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REPORT BY THE U.S.

General Accounting Office

Results Of GAO's Review Of DOD's Fiscal Year 1985 Ammunition Procurement And Production Base Programs

The President's fiscal year 1985 Defense budget request included \$4.9 billion for ammunition items and \$302.2 million for enhancing ammunition production facilities.

At the request of the Subcommittees on Defense of the House and Senate Committees on Appropriations and the House Committee on Armed Services, GAO reviewed the military services' requests for funds to purchase conventional ammunition and to modernize ammunition production facilities.

This report contains the results of GAO's evaluation of the fiscal year 1985 programs. Most ammunition items and production base projects were adequately justified. However, \$627.6 million of the services' ammunition requests and \$97 million of the Army's production base request were questionable.



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NATIONAL SECURITY AND
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The Honorable Joseph P. Addabbo
Chairman, Subcommittee on Defense
Committee on Appropriations
House of Representatives

The Honorable Melvin Price
Chairman, Committee on
Armed Services
House of Representatives

The Honorable Ted Stevens
Chairman, Subcommittee on Defense
Committee on Appropriations
United States Senate

As requested, we examined the military services' justification for their fiscal year 1985 ammunition appropriation requests which totaled \$4.9 billion, and the Army's \$302.2 million request for the production base. Work on this assignment was initiated in late September 1983 and completed in June 1984. We evaluated requests involving large dollar amounts, items being bought for the first time, items that are having production and/or performance problems, and projects to enhance the ammunition production base. Additionally, we reviewed factors such as requirements, inventory position, production schedules, quality control, and testing and development status.

Our work was conducted in accordance with generally accepted government audit standards. We did not obtain official agency comments on this report; however, its contents were discussed with agency officials--both at audit site locations and service headquarters--and their views were incorporated where appropriate. This letter provides an overview of our observations and enclosures I through IV provide supporting details.

During the course of this review, we provided your staff with fact sheets and questions on selected budget line items for use during hearings held in the March timeframe. In early August, we provided a copy of the draft of this report to use in your deliberations to reach decisions on funding levels for conventional ammunition and related production base activities for fiscal year 1985.

In accordance with your request, this final report highlights the overall results of our review and summarizes the data previously provided to you. In addition, it is a useful vehicle for communicating the results of our review to interested members of the ammunition community.

We found that most ammunition items and production base projects were adequately justified. However, \$627.6 million of the services' ammunition requests and \$97 million of the Army's production base request appeared to be questionable.

After we completed the fieldwork, the Department of Defense reduced the Army, Navy, and Air Force appropriation requests by \$185.1 million, \$62 million, and \$205 million, respectively. Several of the reductions coincided with items we believed were not adequately justified. The following overview of findings was based on the President's budget request and does not consider the reductions. However, the enclosures discuss these revisions where appropriate.

ARMY AMMUNITION PROGRAM

We concluded that the Army's \$2.2 billion request for ammunition could be overstated by \$432.9 million which consisted of the following:

- \$222 million for seven items for which total program quantities could not be delivered on schedule.
- \$106 million for 16 items for which additional buys would cause inventory to exceed requirements.
- \$25.8 million for a propelling charge which would buy more charges than the number of projectiles with which it is used.
- \$10.2 million for possible premature procurement of 4.2-inch mortar smoke cartridges.
- \$42.8 million for improved 81-mm. (I81-mm.) cartridges for which need had not been established.
- \$26.1 million for two 40-mm. fuzed cartridges for which the ammunition and weapon system programs were not synchronized.
- The request for 155-mm. binary chemical projectiles probably was not necessary because the request was limited to certain components.

Additionally, we found potential problems with 120-mm. ammunition.

