcommittees on Defense, Senate and House Committees on Appropriations

October 1989

DEFENSE BUDGET

Potential Reductions to DOD's Fiscal Year 1990 Ammunition Budget



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National Security and
International Affairs Division

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October 23, 1989

The Honorable Daniel K. Inouye
Chairman, Subcommittee on Defense
Committee on Appropriations
United States Senate

The Honorable John P. Murtha
Chairman, Subcommittee on Defense
Committee on Appropriations
House of Representatives

As you requested, we reviewed the military services' justifications for their fiscal year 1990 budget requests for ammunition items and the Army's request for ammunition production base support. In March and April 1989 we provided your offices with some observations and questions on various ammunition line items for which fiscal year 1990 funds had been requested. In June 1989 we briefed your offices on the results of our review. This report includes the information provided at those briefings and provides the final results of our review.

We are sending copies of the report to the Secretaries of Defense, the Army, the Navy, and the Air Force; the Commandant of the Marine Corps; and other interested parties.

This report was prepared under the direction of Richard Davis, Director, Army Issues, who may be reached on (202) 275-4141 if you or your staff have any questions. Other major contributors are listed in appendix V.

Frank C. Conahan
Assistant Comptroller General

Executive Summary

Purpose

The Chairmen of the Subcommittees on Defense, Senate and House Committees on Appropriations, asked GAO to review the military services' justifications for their fiscal year 1990 budget requests for ammunition and the Army's request for modernizing and expanding the ammunition production base.

Background

The military services' fiscal year 1990 ammunition budget request was for about $2.7 billion, as shown in table 1.

Table 1: Military Services' Fiscal Year 1990 Ammunition Budget Requests

Dollars in millions

Military service	Amount
Army	$1,530.5
Navy	496.3
Air Force	425.4
Marine Corps	222.3
Total	**$2,674.5**

The services justified their ammunition requests by stating that the funds were needed for training and a war reserve stockpile. The Army requested an additional $174.3 million for ammunition production base support of which $82.8 million was intended for 14 projects to modernize and expand the ammunition production base.

Results in Brief

GAO concluded that $756.2 million, or 28 percent, of the services' $2.7 billion ammunition request was not justified and should not be funded—$511.7 million for the Army, $28.5 million for the Navy, $193.3 million for the Air Force, and $22.7 million for the Marine Corps. GAO also concluded that the Army's ammunition production base support request could be reduced by $3 million.

Principal Findings

Army Ammunition Program

The Army's $1.7 billion request for ammunition and the ammunition production base was overstated by $514.7 million for the following reasons:

- $302.1 million was for three items for which the total program quantities will not be needed to meet fiscal year 1990 delivery schedules;
- $51.9 million was for two items with production backlogs;
- $35.4 million was for three items for which program quantities are greater than needed;
- $59.9 million was for two developmental items that will not be approved for production and troop use in time for inclusion in the fiscal year 1990 budget;
- $54.9 million was for two new items for which existing items can meet Army needs at a lower cost;
- $6.4 million was for an item that has not been fully tested and for which the acquisition plan is uncertain;
- $1.1 million was for an item with an overstated unit cost; and
- $3 million was for a production base support item that will not be produced in the fiscal year 1990 program.

Navy Ammunition Program

The Navy's $496.3 million request for ammunition was overstated by $28.5 million for the following reasons:

- $27.1 million was for three items that have production problems, and
- $1.4 million was for an item that will not be approved for production in time to procure it in the fiscal year 1990 program.

Air Force Ammunition Program

The Air Force's $425.4 million request for ammunition was overstated by $193.3 million for the following reasons:

- $163.3 million was for six items for which the total program quantities will not be needed to meet fiscal year 1990 delivery schedules, and
- $30 million was for three items that are not needed because requested quantities will result in excessive inventories.

Marine Corps Ammunition Program

The Marine Corps' $222.3 million request for ammunition was overstated by $22.7 million because fiscal year 1989 funds can be used to meet fiscal year 1990 needs for one item.

Recommendations

GAO recommends that the Senate and House Committees on Appropriations reduce the Department of Defense's fiscal year 1990 ammunition budget by the following amounts:

- $514.7 million for 15 items in the Army's request,
- $28.5 million for 4 items in the Navy's request,
- $193.3 million for 9 items in the Air Force's request, and
- $22.7 million for 1 item in the Marine Corps' request.

These recommended reductions are summarized by budget line number in appendixes I, II, III, and IV.

Agency Comments

As requested, GAO did not obtain agency comments on its report. GAO discussed the results of its work with Office of the Secretary of Defense, Army, Navy, Air Force, and Marine Corps officials and have included their comments where appropriate.

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Abbreviations

ADAM	area denial artillery munition
AMSAA	Army Materiel Systems Analysis Activity
CEM	combined effects ammunition
DS-TP	discarding sabot target practice
GAO	General Accounting Office
HE	high explosive
HEAA	high explosive anti-armor assault
HERA	high explosive rocket assisted
mm	millimeter
MOPMS	modular pack mine systems
TP-T	target practice-traced

Introduction

As shown in table 1.1, the military services requested about $2.8 billion for ammunition in fiscal year 1990. The $2.8 billion includes the Army's $174.3 million request for ammunition production base support.

Table 1.1: Military Services' Fiscal Year 1990 Budget Requests for Ammunition and Ammunition Production Base Support

Dollars in millions

Military service	Amount
Army	$1,704.8
Navy	496.3
Air Force	425.4
Marine Corps	222.3
Total	**$2,848.8**

The funds requested for ammunition will be used to meet training needs and to build a war reserve stockpile. The Army's ammunition production base support request of $174.3 million included

- $125.3 million for the provision of industrial facilities ($82.8 million of this amount was for 14 projects to modernize and expand the ammunition production base),
- $40 million for the layaway of industrial facilities,
- $7 million for components for prove-out,[1] and
- $2 million for the Jefferson Proving Ground Modernization.

Objectives, Scope, and Methodology

The Chairmen of the Subcommittees on Defense, Senate and House Committees on Appropriations, asked us to assess the services' justifications for their fiscal year 1990 budget requests for ammunition and the Army's request for modernizing and expanding the ammunition production base and to identify potential adjustments.

We evaluated the ammunition budget requests by reviewing such factors as ammunition requirements, inventory levels, production problems, item quality, testing and development, funded program status, unit costs, and field malfunctions to identify items with potential problems. We also analyzed production schedules, production capacities, past production, procurement lead times, and component deliveries to determine whether the services can execute the ammunition programs efficiently and economically. We compared projected inventory levels to

[1] Prove-out is an Army term used to describe the process of demonstrating a plant's production capability.

training usage to ensure that inventories would not greatly exceed objectives. We also determined whether there will be sufficient quantities of components to produce end items. We did not verify the accuracy of data the services provided, such as inventory levels and training usage, but compared such information with data provided in prior years to test it for reasonableness.

To evaluate projects for modernizing and expanding the ammunition production base, we determined whether their designs had been completed prior to budget submission and whether the projects were needed to satisfy production requirements.

In conducting our evaluation, we interviewed ammunition production managers, procurement officials, and quality assurance and engineering staff and reviewed various documents, such as briefings, program status reports, production problem meeting minutes, ballistics test reports, and budget support data, which we obtained at the following locations:

- Army, Navy, and Air Force Headquarters, Washington, D.C.;
- U.S. Army Armament, Munitions and Chemical Command, Rock Island, Illinois;
- U.S. Army Production Base Modernization Activity, Picatinny Arsenal, New Jersey;
- U.S. Army Missile Command, Redstone Arsenal, Alabama;
- Office of Project Manager for Binary Munitions, Aberdeen Proving Ground, Maryland;
- Project Manager for Tank Main Armament Systems, Picatinny Arsenal, New Jersey;
- Project Manager for Autonomous Precision Guided Munitions, Picatinny Arsenal, New Jersey;
- Project Manager for Mines, Countermines and Demolitions, Picatinny Arsenal, New Jersey;
- Close Combat Armaments Center, Picatinny Arsenal, New Jersey;
- Fire Support Armaments Center, Picatinny Arsenal, New Jersey;
- Iowa Army Ammunition Plant, Middleton, Iowa;
- Indiana Army Ammunition Plant, Charleston, Indiana;
- Naval Air Systems Command, Arlington, Virginia;
- Naval Sea Systems Command, Crane, Indiana;
- Naval Ordnance Station, Indian Head, Maryland;
- U.S. Air Force Systems Command, Aeronautical Systems Division, Wright-Patterson Air Force Base, Ohio;
- U.S. Air Force Systems Command, Armament Division, Eglin Air Force Base, Florida; and

- Ogden Air Logistics Center, Hill Air Force Base, Utah.

We discussed a draft of this report with program officials of the Army's Office of the Program Executive Officer for Ammunition, the Navy's Office of the Deputy Chief of Naval Operations for Logistics, the Air Force's Office of the Deputy Chief of Staff for Logistics and Engineering, and the Marine Corps' Office of Deputy Chief of Staff for Installations and Logistics. We made changes to the report, where appropriate, to reflect the views of these officials. As requested, we did not obtain official agency comments on the report.

We conducted our review from January to June 1989 in accordance with generally accepted government auditing standards.