NAVY AMMUNITION PROGRAM

The Navy's \$836.9 million request for ammunition appeared to be overstated by \$88.4 million for the following reasons:

- \$20.7 million for FMU-139 fuzes which could not be delivered until after the fiscal year 1985 funded delivery period.
- \$24.4 million for the net overstated amount for eight budget line items that had more current prices available.
- \$4.2 million for procuring Skipper components when the requirement could be satisfied by retrofit of components from Navy inventory.
- \$12.9 million for the 5-inch/54-caliber guided projectile to increase the production capacity of the current producer to the maximum quantity needed, even though a second source was anticipated.
- \$6.5 million for 30-mm. ammunition war reserve requirements, for which the necessary retrofit program had not yet been implemented.
- \$19.7 million for Bigeye bombs which appeared premature because the request was limited to bomb components, production facilities were not available, and there were technical problems with the bomb.

In addition, there were unresolved problems and issues with both low-level laser-guided bomb kits and 25-mm. ammunition.

AIR FORCE AMMUNITION PROGRAM

The Air Force's \$1.4 billion request for ammunition appeared to be overstated by \$106.3 million for the following reasons:

- \$43.2 million of the \$148.2 million requested for two items was not needed because deliveries extended beyond the fiscal year 1985 funded delivery period.
- \$10.5 million of the \$98.2 million requested for four items was not needed because unit cost estimates were overstated.

- \$8.7 million was not needed for BDU-33 practice bombs because the Air Force had not considered all assets in determining program quantity.
- \$24.1 million for the Durandal air field attack weapon was questionable because the weapon is relatively ineffective and is being replaced.
- \$19.8 million for Bigeye bombs was premature because the request was limited to bomb components, production facilities were not available, and there were technical problems with the bomb.

In addition, the \$36.2 million request for 30-mm. high explosive incendiary cartridges was not needed because the fiscal year 1984 program will exceed inventory objectives. However, deleting this program could adversely affect an ongoing multiyear contract. Therefore, we concluded it might be advisable to apply the \$36.2 million to the 30-mm. armor piercing incendiary cartridge.

ARMY'S AMMUNITION PRODUCTION BASE PROGRAM

The Army's \$302.2 million request for its ammunition production base program appeared to be overstated by \$97 million for the following reasons:

- \$44 million for four RDX/HMX related projects at the Holston Army Ammunition Plant was premature because designs were incomplete.
- \$42 million for three binary-munitions-related projects was premature because designs were incomplete, the request was limited to long-lead-time equipment for two projects, and technical problems involving the Bigeye bomb need resolution before funding the third project.
- \$11 million for design of an HMX facility was premature until numerous questions are answered.

- - - -

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



Frank C. Conahan
Director

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ABBREVIATIONS

AAO	Army acquisition objective
AAP	Army Ammunition Plant
ADAM	area denial artillery munitions
API	armor piercing incendiary
APIT	armor piercing incendiary training
DC	methylphosphonic dichloride
DF	methylphosphonic difluoride

DOD	Department of Defense
DT&E	developmental testing and evaluation
HE	high explosive
HEI	high explosive incendiary
HEICM	high explosive improved conventional munitions
LAP	load, assemble, and pack
LGB	laser-guided bomb
LLLGB	low-level laser-guided bomb
MICLIC	Mine Clearing Line Charge
OSD	Office of the Secretary of Defense
RAAMS	remote antiarmor mines system
TP	target practice

ENCLOSURE 1

ARMY AMMUNITION PROGRAM

The Army's \$2,191.8 million request is for conventional ammunition, miscellaneous items, chemical munitions, and nuclear materials. We reviewed the Army's justification for 59 items, representing about 76 percent of the total request. We concluded that \$432.9 million is questionable for the following reasons:

- A total of \$222 million for seven items may not be needed because total program quantities cannot be delivered on schedule.
- A total of \$106 million for 16 items appears unnecessary because inventory will exceed requirements.
- \$25.8 million for propelling charges appears questionable because the number of propelling charges will exceed the number of projectiles with which it is used.
- \$10.2 million for 4.2-inch mortar smoke cartridges is questionable because the programmed procurement may be premature.
- A total of \$42.8 million for 81-mm. cartridges may not be needed because the need for the cartridges has not been established.
- \$26.1 million is questionable for two 40-mm. fuzed cartridges because the ammunition and weapon system programs are not synchronized.
- None of the request for 155-mm. binary chemical projectiles may be necessary because the request is limited to certain components. The dollar amount is classified.

In addition, there are potential problems with 120-mm. ammunition, of which the Committees should be aware.

DELIVERIES NOT WITHIN FUNDED DELIVERY PERIOD¹

According to Army guidance, ammunition program quantities reflected in a fiscal year budget request are to be delivered within the fiscal year funded delivery period, lead times considered. Quantities not deliverable within the funded delivery period should be programmed for a later fiscal year.

Our review indicates \$222 million of the Army's request for seven items is questionable because the total quantities requested will not be delivered within the fiscal year 1985 funded delivery period. The items and questionable amounts are

- \$40 million for 155-mm. high explosive (HE) dual-purpose improved conventional munitions (ICM) projectiles,
- \$25.1 million for two models of 155-mm. area denial artillery munitions (ADAM) projectiles,
- \$31 million for two models of 155-mm. remote antiarmor mines system (RAAMS) projectiles,
- \$98 million for 8-inch HE ICM projectiles, and
- \$27.9 million for proximity fuzes (M732).

155-mm. high explosive dual-purpose improved conventional munitions projectiles

About \$40 million of the \$252 million request for 598,000 155-mm. high-explosive dual-purpose M483 projectiles is questionable because 95,000 projectiles will not be delivered within the funded delivery period, which ends September 1986. We considered suggesting other reductions so that the Army could initiate action to align the production base with prospective program requirements for the projectile. It seems that the Army's best interests would be served by eventual elimination of one of three scheduled producers. Program quantities would have to be almost doubled to use the production base efficiently; however, requirements for the projectile might in fact be significantly reduced in the future if the Army increased emphasis on other programs, e.g., light artillery. However, it is reasonable for the Army to defer a decision on adjusting its production base until firm requirements are established for the projectile.

¹See definition in appendix VI.

The production schedule in budget justification data shows that 95,000 projectiles will be delivered after the funded delivery period ends in September 1986. In response to Committee questions about this matter, the Army said it had taken action to get the program on schedule. Subsequently, however, in discussing our draft report, Army officials said the program was intentionally scheduled several months beyond normal lead times to maintain monthly production continuity with the fiscal year 1986 program, which is smaller than the 1985 program. This action seems inconsistent with past Army practice of not funding quantities that cannot be delivered during the normal funded delivery period. In our opinion, funds needed to support production in the fiscal year 1986 program period should be requested in fiscal year 1986--not a year earlier than needed. The Army has used a 12-month lead time for this item for several years, and we found no circumstances that would warrant increasing the lead time for the fiscal year 1985 program.

Three ammunition plants (Kansas, Milan, and Mississippi) are scheduled to produce the projectile. Their combined capacity on a 1-8-5² rate is expected to reach 97,000 projectiles a month, or 1.16 million projectiles a year.

There appears to be some question whether the M483 program will ever consistently support 1-8-5 production levels at all three plants. Defense-wide program quantities for fiscal years 1984-86 are 654,000, 846,000, and 703,000 projectiles, respectively. Further, Army officials told us that if greater emphasis is placed on the light artillery program and requirements for the M483 projectile are reduced significantly, lines at one or two load plants and one metal parts producer might have to be shut down.

According to Army officials, the two most efficient plants will ultimately be Mississippi and Milan. Therefore, it seems advisable to produce the M483 at these locations. However, even their combined 1-8-5 capacity of 80,000 projectiles a month (or 960,000 a year) may be difficult to support.

155-mm. area denial artillery munitions

Of the Army's \$64.8 million request for 14,437 155-mm. ADAM projectiles, \$25.1 million for 5,600 projectiles may be questionable because it is highly unlikely that these can be

²See definition in appendix VI.

delivered within the funded delivery period. Further, the Army has encountered "dud" and stockpile reliability problems which may affect production scheduling.