Army Ammunition Program

The Army requested $1.5 billion for ammunition and $174.3 million for ammunition production base support in its fiscal year 1990 ammunition budget request. We reviewed the justifications for 47 ammunition items, representing about $1.3 billion (or about 86 percent of the request), and 3 ammunition production base support items representing $172.3 million (or about 99 percent of the request). Appendix I shows the budget lines we reviewed and the potential reductions we identified.

We believe that the Army does not need $514.7 million in fiscal year 1990 for 14 ammunition items and 1 production base support item for the following reasons:

- $302.1 million was for three items for which total program quantities will not be needed to meet fiscal year 1990 delivery schedules;
- $51.9 million was for two items with production backlogs;
- $35.4 million was for three items for which program quantities are greater than needed;
- $59.9 million was for two developmental items that will not be approved for production and troop use in time for inclusion in the fiscal year 1990 budget;
- $54.9 million was for two new items for which existing items can meet Army needs at a lower cost;
- $6.4 million was for a developmental item that has not been fully tested and for which the acquisition plan is uncertain;
- $1.1 million was for an item for which the unit cost is overstated; and
- $3 million was for a production base support item that will not be produced in the fiscal year 1990 program.

Deliveries Not Within Funded Delivery Period

According to Army budget guidance, ammunition program quantities for which funds are being requested should be delivered within the fiscal year's funded delivery period. The funded delivery period for an ammunition item is the time in months from the first delivery of the ammunition item to the last delivery for a specific fiscal year's procurement. It begins the last month of the procurement lead time and ends 12 months later. For example, if the procurement lead time for an ammunition item in the fiscal year 1990 budget is 15 months, the funded delivery period would start on December 1, 1990, and end on November 30, 1991. Since ammunition programs are funded each year, funding should not be provided for ammunition items that will be delivered after the funded delivery period.

The Army's fiscal year 1990 ammunition budget request should be reduced by $302.1 million because all or part of the quantities the Army requested for the following three items will not be delivered within the fiscal year 1990 funded delivery period:

- $106.3 million for 203,000 155-mm M203A1 red bag propelling charges,
- $148.8 million for 200,000 155-mm M864 baseburner projectiles, and
- $47 million for 155-mm M867 binary chemical projectiles.

155-mm M203A1 Red Bag Propelling Charge

The Army's $106.3 million request for 203,000 155-mm M203A1 propelling charges should not be funded because this quantity cannot be produced within the fiscal year 1990 funded delivery period, which ends September 30, 1991.

The Army's budget justification documents indicate that only 80,000 propelling charges in the fiscal year 1990 program can be produced within the fiscal year 1990 funded delivery period with production scheduled at 20,000 charges a month. However, our analysis indicates that none of the 203,000 propelling charges can be produced because of the limited availability of stick propellant. The Radford Army Ammunition Plant has to operate around the clock, 7 days a week, to produce enough stick propellant to sustain the production of 17,000 propelling charges a month. Even producing propelling charges at this rate, the Army will be unable to produce the 539,134 propelling charges undelivered from fiscal year 1989 and prior year programs by September 1991. Therefore, additional funds in fiscal year 1990 are not needed.

Army officials said that 80,000 propelling charges can be produced within the funded delivery period and that they would like to use the remainder of the funds to buy 314,000 M119A2 propelling charges and 583,000 M3A1 propelling charges. To produce the 80,000 M203A1 propelling charges, the Army proposes to increase the procurement lead time by 4 months, which would in effect extend the funded delivery period by 4 months.[1] However, Army production schedules show a procurement lead time of 12 months for fiscal years 1988 to 1989, and the Army did not have adequate support for increasing this lead time for fiscal year 1990. Concerning the alternate propelling charges, Army data indicates that there will be an excess of M3A1 charges in fiscal

[1]Procurement lead time is the sum of administrative and production lead time. Administrative lead time begins at the start of the fiscal year and represents the time needed to award contracts for components. Production lead time begins when the component contracts have been awarded and ends when initial delivery is made for the assembled ammunition item.

year 1990 and an excess of M119A2 charges after fiscal year 1991. Therefore, we see no reason for procuring these alternate charges in fiscal year 1990.

155-mm Baseburner Projectile

The Army's $178.7 million request for 240,000 155-mm M864 projectiles could be reduced by $148.8 million because 200,000 projectiles cannot be produced during the fiscal year 1990 funded delivery period. The cause for the delay is an inadequate supply of baseburner assemblies, one of the major components of the M864.

Budget backup data shows that these projectiles for the fiscal year 1990 program will be delivered within the funded delivery period, which ends in January 1992. However, revised schedules prepared by the Army show that 200,000 projectiles will be delivered after January 1992 because of delays in producing baseburner assemblies.

Production of the baseburner assemblies will be delayed because one of the contractors will move production from Arizona to Illinois and another contractor has never produced the assembly. The first contractor will produce baseburners for the fiscal year 1988 program at its Arizona plant and then move to the Joliet Army Ammunition Plant to produce the fiscal year 1989 and 1990 program quantities.

Current estimates indicate that the delivery of assemblies for the fiscal year 1990 program by the first contractor will begin in November 1991, 10 months later than originally scheduled. The second contractor is expected to begin deliveries of the fiscal year 1990 baseburner assemblies in May 1991, 2 months behind the original schedule. Given these schedules, the Army anticipates that first production of complete projectiles for the fiscal year 1990 program will begin in December 1991, or 2 months before the end of the fiscal year 1990 funded delivery period. Since only 40,000 projectiles can be produced during the 2-month period, funding of $148.8 million for 200,000 projectiles is unnecessary.

Army representatives said that, while production of a sufficient number of baseburner assemblies is problematic, production could be accelerated to produce the projectiles requested in the fiscal year 1990 program within the funded delivery period. They also expressed concern over the impact of a reduced program on the Scranton and Louisiana Army Ammunition Plants. Our assessment of the acceleration plan is that it has not been developed sufficiently to provide a degree of confidence that the Army can accomplish this ambitious plan. For example, the

Army plans to accelerate production at baseburner production facilities that have not yet produced any parts. Therefore, we continue to believe that the Army's request could be reduced by $148.8 million for 200,000 projectiles.

155-mm M687 Binary Chemical Projectile

The Army's $47 million fiscal year 1990 request for a classified number of 155-mm M687 GB-2 projectiles is premature for two reasons. First, the canister supplier has been unable to meet delivery schedules, resulting in undelivered quantities for prior year programs. Second, a new chemical production facility needed to produce the projectiles may not be completed in time to produce the requested quantity within the fiscal year 1990 funded delivery period.

The canister supplier has experienced problems in meeting past production schedules, is currently behind contract schedules, and has not demonstrated the capability to produce enough canisters for the Army to complete its fiscal year 1990 program within the program's funded delivery period. As of September 15, 1989, the contractor had increased production of canisters using multiple shifts. However, on the basis of the projected rate for September 1989, we estimate that the production backlog could not be eliminated until the end of the fiscal year 1990 funded delivery period. Therefore, we believe that additional funding is not needed in fiscal year 1990.

In addition, the Army's production schedule at the Pine Bluff Arsenal requires completing and operating a new chemical production facility in order to produce the projectiles for fiscal years 1989 and 1990. The contract for that facility was awarded in January 1988, and the Army anticipates that full-scale production will start in March 1990. On the basis of the Army's production schedules, we concluded that the Army will not be able to produce the fiscal year 1990 program quantity within the fiscal year 1990 funded delivery period. Therefore, the requested $47 million should not be provided in fiscal year 1990.

Army representatives believe that the requested quantity can be produced and that the request should be funded. In view of the delays in producing projectiles from prior years, however, we concluded that additional funding is not needed in fiscal year 1990.

Production Backlog

A total of $51.9 million of the Army's request for two items should not be funded because problems have caused a large production backlog. The items and amounts are as follows:

- $40.6 million for modular pack mine systems (MOPMS) and
- $11.3 million for 4.2-inch M329A2 high explosive (HE) mortar cartridges.

MOPMS Program

The Army's $40.6 million request for 3,327 MOPMS should not be funded because, although the Army has received $130.1 million for 8,735 MOPMS since fiscal year 1985, none have been produced. There may be further delays because the MOPMS must successfully complete production testing to ensure that it meets the design specifications before deliveries can begin.

Production of the MOPMS has been delayed over 2 years, from August 1987 to September 1989. Army project officials said that the delays were due to premature funding for procurement in fiscal year 1985. Also, as of May 1989, contractors were behind their contract schedules in delivering component parts needed for final assembly. The Army's contracting officer said that production will probably slip further, although he could not predict how much.

Before the Army accepts the MOPMS for troop use, the system must pass a first article test, scheduled for completion in November 1989, followed by a production qualification test. The purpose of these tests is to determine whether production dispensers meet design specifications. Army project officials said that they expect deliveries to start in April 1990 if testing is successful.

Further, the Army's budget justification document indicates that the procurement lead time for the MOPMS is 22 months, but project officials want to reduce the lead time and accelerate production. The Army's project engineer estimated that the production lead time can be reduced to about 16 months. Our analysis shows that if this can be done, the fiscal year 1990 program would not be needed because prior year funds could be used to support production through the fiscal year 1990 funded delivery period. Deliveries of the planned fiscal year 1991 program quantities could begin immediately after the last month of delivery of the fiscal year 1989 program quantities.