Both the Army and Marine Corps are requesting this item as follows:

<u>Item</u>	<u>Army</u>		<u>Marine Corps</u>	
	<u>Quantity</u>	<u>Amount</u> (millions)	<u>Quantity</u>	<u>Amount</u> (millions)
ADAM M692	7,196	\$32.3	3,784	\$17.0
ADAM M731	<u>7,241</u>	<u>32.5</u>	<u>4,080</u>	<u>18.3</u>
Total	<u>14,437</u>	<u>\$64.8</u>	<u>7,864</u>	<u>\$35.3</u>

Budget justification data shows, and Army officials contend, that the quantities will be delivered by September 1986 --the end of the funded delivery period. However, officials at the procuring activity maintain that the funded delivery period is based on an unrealistically short procurement lead time of 12 months, which was arbitrarily imposed by the Office of the Secretary of Defense. According to these officials, historical data indicates that 15 months is more realistic due to the long lead time required to obtain electronic components (housing, timing, and fuzing devices). They contend that 5,600 projectiles will be delivered between October and December 1986, which corresponds with the end of a funded delivery period based on a 15-month procurement lead time.

Our analysis indicates that delivery of the fiscal year 1985 program quantities will be finished during December 1986. We could not determine whether this was because of production lead time or production backlog. However, a substantial portion of the fiscal year 1984 program is scheduled for delivery during the fiscal year 1985 funded delivery period, thus delaying first delivery of the fiscal year 1985 program. The question then is whether the budget data lead time is too short or whether the production backlog will preclude delivery of the 1985 program in the funded delivery period.

Production officials estimate it takes 11 or 12 months to receive first delivery of the electronic components once the contract has been awarded. If these times are valid, a procurement lead time of 12 months apparently is achievable. The Army could take many actions short of contract award before the

fiscal year begins. Congressional delays in enacting appropriations bills could be neutralized by use of a continuing resolution. A contract could then be awarded in October or November, if a number of administrative requirements were taken care of in advance.

If a 12-month procurement lead time is not attainable, a reduction in the program quantity could result in decreasing production from the current 1-8-5 monthly rate to the minimum sustaining rate³ to avoid a break in production. However, this could be avoided by providing advance procurement authority in the fiscal year 1985 program for electronic components needed in the fiscal year 1986 program.

Further, if problems, e.g., duds, continue, a reduction in production levels may be necessary. The Army established two committees to investigate the several problems associated with the ADAM. In its response to Committee questions, the Army stated that investigation had not revealed any reasons to discontinue production. We did not have time to evaluate the responses. However, we believe the collective problems with the ADAM could easily result in production cutback.

The Committees may wish to consider decreasing the Army's request by \$25.1 million for the 5,600 projectiles to be delivered between October and December 1986. If such a reduction is made, the Army may need advance procurement authority of \$591,700 for electronic components (housing, timing, and fuzing devices) to preclude a break in production.

155-mm. remote antiarmor mines system

About \$31 million of the Army's \$96.7 million request for 52,903 155-mm. RAAMS projectiles may not be needed because probably not all of the program quantity will be delivered in the funded delivery period.

Both the Army and Marine Corps are requesting this item as follows:

³See definition in appendix VI.

<u>Item</u>	<u>Army</u>		<u>Marine Corps</u>	
	<u>Quantity</u>	<u>Amount</u> (millions)	<u>Quantity</u>	<u>Amount</u> (millions)
RAAMS M718	16,445	\$30.2	8,448	\$15.1
RAAMS M741	<u>36,458</u>	<u>66.5</u>	<u>6,656</u>	<u>11.9</u>
Total	<u><u>52,903</u></u>	<u><u>\$96.7</u></u>	<u><u>15,104</u></u>	<u><u>\$27.0</u></u>

Budget justification data for the fiscal year 1985 request indicates that the 1985 program quantity would be delivered within the funded delivery period ending in September 1986 using a procurement lead time of 12 months. However, according to Army officials, the procurement lead time should be 15 months due to the time required to obtain electronic components.

Production officials have scheduled delivery of 16,800 projectiles, estimated to cost \$31 million, between October and December 1986, or 3 months beyond the funded delivery period indicated in budget data.

However, a program reduction may be advisable because future requirements for the projectile may be reduced significantly because of potential increased emphasis on the light artillery program. If that occurs, the Army expects significant reductions in RAAMS requirements due to increased emphasis on other scatterable mine systems. In fact, an Army official indicated that a fiscal year 1985 procurement of RAAMS projectiles could be the last.

Army officials told us our point was moot since the Army's revised budget deletes \$30.2 million from the program.

8-inch high-explosive,
improved conventional munitions projectiles

The \$146.5 million request for 170,000 8-inch M509A1 HE ICM projectiles could be reduced by \$98 million. First, about 44,000 projectiles estimated to cost \$38 million are scheduled for delivery outside the funded delivery period. Second, significant quantities funded in prior years have not been delivered and the Army has developed an optimistic schedule for eliminating the backlog. Third, the program could be reduced by an additional 70,000 projectiles estimated to cost \$60 million to reflect a more reasonable production rate.

The production schedules in budget justification data show that 44,000 projectiles will be delivered after the funded delivery period ends in September 1986. Army officials acknowledge that deliveries are outside the funded delivery period, but contend that the program should be fully funded because of the relatively low inventory position. We are aware of the inventory position; however, funding needed to support production during the fiscal year 1986 funded delivery period should not be requested in fiscal year 1985.

Although the Army has apportioned funds for this projectile annually since fiscal year 1981, initial production did not begin until March 1984. Total funded program quantities are shown in the following table.

<u>Fiscal year</u>	<u>Army</u>	<u>Marine Corps</u>	<u>Foreign military sales</u>	<u>Total</u>
1982 and prior	96,000	16,000	-	112,000
1983	99,000	44,000	9,000	152,000
1984	<u>137,000</u>	<u>11,000</u>	<u>-</u>	<u>148,000</u>
Total	<u>332,000</u>	<u>71,000</u>	<u>9,000</u>	<u>412,000</u>

The delay in deliveries is attributable to the inability to produce the projectile as designed. For example, production problems resulted in a change from a press fit to a threaded base plate. Further, an inbore (projectile explosion in the gun barrel) occurred in July 1983 during ballistics testing of the threaded base projectile, which resulted in a change to the technical data package. Final testing of the new design in January 1984 was successful.

The Army's production plans for eliminating the backlog seem overly optimistic. Beginning in August 1984, the Lone Star Army Ammunition Plant (AAP) is scheduled to produce in excess of the 1-8-5 rate of 8,000 projectiles a month on each of two lines. Army production officials believe that Lone Star's learning curve in producing the projectile will be minimal. They said that although Lone Star has no production history with the 8-inch M509A1, the plant has produced the 155-mm. M483 HE ICM projectile for about 8 years, and that production operations are similar for both projectiles. Accordingly, we believe that the Lone Star AAP has the potential to initiate dual line

production with minimal learning problems. However, until Lone Star demonstrates sustained production at the 1-8-5 rate, we believe it would be prudent for the Army not to plan production at higher levels.

Production officials said that a reasonable production level was 17,000 projectiles a month based on a daily production rate of 800 projectiles and an average of 21 workdays per month.

By scheduling production at the rate of 17,000 projectiles per month beginning in August 1984, delivery of the total Defense program quantities for prior fiscal years would extend through May 1986--8 months into the fiscal year 1985 funded delivery period. A total of 75,000 projectiles would be needed in the fiscal year 1985 program for delivery in the remaining months through September 1986. Since the Marine Corps is requesting funding for 19,000 projectiles in its fiscal year 1985 program, the Army will need funding for 56,000 projectiles. Therefore, the Committees could reduce the Army's request by 114,000 projectiles estimated to cost \$98 million.

Army officials agree that deliveries extend 3 months beyond the normal funded delivery period. They contend that the program should not be reduced because of the low inventory of this item. We agree the inventory position is low, but we do not see how funding 3 months' production outside the funded delivery period will enhance production.

Proximity fuzes, M732

The \$47.7 million request for 825,000 M732 proximity fuzes could be reduced by at least \$27.9 million because of production delays; i.e., production of prior year program quantities will be suspended in May 1984 until a design problem with the power supply is resolved.