Army representatives agreed that there is a backlog but said that the funds are needed because they are facing a decreasing ammunition

budget. They said that if there are production problems, they will not request funding in fiscal year 1991. Given the substantial backlog and the potential for reducing the procurement lead time, we believe that funding in fiscal year 1990 is unnecessary.

4.2-Inch M329A2 HE Mortar Cartridge

The Army's fiscal year 1990 budget request of $11.3 million for 99,300 4.2-inch M329A2 HE mortar cartridges should not be funded because the cartridges are not functioning properly and a substantial backlog exists.

The Army's ballistics test reports show that 7 of 18 production lots tested during fiscal year 1988 were rejected because cartridges were getting stuck in the mortar barrel or had an erratic range. As of March 1, 1989, 858,262 cartridges from fiscal year 1989 and prior year programs had not yet been produced. The Army's budget justification documents show production from November 1988 through August 1990 at the 2-8-5 shift rate (two shifts, 8 hours a day, 5 days a week), averaging about 44,000 cartridges a month. Other Army production schedules show one-shift production of 26,000 cartridges a month. At 26,000 cartridges a month, production of fiscal year 1989 and prior year quantities will extend beyond the fiscal year 1990 funded delivery period, eliminating the need for additional funds in fiscal year 1990.

Army representatives initially said that a two-shift operation is needed to put the program back on schedule. They also said that the problem with the cartridge's functioning had been resolved and that operating two shifts would preclude the layoff of about 100 people. However, an Army official subsequently told us that the production line had been shut down because four of eight lots had failed tests. This representative said that the problems with the cartridge's functioning have not been resolved and that the fiscal year 1990 program may not be executable. Because the Army has had continuing problems with the M329A2 and has enough backlog to support one-shift production through the fiscal year 1990 funded delivery period, we believe that additional funding is unnecessary.

Inventory Will Exceed Requirements

An Army objective in procuring training ammunition is to acquire a sufficient quantity for training and to maintain a predetermined depot level of inventory.

A total of $35.4 million of the $82.7 million requested for three items is not needed because the Army's request provides greater quantities than needed. The Army's request is overstated by the following amounts:

- $16.5 million for 105-mm M724A1 discarding sabot-target practice (DS-TP) tank cartridges,
- $15 million for 105-mm M490A1 target practice-tracer (TP-T) tank cartridges, and
- $3.9 million for AT-4 multipurpose weapon trainers.

105-mm M724A1 Tank Cartridge

The Army's $55.9 million request for 353,000 105-mm M724A1 DS-TP tank cartridges should be reduced by $16.5 million because inventories will exceed the Army's requirements. Approximately $16.5 million for 104,000 105-mm M724A1 cartridges is unnecessary, because procuring that quantity would result in a projected excessive inventory at the end of the fiscal year 1990 funded delivery period, as shown in table 2.1.

Table 2.1: Projected Excessive Inventory of 105-mm M724A1 Cartridges

Item	Quantity
Inventory as of September 30, 1988	414,000
Quantity due in from prior year programs	459,000
Requested quantity for fiscal year 1990	353,000
Total	**1,226,000**
Less estimated usage through February 29, 1992	−973,000
Projected inventory on February 29, 1992	**253,000**
Less inventory objective	−149,000
Total excess	**104,000**

The fiscal year 1990 budget request could be reduced by $16.5 million without affecting the Army's ability to provide a sufficient number of cartridges for training and to maintain its inventory objective.

Army officials agreed that $16.5 million is not needed in fiscal year 1990 but said that they would like to use the funds to procure 23,600 120-mm M865 cartridges. Our analysis of data provided by the Army indicates that the Army will have to increase quantities of the M865 to preclude shortages in the future. However, adequate quantities will be provided for the short-term, through the fiscal year 1990 program, and therefore funding for fiscal year 1990 is not necessary.

105-mm M490A1 Tank Cartridge

The Army's $22.9 million request for 164,000 105-mm M490A1 TP-T tank cartridges should be reduced by about $15 million for 107,000 cartridges because projected inventories will exceed requirements, as shown in table 2.2.

Table 2.2: Projected Excessive Inventory of 105-mm M490A1 TP-T Cartridges

Item	Quantity
Inventory as of September 30, 1988	187,000
Quantity due in from prior year programs	394,000
Requested quantity for fiscal year 1990	164,000
Total	**745,000**
Less estimated usage through February 29, 1992	−555,000
Projected inventory on February 29, 1992	**190,000**
Less inventory objective	−83,000
Total excess	**107,000**

The fiscal year 1990 budget could be reduced by about $15 million without affecting the Army's ability to provide a sufficient number of cartridges for training and to maintain a predetermined level of inventory.

Army officials agreed that inventories will exceed the Army's needs but said that they would like to use the funds to buy 15,800 120-mm M831 tank cartridges, which will be in short supply by fiscal year 1993. According to these officials, inventories will exceed needs because requirements for the M490A1 cartridge have decreased since the budget was submitted. Our review of data provided by the Army indicates that the Army will have to increase quantities of the M831 to preclude shortages in the future. However, adequate quantities will be provided for the short-term through the fiscal year 1992 program, and therefore fiscal year 1990 funds are not required.

AT-4 Multipurpose Weapon Trainer

The Army does not need the $3.9 million it requested for 5,859,000 AT-4 multipurpose weapon trainers in fiscal year 1990 because projected inventories will exceed the Army's requirements without a fiscal year 1990 program, as shown in table 2.3.

Table 2.3: Projected Excessive Inventory of AT-4 Multipurpose Weapon Trainers

Item	Quantity
Inventory as of September 30, 1988	1,642,000
Quantity due in from prior year programs	9,754,000
Total	**11,396,000**
Less estimated usage through February 29, 1992	−9,122,000
Projected inventory on February 29, 1992	**2,274,000**
Less inventory objective	−1,497,000
Total excess	**777,000**

Therefore, the Army can meet its inventory objective for the AT-4 multipurpose weapon trainer without a fiscal year 1990 program. Army officials agreed but said that they would like to use the funds to buy additional AT-4 multipurpose weapons.

Type Classification Delayed

Type classification identifies items that are acceptable for their intended missions and for introduction into the inventory. Army policy states that, in general, ammunition items to be procured in a particular fiscal year should be type classified prior to their inclusion in the budget.

A total of $59.9 million requested for two items is premature because the planned type classification has been delayed until the second quarter of fiscal year 1990. The items and amounts are as follows:

- $15.9 million for 27,000 XM913 high explosive rocket assisted (HERA) cartridges and
- $44 million for XM900E1 105-mm tank cartridges.

XM913 HERA Cartridges

The Army is developing the XM913 105-mm high explosive rocket assisted cartridge for the new M119 105-mm lightweight howitzer. The XM913 cartridge is designed to have greater range and lethality than the existing 105-mm rocket assisted cartridge.

The Army originally planned to type classify the cartridge for limited production in December 1987. However, because of a series of contract and technical problems, the Army has postponed the program for more than 2 years. The fiscal year 1990 budget justification documents indicate that the cartridge will be type classified for full production in September 1989, but Army project officials said that this date has been

delayed until March 1990. The Army stopped advance engineering testing because of the failure of a cartridge component part that is necessary for rocket ignition.

The XM913 must still pass a series of developmental tests before it can be type classified. According to Army project office officials, testing must be completed by January 1990 in order for the cartridge to be type classified in March 1990. The Army's project manager said that this schedule is optimistic and is dependent on a problem-free test program. In addition, the M732E2 proximity fuze that is required for the XM913 has not met its reliability requirements during testing.

Army officials are aware of the recent delay in type classification. However, they still support the fiscal year 1990 program but at a reduced level of approximately 10,000 cartridges for $5.9 million. We believe that the Army's request for $15.9 million for fiscal year 1990 should be denied because of type classification delays.

XM900E1 Tank Cartridges

As discussed in one of our recent reports, unresolved technical problems with the XM900E1 tank cartridge's accuracy have prevented the Army from completing development testing and obtaining type classification approval.[2] Because of this delay, it is premature to provide the additional $44 million that the Army requested for XM900E1 cartridges in fiscal year 1990. The Army can use the $30.9 million in the fiscal year 1989 budget to meet its fiscal year 1990 needs.

Approval for low-rate initial production is to be based on development tests and a consolidated safety and verification test conducted by the Army's Test and Evaluation Command. These tests are currently in progress. In addition, the Ballistic Research Laboratory is testing XM900E1 rounds to determine the round's armor penetration capability.

Last year, the Army expected to type classify the XM900E1 round for limited procurement in December 1988, and the Congress provided $30.9 million to procure it in fiscal year 1989. The Army's most recent January 1989 justification data in support of its $44 million fiscal year 1990 budget request showed that the planned type classification date had slipped to February 1989. However, as of August 1989, the XM900E1 had not been type classified because of unresolved technical

[2]Army Ammunition: Acquisition of the M762 Electronic Time Fuze and the XM900E1 Tank Round (GAO/NSIAD-89-161, May 31, 1989).

problems. An accuracy problem, which has prevented the Army from finalizing the design, is one reason for the delay.