The Army has found leakage and corrosion in power supplies of M732 fuzes and has traced the problem to a design flaw. Production will be suspended until the problem can be resolved. According to Army officials, the current contracts for the power supply have been terminated and the Lone Star AAP will stop producing the fuzes in May 1984. One contractor will continue to assemble the fuze for the fiscal year 1983 program up to the point of installing the power supply. The unfinished fuzes will then be stored until the power supply problem is resolved.

Precisely when the fiscal year 1983 program will resume is uncertain. However, Army production officials predict that Lone Star could resume production between November 1985 and January 1986.

If production resumes in November 1985, about 342,000 fuzes in the fiscal year 1985 Army program can be delivered within the funded delivery period, which ends in September 1986. None of the fiscal year 1985 program can be delivered by September 1986 if production resumes in January 1986. Assuming production starts in November 1985, the Army will need \$19.8 million to fund 342,000 fuzes. Therefore, the program can be reduced by \$27.9 million.

Army officials agreed that a reduction of \$27.9 million was appropriate.

INVENTORY WILL EXCEED INVENTORY OBJECTIVES

Inventory objectives are computed differently for ammunition intended for combat use than for ammunition intended exclusively for training. The combat ammunition objective is the quantity needed to sustain approved forces for a specified time during a war. The training-unique ammunition objective includes 25 percent of projected training requirements for the last year in the Program Objective Memorandum period plus two increments of mobilization training, referred to as Mobilization A and Mobilization B requirements. The Mobilization A requirements are for units scheduled to deploy earlier than the units in the Mobilization B category. According to Department of the Army officials, the Mobilization B training requirements should not be funded.

Our review indicates that at least \$68.8 million of the funds requested for 16 items is questionable because program quantities will cause inventories at the end of the funded delivery period to exceed objectives.

Additional amounts are questionable because the Army's projected training requirements appear overstated compared with past actual training consumption as shown below.

<u>Item</u>	<u>Basis</u>	
	<u>Excess program quantity</u>	<u>Possible overstated training requirements</u>
Cartridges:		
5.56mm. ball	\$17.5	\$21.3
5.56mm. blank	3.5	
7.62mm. linked	9.9	
.22 cal. ball, long rifle	.2	
.22 cal. ball, match	.4	
.50 cal. 4ball/1tracer	9.6	5.5
.50 cal. APIT	1.0	
.50 cal. ball	1.2	1.9
.50 cal. tracer	.8	.9
40mm. practice	1.5	
Subcal. 22mm. M744	.3	1.1
Subcal. 22mm. M746	.4	1.0
Subcal. 22mm. M747	.8	.9
105mm. TP-T, M490	12.2	
Signals (HC smoke pots)	9.5	
Simulators (ATWESS)		<u>4.6</u>
Total	\$68.8	\$37.2

5.56-mm. ball cartridges

The Army's \$57.2 million request for 390.7 million 5.56-mm. ball cartridges is only partially justified because the quantity requested would result in excess inventory. The entire request may be unnecessary because projected training requirements appear overstated. However, to maintain production at a 1-8-5 rate, the Army's program must provide funds for 126.1 million cartridges.

On the basis of Army's receipt, loss, and inventory data, the quantity requested will result in excess inventory of 119,260,000 cartridges at the end of the funded delivery period in June 1986, as follows:

	<u>Quantity</u>
Inventory at September 30, 1983	456,305,000
Due in	564,317,000
Fiscal year 1985 request	<u>390,705,000</u>
Total	1,411,327,000
Less: Estimated losses through June 1986	<u>764,324,000</u>
Projected inventory at June 1986	647,003,000
Less inventory objective	<u>527,743,000</u>
Excess	<u><u>119,260,000</u></u>

The excess could be even greater because the Army's projected monthly training requirements of 22,865,000 cartridges appear to be overstated. Past actual monthly consumption has been much lower, as follows:

<u>Fiscal year</u>	<u>Average monthly consumption</u>
1983	13,451,000
1982	13,926,000
1981	12,309,000
1980	11,809,000

Our analysis of inventory records shows that there were enough cartridges available to permit greater consumption. If the Army's request were limited to 126.1 million cartridges to support a 1-8-5 production rate, there would be sufficient quantities to train at the rate of 18,199,000 cartridges per month, which exceeds the actual usage in recent years.