Developmental testing by the Army's Test and Evaluation Command has disclosed that the XM900E1 round has not met the target impact dispersion (accuracy) criteria contained in the Required Operational Capability document for the round. The Ballistic Research Laboratory has identified two problems that it believes are degrading the round's accuracy. The Army is working on design changes that it believes will enable the XM900E1 to meet the established accuracy requirement. Army officials told us that a final design cannot be completed until developmental testing has shown that the planned design changes have corrected the accuracy problem. They also said that type classification has slipped to the second quarter of fiscal year 1990. Because of this delay we believe that it is premature to provide additional procurement funds for the XM900E1 round for fiscal year 1990.

Premature Procurement

The Army requested $54.9 million for 478,118 electronic time fuzes ($47.4 million for 417,120 M762 fuzes and $7.5 million for 60,998 M767 fuzes). Our current work on the electronic time fuze did not disclose any compelling need to procure electronic time fuzes at this time and showed that mechanical time fuzes can be used to satisfy the Army's current fuze requirements at a lower cost. Therefore, we believe that the Army should procure existing mechanical time fuzes with unused fiscal year 1989 funds intended for electronic fuzes. By doing so, the Army would not need the $54.9 million it requested for electronic fuzes in fiscal year 1990.

As indicated in our May 31, 1989, report on the Army's acquisition of the M762 electronic time fuze, the Army developed the M762 and M767 electronic fuzes to fill a need for an accurate, reliable, low-cost time fuze that can be automatically or manually set. The autoset capability is required to allow future artillery systems to handle increased rates of fire, reduce response time, and eliminate human error. This feature allows the fuze to be set automatically from a remote location. The new electronic fuzes will replace the older mechanical fuzes, which do not have this autoset capability. The hand-set feature will make the electronic fuze usable in all existing and developmental projectiles in the 105-mm, 155-mm, and 8-inch artillery weapon systems. However, the

Army does not currently have an autoset capability requirement. Therefore, it does not need to procure electronic fuzes with an autoset capability and should procure the most economical fuze that meets current requirements.

Officials from the U.S. Army Materiel Systems Analysis Activity (AMSAA) maintain that both mechanical and electronic fuzes meet the Army's current requirements. Further, the product manager for fuzes agrees that mechanical and electronic fuzes have comparable operational capabilities when used with artillery systems that do not have an autoset capability.

The Army received $39.1 million in fiscal year 1989 funding to procure 368,000 electronic and mechanical time fuzes. This funding included $23.2 million to procure 161,000 M762 electronic time fuzes at an estimated unit cost of $144.10 and $15.9 million to procure 207,000 M577 and M582 mechanical time fuzes at an average unit cost of $76.81.

On May 2, 1989, the Army awarded a contract for about $16 million for 414,812 M577 mechanical fuzes, or a unit price of $38.59.[3] The unit price for the M577 mechanical fuze is significantly lower than the Army's estimate of the unit prices for the new electronic fuzes. The Army's fiscal year 1990 budget request shows unit prices of $113.55 for the M762 and $122.56 for the M767.

Since the Army had planned to procure 368,000 electronic and mechanical fuzes in fiscal year 1989 and has already procured 414,812 M577 mechanical fuzes with the amount budgeted for mechanical fuzes, the Army could apply the difference of 46,812 fuzes (414,812 minus 368,000) against its fiscal year 1990 needs.

If the $23.2 million provided for procuring electronic fuzes in fiscal year 1989 is used to procure additional mechanical fuzes, the fiscal year 1990 request of $54.9 million for electronic fuzes would not be needed. On the basis of the fiscal year 1989 contract price of $38.59 per fuze, the Army should be able to procure the 431,306 M577 fuzes (478,118 minus 46,812) in fiscal year 1990 with the $23.2 million since this is equivalent to a unit price of $53.79.

[3]The Army only procures M577 mechanical fuzes. The contractor provides M577 fuzes with M582 fuze markings at no cost to the Army. These M577 fuzes are then modified by the Army into M582 fuzes.

Army officials believe that the electronic fuze will become cost competitive with the existing mechanical fuzes when higher production rates are achieved and the electronic fuze producers have amortized their capital investments. However, on the basis of current pricing information, we believe that substantial savings could be achieved if the Army were to continue to procure mechanical fuzes, which meet the Army's current requirements.

Testing Incomplete and Acquisition Plan Uncertain

The Army's $6.4 million request for 20,000 XM840 60-mm 1/10 practice cartridges should not be funded because the Army has neither fully tested the cartridge nor decided on an acquisition strategy. The risk associated with the proposed strategy is high.

The Army plans to use the XM840 as a low-cost practice round in lieu of the high explosive rounds currently used in practice. The XM840 is reusable and can be fired 10 times after being rebuilt with components from a refurbishment kit.

The Army has not decided on an acquisition strategy for buying this cartridge but was planning to hold a meeting in the near future to decide which strategy to select. Product office officials said that they plan to propose a strategy to type classify the cartridge based solely on performance specifications, not test results. If the Army decides to type classify the XM840 cartridge based solely on performance specifications, the Army plans to select a contractor and award a production contract no earlier than May 1990. Testing the cartridge to determine whether it meets the performance specifications would be scheduled during first article and initial production testing in fiscal year 1991. Product office officials say that this is a high risk strategy because the Army would be awarding a production contract before testing the item.

A technical feasibility test indicated that the prototype XM840 appeared to satisfy U.S. military requirements, but there were several safety problems. Two of the problems were that (1) there was no way of distinguishing a failed from a spent cartridge and (2) the cartridge's fin bulged. According to product office officials, the performance specifications will include requirements that address these safety problems, but corrective actions will not be tested until after production begins.

We believe that the Army's planned fiscal year 1990 procurement of the XM840 practice cartridge for $6.4 million is premature due to the absence of an approved acquisition strategy and the high risk involved

in buying an item with known problems and without having been tested. According to Army officials at the product office and headquarters, there is no urgent need for this practice cartridge in fiscal year 1990 because about 3.5 million M49 high explosive cartridges are available for practice.

Army officials said that the XM840 must be watched closely. While we agree, we also believe that funding for this item is premature.

Overstated Unit Cost

The Army's $62.1 million request for 14,000 155-mm M731 area denial artillery munitions (ADAM) projectiles for fiscal year 1990 is overstated by $1.1 million because the unit cost is overstated. The Army used a unit cost for loading, assembling, and packing of $538.92, but updated Army data indicates that the appropriate cost is $461.51.

Army officials agree that the unit cost is overstated but would like to use the $1.1 million to buy more ADAM projectiles. Our analysis of Army data indicates that the production capability exists to produce additional ADAM projectiles during the fiscal year 1990 funded delivery period.

Ammunition Production Base Support

The Army's fiscal year 1990 ammunition production base support request of $174.3 million includes $125.3 million for the provision of industrial facilities ($82.8 million of this amount was for 14 projects to modernize and expand the ammunition production base), $40 million for the layaway of industrial facilities, $7 million for components for prove-out, and $2 million for the Jefferson Proving Ground Modernization.

We reviewed the status of the designs for all 14 projects to modernize and expand the ammunition production base, the $40 million request for the layaway of industrial facilities, and the $7 million request for components for the prove-out of ammunition production facilities.

Congressional guidance states that a project should not be funded when the final design is not completed prior to the budget submission. We found that, where applicable, final designs had been completed prior to budget submission for all but six projects. The designs had been completed after budget submission for five of these six, and the remaining project involves nine separate subprojects to correct safety deficiencies at Army ammunition plants. Although the final designs for two of the nine subprojects (involving $1.4 million) have not been completed, we

are not recommending budget reductions for them since they are being designed to correct safety deficiencies.

We believe that the Army's $40 million request for the layaway of industrial facilities is adequately justified. However, we believe that $3 million of the Army's $7 million request for components for prove-out for the 155-mm M483A1 projectile should not be funded because the Army is not scheduled to produce the M483A1 projectile during the fiscal year 1990 funded delivery period. Army officials said that the $3 million for prove-out is needed to stretch out the fiscal year 1989 production at the Mississippi Army Ammunition Plant through July 1990. Army schedules, however, indicate that sufficient components for prove-out are available in the fiscal year 1989 program to support production through September 1990.

Conclusions

We believe that $514.7 million of the Army's fiscal year 1990 request is not needed because (1) three items cannot be delivered within the funded delivery period, (2) two items have production backlogs, (3) requested program quantities for three items are greater than needed, (4) type classification is too late for two items, (5) two new items are not needed, (6) one item has not been fully tested and its acquisition plan is uncertain, (7) the unit cost is overstated for one item, and (8) components for prove-out funds have been requested for an item that is not scheduled to be produced in fiscal year 1990.

Recommendation

We recommend that the Senate and House Committees on Appropriations reduce the Army's ammunition budget request by $514.7 million for 15 items, as shown in appendix I.

Navy Ammunition Program

The Navy's fiscal year 1990 budget request consists of $496.3 million for 25 ammunition budget lines. We examined the Navy's justifications for items in 16 of these budget lines, representing $377.8 million, or 76 percent of the funds requested. Appendix II shows the budget lines we reviewed and the potential reductions we identified. We believe that the total request could be reduced by $28.5 million for the following reasons:

- $27.1 million was for three items for which program quantities will not be delivered during the fiscal year 1990 funded delivery period, and
- $1.4 million was for an item that will not be approved for production in time to procure it in the fiscal year 1990 program.