A further consideration in determining the funding level are the existing and potential production problems. The Lake City AAP, which produces the majority of DOD's 5.56-mm.

cartridges, is experiencing serious production problems with the Small Caliber Ammunition Production facility line. The problems include high case cup and primer scrap rates, cartridge case splits, and dropped and blown primers. Because of these problems, the Lake City AAP has had to use some of its more costly conventional line capacity to meet production schedules. The Army has a team of investigators looking at the Small Caliber Ammunition Production lines to identify the cause of the problems and the solutions.

Further, we were informed that the Army is going to put the Lake City management contract up for bid. If a new contractor is selected, production could drop during the transition period.

A program reduction of 119.3 million cartridges estimated to cost \$17.5 million appears warranted. The Committees may wish to consider an additional reduction because training requirements appear to be overstated. However, given the total DOD request of 390.7 million cartridges, reduction of the Army's program should be limited to 264.6 million cartridges, estimated to cost about \$38.75 million, to preclude production from falling below the 1-8-5 rate of 126.1 million cartridges.

Army officials said that the total ammunition program had to be reduced and that the Army's revised budget for this item had been reduced by \$22.1 million.

5.56-mm. blank cartridges

The \$13.3 million request for 118.4 million cartridges is not fully justified because the inventory objective includes a Mobilization B requirement.

Based on the Army's receipt, requirement, and inventory objective information, the fiscal year 1985 request appears justified, as follows:

	<u>Quantity</u>
Inventory at September 30, 1983	120,140,000
Due in	310,432,000
Fiscal year 1985 request	<u>118,375,000</u>
Total	548,947,000
Less: Estimated losses through June 1986	<u>335,991,000</u>
Projected inventory at June 1986	212,956,000
Less: Inventory objective	<u>276,567,000</u>
Deficit	<u><u>63,611,000</u></u>

However, the inventory objective includes a Mobilization B requirement of 130,309,000 cartridges that should not be funded, according to Army officials. Therefore, the quantity requested would result in an excess inventory of 66.7 million cartridges at June 1986, rather than a deficit.

A program reduction of 66.7 million cartridges estimated to cost \$7.5 million appears to be warranted. However, given the total DOD request of 133.5 million cartridges, the Army's request can be reduced by only 31.5 million cartridges, or about \$3.5 million, to prevent production from falling below the 1-8-5 rate of 102 million cartridges a year.

Army officials said that inventory would not exceed requirements on the basis of the latest 5 year plan. We will not have access to this data until early 1985; therefore, we were not in a position to assess its credibility.

7.62-mm. ball, linked cartridges

The \$9.9 million request for this item is not justified because there is enough inventory on hand and due in to meet the Army's projected requirements through the end of the fiscal year 1985 funded delivery period (May 1986), as follows:

	<u>Quantity</u>
Inventory at September 30, 1983	33,607,000
Due in	<u>10,754,000</u>
Total	44,361,000
Less: Estimated losses through May 1986	<u>26,730,000</u>
Projected inventory at May 1986	17,631,000
Less: Inventory objective	<u>16,397,000</u>
Excess	<u>1,234,000</u>

The Army also included 7.1 million cartridges in its inventory objective for mobilization requirements that should not be funded, according to Army officials. Therefore, the projected excess inventory is increased to 8,334,000 cartridges. Funding of the fiscal year 1985 program quantity would result in an excess inventory of 44,327,000 cartridges.

Army officials said that the total ammunition program had been reduced by \$9.9 million in the revised budget.

.22 caliber ball, long rifle cartridge

The \$1 million request for 54 million cartridges is not fully justified because the quantity requested would result in excess inventory at the end of the funded delivery period in May 1986.