Deliveries Not Within Funded Delivery Period

A total of $27.1 million of the $36.7 million requested for three items is not needed because part of the requested quantities cannot be delivered within the fiscal year 1990 funded delivery period. The Navy's request is overstated by the following amounts:

- $13.2 million for FMU-139 fuzes,
- $8.9 million for MK 82 practice bombs, and
- $5.0 million for MK 83 practice bombs.

FMU-139 Fuzes

The Navy's $80.3 million request for general purpose bombs includes $22.8 million for 39,300 FMU-139 fuzes. Approximately $13.2 million of this request should not be funded because about half of the fuzes cannot be produced within the fiscal year 1990 funded delivery period.

The Army, which procures FMU-139 fuzes for the Navy and the Air Force, has awarded contracts to two producers. However, after being awarded contracts for the Navy's fiscal year 1985 and 1986 programs, one producer has been unable to pass qualification testing. As a result, the producer's contracts, for 75,000 fuzes, were terminated for default. The Army has not reached a decision on how to procure the 75,000 fuzes, but the options are to (1) award the contract to the other producer, (2) develop another source, or (3) add the quantity to the fiscal year 1990 program. Navy officials said that about 40,000, rather than 75,000, fuzes will likely be bought because the unit cost in the contract that was terminated for default was about half that of the other producer.

The Navy's budget support documents show a 21-month procurement lead time for the fiscal year 1990 program. However, the Navy did not have support for this lead time. We believe that this lead time is overstated because Army documents show a 12-month procurement lead time, and the Air Force's budget support documents for the fiscal year 1990 program show a 16-month procurement lead time for the FMU-139 fuze. On the basis of this information and the Navy's inadequate justification for the use of a 21-month lead time, we believe that a 16-month procurement lead time is more reasonable.

With a 16-month procurement lead time, the fiscal year 1990 deliveries should begin in January 1991 and end in December 1991. Production for the fiscal year 1988 program is scheduled to end in May 1990. There are about 101,000 fuzes in the Navy and Air Force fiscal year 1989 programs and about 40,000 to be produced from the terminated contract. The total quantity (141,000 fuzes) is sufficient to maintain production at a monthly rate of 9,000 fuzes into September 1991. This schedule leaves less than 4 months to produce the Navy's fiscal year 1990 program of 39,300 fuzes, plus the Air Force's program of 36,213 fuzes (a total of 75,513 fuzes). If production remains at 9,000 a month, 30,000 of the 75,513 fuzes can be produced through December 1991. As a result, funding for 45,513 fuzes is unnecessary. Distributing this reduction equally between the Navy and the Air Force results in a decrease of 22,756 fuzes to each program. Since Navy fuzes cost about $580 each, the reduction to the fiscal year 1990 program should be about $13.2 million.

Navy officials said that a 21-month procurement lead time should be used but did not have support for the 21-month procurement lead time. Consequently, we believe that the Navy's fiscal year 1990 program should be reduced by 22,756 fuzes, estimated to cost $13.2 million.

MK 82 Practice Bomb

The Navy's $34.4 million request for practice bombs includes $8.9 million for 20,000 MK 82 practice bombs. The $8.9 million is not needed because none of the bombs can be delivered during the fiscal year 1990 funded delivery period, which ends in October 1991.

The Army procures this item for the Navy. As of May 1989, approximately 182,700 MK 82 practice bombs had not yet been produced for the programs for fiscal years 1985 through 1989. Production of the quantities from prior years will extend through October 1991. Production delays are attributable to a lack of MS3314 suspension lugs and M72

cable assemblies (each MK 82 practice bomb uses two suspension lugs and one cable assembly). According to production officials, there is a sufficient supply of MS3314 suspension lugs to support production; however, production of M72 cable assemblies was not scheduled to start until August 1989.

In January and February 1988, contracts for both the M72 and M73 cable assemblies were awarded to two producers. Navy engineers have been providing technical assistance to one of the contractors since March 1989, and the contractor was scheduled to repeat a first article test in August 1989. If the contractor passed this second attempt, M72 cable assembly deliveries were expected to begin in September 1989. The second contractor was initially scheduled for first article testing in August 1989. However, due to delays, the first article testing has been rescheduled for October 1989, and deliveries are expected to begin in January 1990. Production of MK 82 practice bombs was scheduled to begin in June 1989; however, production has been delayed further, since M72 cable assemblies were not available.

The Navy's budget backup documents for the fiscal year 1990 program show a 19-month procurement lead time, but the fiscal year 1988 and 1989 budget backup documents show a 14-month reorder procurement lead time. In addition, Army procurement plans show a 14-month reorder lead time, and the Navy did not have support for increasing the procurement lead time. On the basis of a 14-month procurement lead time, we estimate that deliveries for the fiscal year 1990 program should begin in November 1990 and end in October 1991. However, deliveries of fiscal year 1989 and prior year programs are scheduled to be completed during October 1991. Therefore, a fiscal year 1990 program is not needed.

Navy representatives agreed that there is a problem in getting cable assemblies but said that about 30 percent of training can be done with bombs that do not contain cable assemblies. They said that if bombs without cable assemblies are used in 30 percent of training, sufficient cable assemblies will be available to produce the fiscal year 1990 program. We did not assess the merits of training with bombs that do not contain cable assemblies; however, it would seem that the type of practice bomb that the Congress has funded should be produced, rather than eliminating items that are experiencing production difficulties. We therefore believe that the $8.9 million requested for this item should not be funded.

MK 83 Practice Bomb

The Navy's $34.4 million request for practice bombs includes $5 million for 4,800 MK 83 practice bombs. The $5 million is not needed because none of the bombs can be delivered during the fiscal year 1990 funded delivery period, which ends in October 1991.

As of May 1989, the Navy had not received any of the 31,134 MK 83 practice bombs funded since fiscal year 1986, but delivery is scheduled to be completed in September 1992. Prior year delays were due to the lack of MS3314 suspension lugs and M73 cable assemblies (each MK 83 practice bomb uses two suspension lugs and one cable assembly). The Army procures this item for the Navy. According to Army production officials, there is a sufficient supply of MS3314 suspension lugs to support production; however, no M73 cable assemblies are scheduled to be produced until December 1989.

The lack of M73 cable assemblies has also delayed deliveries of MK 83 general purpose bombs. Delivery of approximately 16,800 MK 83 bombs from the fiscal year 1982 and 1984 programs and about 750 MK 83 inert practice bombs from the fiscal year 1986 and 1987 programs has been delayed due to the lack of cable assemblies.

The Navy's budget backup documents for the fiscal year 1990 program show a 22-month procurement lead time, but budget backup documents for the fiscal years 1988 and 1989 programs and the Army's procurement plans show a 14-month reorder lead time. In addition, the Navy did not have support for increasing the procurement lead time. We therefore believe that the 14-month procurement lead time is more reasonable.

On the basis of a 14-month procurement lead time, we calculate that deliveries for the fiscal year 1990 program should begin in November 1990 and end in October 1991. However, deliveries of the fiscal year 1989 and prior year programs are not scheduled to be completed until September 1992, or 11 months beyond the end of the fiscal year 1990 funded delivery period. Therefore, we conclude that the fiscal year 1990 funding is not needed.

Navy representatives agreed that there is a problem with getting cable assemblies but said that about 30 percent of training can be done with bombs that do not contain cable assemblies. They said that if such bombs are used for training, sufficient cable assemblies will be available to produce the fiscal year 1990 program. We did not assess the merits of training with bombs that do not contain cable assemblies; however, it would seem that the type of practice bomb that the Congress has funded

should be produced, rather than eliminating items that are experiencing production difficulties. We therefore believe that the $5 million requested for this item should not be funded.

Item Not Approved for Production

The Navy's $18.8 million request for 2.75-inch rockets includes $1.4 million for 3,000 illuminating M257 warheads. The $1.4 million is not needed because the M257 will not be approved for production in time to produce these quantities in the fiscal year 1990 program.

Navy representatives agreed but would like to use the $1.4 million to buy additional rocket motors.

Conclusions

We believe that $28.5 million of the Navy's fiscal year 1990 request is not needed because (1) three items cannot be delivered within the funded delivery period (as defined using more realistic procurement lead times) and (2) approval for production is too late for one item.

Recommendation

We recommend that the Senate and House Committees on Appropriations reduce the Navy's ammunition budget request by $28.5 million for four ammunition items, as shown in appendix II.

Air Force Ammunition Program

The Air Force requested $425.4 million for ammunition in its fiscal year 1990 budget. We reviewed the justifications for 15 budget line items, representing $366.9 million, or about 86 percent of the funds requested. Appendix III shows the items we reviewed and our recommended adjustments to the request. We believe that the requests for nine budget line items should be reduced by a total of $193.3 million for the following reasons:

- $163.3 million for six items was not needed because total program quantities will not be delivered during the fiscal year 1990 funded delivery period, and
- $30 million for three items was not needed because the requested quantities will result in inventories that exceed needs.

Deliveries Not Within Funded Delivery Period

A total of $163.3 million of the $229.6 million requested for six items is not needed because some of the requested quantities cannot be delivered within the fiscal year 1990 funded delivery period. Overstated amounts for these items are as follows:

- $117.5 million for CBU-87 combined effects munitions (CEM),
- $22.5 million for BDU-33 practice bombs,
- $15.8 million for FMU-139 fuzes,
- $5.6 million for BSU-49 inflatable retarders,
- $1 million for 5.56-mm plastic cartridges, and
- $0.9 million for 30-mm tubes.

CEM Program

The Air Force's request of $156.6 million for 11,537 CEMs should be reduced by $117.5 million because 8,653 CEMs are not scheduled to be delivered during the fiscal year 1990 funded delivery period. The request, which is for funding for the first year (1990) of a planned 4-year contract, includes $20 million for advanced procurement of components.

Because of delays in establishing production lines at contractor plants, production of prior year programs was delayed. Fiscal year 1985 program deliveries, for example, were delayed 4 months due to problems with contractor production lines. These problems also contributed to delays in the fiscal year 1986 and 1987 programs. In October 1987, we reported that fiscal year 1988 program deliveries were scheduled to

occur 7 months into the fiscal year 1989 funded delivery period.[1] Likewise, we reported in our October 1988 report that fiscal year 1989 deliveries could not begin until 7 months after the beginning of the fiscal year 1989 funded delivery period.[2]

Budget support documents for the fiscal year 1990 program show a 16-month procurement lead time. Deliveries for this program quantity should therefore begin in January 1991 and end in December 1991. However, according to the fiscal year 1989 delivery schedule, deliveries are not scheduled to be completed until September 1991; therefore, fiscal year 1990 deliveries cannot begin until October 1991. As a result, 9 months of deliveries will extend beyond the fiscal year 1990 funded delivery period. Consequently, the procurement of 8,653 of the 11,537 CEMs could be deferred, and the budget should be reduced by about $117.5 million.

Air Force officials said that, since the request is the first increment of funding for a planned 4-year contract, a reduction would affect the entire plan. However, we believe that, since 8,653 CEMs are not scheduled to be delivered during the fiscal year 1990 funded delivery period, the fiscal year 1990 budget for the CEM could be reduced by $117.5 million.

BDU-33 Practice Bomb

The Air Force's $22.5 million request for 1,496,481 BDU-33 practice bombs should not be funded because none of the bombs for which funding has been requested can be delivered during the fiscal year 1990 funded delivery period.

According to budget support documents, the procurement lead time for the fiscal year 1990 BDU-33 program is 14 months, and reorder lead time is 10 months. The production manager stated that a 13-month lead time was needed because bids would be solicited from more than one contractor, and if a new contractor were selected, an additional 3 to 4 months would be needed for tooling to produce quantities for the fiscal year 1990 program. Past procurements have been awarded competitively with lead times of less than 10 months, even though more than one contractor produced the item. Actual procurement lead times ranged

[1]Defense Budget: Potential Reductions to DOD's Fiscal Year 1988 Ammunition Budget (GAO/NSIAD-88-29, Oct. 27, 1987).

[2]Defense Budget: Potential Reductions to DOD's Fiscal Year 1989 Ammunition Budget (GAO/NSIAD-89-14, Oct. 20, 1988).

from 1 month to 9 months for the fiscal year 1982 to 1988 programs. On the basis of this historical data, we believe that 10 months is a more reasonable lead time for the BDU-33 practice bomb.

Using a 10-month lead time, we calculate that fiscal year 1990 deliveries will begin in July 1990 and end in June 1991. However, fiscal year 1989 deliveries are not forecast to be completed until June 1991. As a result, deliveries of the fiscal year 1990 program would not start during the fiscal year 1990 funded delivery period. Therefore, the Air Force's $22.5 million request for the fiscal year 1990 BDU-33 practice bomb program may not be necessary. According to the production manager, fiscal year 1989 deliveries will be delayed because the Air Force has requested additional practice bombs financed with reprogrammed fiscal year 1987 funds before the fiscal year 1988 and 1989 quantities are produced.

Air Force officials acknowledged that the length of procurement lead time is the key issue. They believe that the use of a 13-month lead time is reasonable, because if other vendors are selected, they may not be as efficient as the current one. However, we continue to believe that, since actual procurement lead times have ranged from 1 month to 9 months over the past several years, a 10-month lead time is more realistic.

FMU-139 Fuze

The Air Force's $25.1 million request for 36,213 FMU-139 fuzes should not be fully funded. As discussed in chapter 3, 45,513 fuzes in the Air Force and the Navy fiscal year 1990 program quantities cannot be produced during the funded delivery period. As a result, the Air Force program should be reduced by 22,756 fuzes, estimated to cost $15.8 million (Air Force fuzes cost $693 each).

Air Force officials said that the fuze backlog could be eliminated if the present contractor increased production to 13,000 fuzes per month. However, total fuze requirements are not sufficient to sustain that monthly production rate through the fiscal year 1990 funded delivery period. To increase and then decrease the production rate may increase production costs, according to an Army official.

BSU-49 Inflatable Retarder

The $5.6 million the Air Force requested for 14,969 inflatable retarders should not be funded because it is unlikely that these retarders will be produced within the fiscal year 1990 funded delivery period.

Production of the BSU-49 inflatable retarder has been delayed because the current contractor does not have the capacity to meet production requirements. The contractor has been awarded contracts to produce the Air Force's BSU-49 and BSU-50 retarders and the Navy's BSU-85 retarder. However, because the contractor has not completed the expansion of its manufacturing facilities for producing all three items, production bottlenecks and problems with material handling have caused production delays. As a result, about 27,700 BSU-49 retarders from fiscal year 1987 and 1988 programs had not been delivered as of mid-March 1989.

The delivery schedule shows that the fiscal year 1989 program is scheduled to be completed in November 1991. This schedule is based on an average production rate of about 3,800 retarders per month. However, the expanded production line will only be able to produce about 3,000 per month. As a result, our analysis indicates that the contractor cannot complete deliveries of this program until February 1992.

Budget support documents for the fiscal year 1990 program show that a 23-month procurement lead time was used to schedule fiscal year 1990 deliveries. Budget support documents, however, show that the reorder procurement lead time for this item is 16 months. Because the current contractor is scheduled to produce BSU-49 retarders for the fiscal year 1987 and 1988 programs, the reorder procurement lead time for the fiscal year 1989 and 1990 programs is appropriate.

On the basis of a 16-month procurement lead time, we calculate that fiscal year 1990 deliveries should begin in January 1991 and end in December 1991. However, delivery of the fiscal year 1989 program quantities cannot be completed until February 1992. Consequently, none of the fiscal year 1990 program quantity could be delivered during the fiscal year funded delivery period, and the Air Force's entire request of $5.6 million for 14,969 retarders could be deferred until fiscal year 1991.

Air Force officials recognize that the program is behind schedule and that an additional contractor is needed in order to catch up. They said that they will have to use existing stocks if the fiscal year 1990 program is not funded. Since the program is behind schedule and it will require some time to catch up, then existing stocks will likely be used with or without a fiscal year 1990 program.

5.56-mm Plastic Cartridge

The $1 million request for 2,998,809 5.56-mm plastic cartridges should not be funded because the fiscal year 1990 program quantities cannot be delivered during the funded delivery period.

Production of fiscal year 1988 and 1989 programs for 5.56-mm plastic cartridges is behind schedule due to problems with qualification testing. Until fiscal year 1988, the 5.56-mm plastic cartridge was produced by an overseas contractor. Three U.S. contractors are attempting to produce the cartridge at a lower unit cost but are unable to pass qualification testing. According to the project engineering team leader, production could be further delayed if the contractors fail to pass qualification testing on their second attempts.

According to budget support documents, the procurement lead time for the fiscal year 1990 5.56-mm plastic cartridge program is 11 months. Deliveries should therefore begin in August 1990 and end in July 1991. However, deliveries of the fiscal year 1989 program are scheduled to be completed in September 1991. As a result, fiscal year 1990 deliveries cannot begin until October 1991, or 3 months beyond the fiscal year 1990 funded delivery period. Therefore, the Air Force's request of $1 million for about 3 million cartridges should not be funded. Air Force representatives agreed with our conclusion.

Improved 30-mm Tube

The $1.8 million requested for 13 million improved 30-mm tubes should be reduced by $0.9 million because about half of the tubes cannot be produced during the fiscal year 1990 funded delivery period.

The improved 30-mm tube was developed to eliminate problems in loading 30-mm training cartridges into aircraft 30-mm cannons and gun pods. According to the item manager, the improved tube is needed because the current tube causes the 30-mm training cartridge to jam in excessively cold weather and to slip out of the tube in extremely hot weather.

While the tube is needed to improve loading operations, the existing contractors do not have the capacity to produce this quantity of tubes within the fiscal year 1990 funded delivery period. On the basis of the maximum production capacity of the two contractors who can produce the improved tubes, we estimate that only 6.3 million tubes can be produced within the fiscal year funded delivery period. Therefore, the request should be reduced by $0.9 million. Air Force representatives agreed with our conclusion.

Inventory Will Exceed Requirements

A total of $30 million of the $39.4 million requested for three items is not needed because the requested quantities will cause inventories for these items to exceed the Air Force's needs. Unneeded amounts for these items are as follows:

- $27 million for 20-mm training cartridges,
- $1.9 million for 30-mm straps, and
- $1.1 million for 5.56-mm blank cartridges.

20-mm Training Cartridge

The Air Force requested $27 million for 9,389,023 20-mm training cartridges. This amount is not needed because procurement of this quantity will result in an excessive inventory of training cartridges at the end of the fiscal year 1990 funded delivery period.

The Air Force projected consumption for the fiscal year 1990 program that exceeded historical rates, even though training requirements have not increased, according to an Air Force representative. The Air Force used an annual consumption rate of about 10.9 million cartridges to project consumption from May 1988 to the end of the fiscal year 1989 program. In addition, it used an annual rate of about 13.6 million cartridges to project consumption to the end of the fiscal year 1990 program. These projected figures seem excessive when compared to past consumption rates, as shown in table 4.1.

Table 4.1: Number of 20-mm Training Cartridges Used Annually

Calendar year	Quantity (20-mm TP and TPT)
1983	4,245,000
1984	4,869,000
1985	6,908,676
1986	4,478,995
1987	4,663,436
1988	7,063,144

While the Air Force's consumption of 20-mm training cartridges reached a high of about 7.1 million cartridges in calendar year 1988, the average annual consumption for calendar years 1986 to 1988 was about 5.4 million cartridges. Because the Air Force considers these rates to be valid and because training requirements for this item have not increased, consumption data for the most recent 3 years appears to be a valid indication of the Air Force's needs.

Using this average consumption rate of 5.4 million cartridges, we estimate that the Air Force will have 11.1 million training cartridges on hand at the end of the fiscal year 1990 funded delivery period without the fiscal year 1990 program. This exceeds the Air Force's inventory objective of 6.9 million cartridges for both 20-mm TP and TPT training cartridges. As a result, the Air Force would not need the $27 million it requested for 9,389,023 training cartridges.

Air Force representatives acknowledged that projected requirements exceed past consumption but pointed out that the user determines requirements and that the Air Force does what it can to meet the user requirements. On the basis of past consumptions, we believe that a fiscal year 1990 program is unnecessary.

30-mm Strap

The $1.9 million requested for 30-mm straps is unnecessary because straps procured under the fiscal year 1989 program will meet the Air Force's needs in fiscal year 1990.

The 30-mm strap is used to bind 30-mm tubes into units containing 30-mm training cartridges. The tubes are bound into units to facilitate their loading into aircraft 30-mm cannons and gun pods. According to the item manager, 30-mm training cartridges cannot be loaded into aircraft unless the tubes are bound into units with the straps.

According to the item manager, the fiscal year 1989 program quantity includes an advanced procurement of about 13.4 million straps for fiscal year 1990. This quantity is being procured to ensure that a sufficient number of straps will be available when 30-mm cartridges are produced in fiscal year 1990. This advanced procurement quantity will eliminate the need for the Air Force's fiscal year 1990 request for 30-mm straps. Air Force representatives agreed with our conclusion.

5.56-mm Blank Cartridge

The Air Force's request of $1.1 million for 10 million 5.56-mm cartridges should not be funded because the program quantity is overstated.

In developing its fiscal year 1990 request for 5.56-mm blank cartridges, the Air Force used annual consumption rates in excess of historical consumption figures, even though fiscal year 1990 training requirements for this item have not increased, according to an Air Force representative. The Air Force further overstated its request by projecting consumption based on a 12-month procurement lead time, while budget

support documents show a 10-month procurement lead time for this item.

The Air Force used an annual consumption rate of approximately 11.8 million cartridges to project consumption from May 1988 to the end of the fiscal year 1989 program. The Air Force used an annual rate of about 15.1 million cartridges to project consumption to the end of the fiscal year 1990 program. These projected consumption rates seem excessive in view of historical data, as shown in table 4.2.

Table 4.2: Number of 5.56-mm Blank Cartridges Used Annually

Calendar year	Quantity
1987	8,380,663
1988	6,563,783

On the basis of this data, we estimate that the annual consumption averaged about 7.5 million cartridges, or less than half of the 15.1 million cartridges the Air Force used to project the fiscal year 1990 consumption. An Air Force headquarters official stated that the consumption data for calendar years 1987 and 1988 is reliable because the data is based on actual consumption reported by Air Force major commands.

Using an annual consumption rate of 7.5 million cartridges, we estimate that the Air Force will have 5.1 million cartridges on hand at the end of the fiscal year 1990 funded delivery period without the fiscal year 1990 program. This exceeds the Air Force's inventory objective of 5 million cartridges. Therefore, the fiscal year 1990 request of $1.1 million for about 10 million 5.56-mm blank cartridges will not be needed. Air Force representatives agreed with our conclusion.

Conclusions

We believe that the Air Force's request is overstated by $193.3 million because (1) deliveries cannot be made during the fiscal year 1990 funded delivery period for six items and (2) requested quantities for three items will cause inventories to exceed the Air Force's needs.

Recommendation

We recommend that the Senate and House Committees on Appropriations reduce the Air Force's ammunition request by $193.3 million for nine budget line items, as shown in appendix III.

Marine Corps Ammunition Program

The Marine Corps requested $222.3 million in fiscal year 1990 for ammunition. We reviewed its justification for 20 items, representing $194.3 million, or about 87 percent of the request. Appendix IV shows the budget lines we reviewed and the potential reductions we identified. We believe that $22.7 million is unnecessary for one item because fiscal year 1989 funds can be used to fund the fiscal year 1990 program.

Premature Request

The Marine Corps' $22.7 million request for 8,611 83-mm MK6 MOD O, high explosive anti-armor assault (HEAA) rockets in fiscal year 1990 should not be funded because the Marine Corps can use the $22.6 million it received in fiscal year 1989 to fund the fiscal year 1990 program.

Marine Corps officials said that they had canceled the fiscal year 1989 program because of problems with the technical data package and excessive unit costs and that it planned to use the fiscal year 1989 funds to buy 83-mm common practice MK7-0 rockets and 60-mm illumination M721 cartridges.

Our analysis of Marine Corps budget data indicates that purchasing additional common practice MK7-O rockets may result in an inventory that will exceed the Marine Corps' objective at the end of the fiscal year 1990 funded delivery period, as shown in table 5.1.

Table 5.1: Projected Excessive Inventory of 83-mm Common Practice MK7-0 Rockets

Item	Quantity
Inventory as of September 30, 1988	0
Quantity due in from prior year programs	13,264
Quantity from fiscal year 1989 HEAA program	11,861
Requested quantity for fiscal year 1990	4,691
Total	**29,816**
Less estimated usage through September 30, 1991	−9,000
Projected inventory on September 30, 1991	**20,816**
Less inventory objective	−17,634
Total Excess	**3,182**

The Marine Corps has revised its estimated annual usage of the MK7-0 rocket to 13,500 due to increased availability of the item. If this estimate is used, the projected inventory on September 30, 1991, will be 1,318 less than the inventory objective. Concerning the M721 cartridge, the Department of Defense's Office of the Inspector General recently recommended delaying its procurement until an electronic time fuze

manufactured in the United States is available. As a result, the Army does not plan to buy the M721 for the Army until fiscal year 1991.

Given the potential for an excessive inventory of practice rockets and the recommendation of the Department of Defense's Inspector General concerning the M721, we believe that the Marine Corps should use the $22.6 million in fiscal year 1989 funds to fund the fiscal year 1990 program for the MK6 MOD O and delay procurement of the MK7-O rocket and the M721 cartridge.

Marine Corps officials said that, since the fiscal year 1989 program could not be executed, buying the two alternate items was a reasonable use of funds.

Conclusion and Recommendation

We believe that $22.7 million of the Marine Corps' fiscal year 1990 request is not needed for one item. Accordingly, we recommend that the Senate and House Committees on Appropriations reduce the Marine Corps' ammunition budget by $22.7 million, as shown in appendix IV.

Potential Reductions to the Army's Ammunition Request

Dollars in millions

Budget line number	Item	Budget request	Potential reduction	Adjusted request	Remarks
3	Projectile, 155-mm binary chemical, M687	$47.0	$47.0	$0	Production problems (see p. 14).
4	Cartridge, 5.56-mm, all types	41.7	0	41.7	-
12	Cartridge, 7.62-mm, all types	18.8	0	18.8	-
17	Cartridge, .50 caliber ball, M33	1.4	0	1.4	-
20	Cartridge, 20-mm LKD TP-T, M220	15.0	0	15.0	-
22	Cartridge, 20-mm MPT-SD M940	9.4	0	9.4	-
25	Cartridge, 25-mm AP training, M910	14.4	0	14.4	-
26	Cartridge, 25-mm APFSDS-T M919	9.1	0	9.1	-
27	Cartridge, 30-mm LKD TP, M788	10.0	0	10.0	-
28	Cartridge, 40-mm, all types	46.9	0	46.9	-
36	Cartridge, 60-mm, 1/10 practice XM840	6.4	6.4	0	Testing incomplete and acquisition plan uncertain (see p. 23)
38	Cartridge, 60-mm, smoke M722	3.6	0	3.6	-
44	Cartridge, 4.2-inch, HE, M329A2	11.3	11.3	0	Production backlog (see p. 16).
50	Cartridge, 35-mm, subcaliber practice	15.2	0	15.2	-
51	Cartridge, 105-mm, TP-T, M490A1	22.9	15.0	7.9	Inventory will exceed needs (see p. 18).
52	Cartridge, 105-mm, DS-TP, M724A1	55.9	16.5	39.4	Inventory will exceed needs (see p. 17).
54	Cartridge, 105-mm, XM900E1	44.0	44.0	0	Type classification delayed (see p. 20).
61	Cartridge, 120-mm, TP-T M831	28.5	0	28.5	-
62	Cartridge, 120-mm, TPCSDS-T, M865	63.5	0	63.5	-
63	Cartridge, 75-mm blank, M337A1	1.8	0	1.8	-
65	Cartridge, 105-mm, HERA, XM913	15.9	15.9	0	Type classification delayed (see p. 19).

(continued)

Budget line number	Item	Budget request	Potential reduction	Adjusted request	Remarks
72	Projectile, 155-mm, ADAM-L, M731	62.1	1.1	61.0	Overstated unit costs (see p. 24).
74	Projectile, 155-mm, RAAMS-L, M741	47.4	0	47.4	-
75	Projectile, 155-mm, baseburner, M864	178.7	148.8	29.9	Deliveries not within funded delivery period (see p. 13).
79	Propelling charge, 155-mm green bag, M3	11.7	0	11.7	-
80	Propelling, charge, 155-mm, red bag, M203	106.3	106.3	0	Deliveries not within funded delivery period (see p. 12).
82	Fuze, electronic time, M767	7.5	7.5	0	Mechanical time fuze can meet Army needs at lower cost (see p. 21).
84	Fuze, PD, M739	13.7	0	13.7	-
87	Fuze, electronic time, M762	47.4	47.4	0	Mechanical time fuze can meet Army needs at lower cost (see p. 21).
88	Training device, mine system	0.1	0	0.1	-
91	Mine, Volcano, AT/AP, M87	81.0	0	81.0	-
92	Mine, (MICLIC), rocket motor, MK22	6.9	0	6.9	-
93	Mine, (MICLIC), line charge, M58	9.9	0	9.9	-
94	Mine, (MOPMS), AT/AP, M131	40.6	40.6	0	Production backlog (see p. 15).
97	AT-4 multi-purpose weapon	56.0	0	56.0	-
98	AT-4 multi-purpose weapon trainer	3.9	3.9	0	Inventory will exceed needs (see p. 18).
99	Hydra 70 rocket, illuminating, M257	15.6	0	15.6	-
101	Hydra 70 rocket, smoke, M264	1.2	0	1.2	-
102	Hydra 70 rocket, MPSM practice, M267	3.9	0	3.9	-
103	Hydra 70 rocket, HE/PD, M151/M423	8.8	0	8.8	-
104	Hydra 70 rocket, signal practice M274	51.2	0	51.2	-
105	Cartridge, 165-mm, combat engineer vehicle, M623	8.1	0	8.1	-
110	Grenades, all types	12.6	0	12.6	-
112	Signals, all types	5.0	0	5.0	-
113	Simulators, all types	5.3	0	5.3	-
114	Ammunition components, all types	25.6	0	25.6	-
120	Nitroguanidine	22.8	0	22.8	-

(continued)

Budget line number	Item	Budget request	Potential reduction	Adjusted request	Remarks
123	Provision of industrial facilities	125.3	0	125.3	-
124	Components for prove-out	7.0	3.0	4.0	M483A1 production not scheduled (see p. 25).
125	Layaway of industrial facilities	40.0	0	40.0	-
Total[a]		**1,488.3**	**514.7**	**973.6**	
Total[b]		**216.5**	**0**	**216.5**	
Total		**$1,704.8**	**$514.7**	**$1,190.1**	

[a]Total for budget lines we reviewed.

[b]Total for budget lines we did not review.

Potential Reductions to the Navy's Ammunition Request

Dollars in millions

Budget line number	Item	Budget request	Potential reduction	Adjusted request	Remarks
185	General purpose bombs	$80.3	$13.2	$67.1	FMU-139 fuze deliveries not within funded delivery period (see p. 26).
190	2.75-inch rocket	18.8	1.4	17.4	Approval for production delayed (see p. 30).
193	Practice bombs	34.4	13.9	20.5	MK 82 and MK 83 deliveries not within funded delivery period (see pp. 27 and 29).
194	Cartridges and cartridge actuated devices	24.0	0	24.0	-
196	Airborne expendable countermeasures	35.5	0	35.5	-
197	Marine location markers	6.7	0	6.7	-
200	Jet-assisted takeoff	6.6	0	6.6	-
201	Gator	9.7	0	9.7	-
215	3-inch, 50-caliber gun ammunition	0.7	0	0.7	-
216	5-inch, 38-caliber gun ammunition	5.4	0	5.4	-
217	5-inch, 54-caliber gun ammunition	39.8	0	39.8	-
218	16-inch gun ammunition	26.5	0	26.5	-
219	CIWS ammunition	30.8	0	30.8	-
220	76-mm gun ammunition	5.5	0	5.5	-
221	Other ship gun ammunition	22.7	0	22.7	-
247	Small arms and landing party ammunition	30.4	0	30.4	-
Total[a]		**377.8**	**28.5**	**349.3**	
Total[b]		**118.5**	**0**	**118.5**	
Total		**$496.3**	**$28.5**	**$467.8**	

[a]Total requested for these budget lines.

[b]Total for budget lines we did not review.

Potential Reductions to the Air Force's Ammunition Request

Dollars in millions

Budget line number	Item	Budget request	Potential reduction	Adjusted request	Remarks
1	2.75-inch rocket motor	$15.6	$0	$15.6	-
2	2.75-inch rocket head	6.0	0	6.0	-
6	5.56-mm cartridge	5.4	2.1	3.3	Inventory will exceed needs, and deliveries not within funded delivery period (see pp. 35 and 37).
8	Cartridge, 20-mm, training	27.0	27.0	0	Inventory will exceed needs (see p. 36).
9	Cartridge, 30-mm, training	58.7	0	58.7	-
17	Items less than $2 million each	11.3	1.9	9.4	Inventory will exceed needs (see p. 37).
20	BSU-49 inflatable retarder	5.6	5.6	0	Deliveries not within funded delivery period (see p. 33).
25	Bomb, practice, 25-pound	24.2	22.5	1.7	Deliveries not within funded delivery period (see p. 32).
29 30	CBU-87, combined effects munition	156.6	117.5	39.1	Deliveries not within funded delivery period (see p. 31).
34	Flare, IR, MJU-7B	6.6	0	6.6	-
35	Parachute flare, LUU-2 B/B	1.7	0	1.7	-
36	Flare, IR, MJU-23B	6.0	0	6.0	-
40	Items less than $2 million each	17.1	0.9	16.2	Deliveries not within funded delivery period (see p. 35).
41	Fuze, FMU-139	25.1	15.8	9.3	Deliveries not within funded delivery period (see p. 33).
Total[a]		**366.9**	**193.3**	**173.6**	
Total[b]		**58.5**	**0**	**58.5**	
Total		**$425.4**	**$193.3**	**$232.1**	

[a]Total requested for these budget items.

[b]Total for budget lines we did not review.

Potential Reductions to the Marine Corps' Ammunition Request

Dollars in millions

Budget line number	Item	Budget request	Potential reduction	Adjusted request	Remarks
1	5.56-mm, all types	$11.8	0	$11.8	-
2	7.62-mm, all types	1.1	0	1.1	-
3	Linear charges, all types	2.6	0	2.6	-
4	.50 caliber	12.0	0	12.0	-
6	40-mm, all types	22.5	0	22.5	-
7	60-mm, illumination, M721	7.6	0	7.6	-
8	60-mm, smoke, WP	3.1	0	3.1	-
10	81-mm, HE	2.3	0	2.3	-
12	81-mm, TP, M879	10.0	0	10.0	-
13	120-mm, HEAT, MP-T, M830	8.8	0	8.8	-
15	120-mm, TPCSDS-T, M865	9.6	0	9.6	-
16	120-mm, TP-T, M831	8.6	0	8.6	-
19	155-mm, HE, M107	38.0	0	38.0	-
22	155-mm, M864, projectile, baseburner	5.9	0	5.9	-
23	155-mm, charge, white bag	2.8	0	2.8	-
24	155-mm, charge, green bag	1.9	0	1.9	-
25	Fuze, PD, M739A1	5.3	0	5.3	-
29	83-mm, rocket, HEAA (SMAW)	28.4	22.7	5.7	Fiscal year 1989 funds can be used to fund 1990 program (see p. 39).
30	Light anti-armor weapon	3.3	0	3.3	-
35	Grenades, all types	8.7	0	8.7	-
Total[a]		**194.3**	**22.7**	**171.6**	
Total[b]		**28.0**	**0**	**28.0**	
Total		**$222.3**	**$22.7**	**$199.6**	

[a]Total requested for these budget lines.

[b]Total for budget lines we did not review.

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