On the basis of Army receipt, loss, and inventory data, the request would result in excess inventory of 11,342,000 cartridges in May 1986, as follows:

	<u>Quantity</u>
Inventory at September 30, 1983	225,497,000
Due in	-
Fiscal year 1985 request	<u>54,081,000</u>
Total	279,578,000
Less: Estimated losses through May 1986	<u>242,602,000</u>
Projected inventory at May 1986	36,976,000
Less: Inventory objective	<u>25,634,000</u>
Excess	<u>11,342,000</u>

Further, the inventory objective includes 484,000 cartridges for a mobilization requirement that should not be funded, according to Army officials. Therefore, the projected excess inventory is 11,826,000 cartridges.

A program reduction of 11.8 million cartridges estimated to cost \$220,000 appears warranted. Since this item is procured commercially, reducing the program should not affect production base rates.

Army officials said that there will be a severe inventory degradation in fiscal years 1986-90 and the fiscal year 1985 program should not be cut.

.22 caliber ball, match cartridges

Most of the \$400,000 request for 4.4 million cartridges is not justified because it would result in excess inventory. Further, the entire request may not be necessary because the Army's projected training requirements appear to be overstated.

On the basis of Army receipt, loss, and inventory data, the quantity requested would result in excess inventory of 4,017,000 cartridges at the end of the funded delivery period in May 1986, as follows:

	<u>Quantity</u>
Inventory at September 30, 1983	4,891,000
Due in	12,000,000
Fiscal year 1985 request	<u>4,429,000</u>
Total	21,320,000
Less: Estimated losses through May 1986	<u>14,583,000</u>
Projected inventory at May 1986	6,737,000
Less: Inventory objective	<u>2,720,000</u>
Excess	<u>4,017,000</u>

The inventory objective also includes a nominal quantity of 5,000 cartridges for a mobilization requirement which should not be funded, according to Army officials. Therefore, the projected excess is 4,022,000 cartridges.

Furthermore, the Army's projected monthly training requirements of 456,000 cartridges appear to be overstated. Past consumption has been much lower.

<u>Fiscal year</u>	<u>Average monthly consumption</u>
1980	332,000
1981	351,000
1982	267,000
1983	296,000

Our analysis shows that there were enough cartridges available to permit greater consumption. The Army has sufficient inventory on hand and due in to train at an average monthly consumption rate of 443,000 cartridges, which is well above actual usage in recent years.

A program reduction of 4 million cartridges estimated to cost \$360,000 appears to be clearly warranted. Because this is so close to the total program and training requirements appear overstated, the entire program could be deleted. Production will not be affected since this item is procured commercially.

Army officials said that inventory would not exceed requirements on the basis of the latest data. We did not have access to this data and are not in a position to assess its credibility.

.50 caliber cartridges

The request includes \$34.8 million for the following .50 caliber cartridges.

<u>Cartridge type</u>	<u>Quantity</u> (thousands)	<u>Dollars</u> (millions)
Blank, M1A1	17,453	\$13.9
Armor piercing incendiary traced (APIT)	569	1.0
4ball/1tracer	11,849	15.1
Ball, linked	2,198	3.1
Tracer, linked	791	<u>1.7</u>
Total		<u><u>\$34.8</u></u>

The \$13.9 million request for the M1A1 blank cartridge appears justified. However, the request for the APIT cartridge is not justified because sufficient inventory is on hand and due in to meet the Army's projected training requirements and inventory objective through the end of the funded delivery period. The requests for the other three cartridges are partially justified by Army data, but because the projected training requirements appear to be overstated, none of the requests may be necessary.

Deleting these programs should not adversely affect production since the quantity in the M1A1 blank program is large enough to maintain production above the minimum sustaining rate of 1 million cartridges a month.

Armor-piercing incendiary-traced cartridge

The \$1 million request for this item is not justified because there is enough inventory on hand and due in to meet the Army's projected requirements through the end of the fiscal year 1985 funded delivery period (May 1986), as follows:

	<u>Quantity</u>
Inventory at September 30, 1983	4,337,000
Due in	<u>585,000</u>
Total	4,922,000
Less: Estimated losses through May 1986	<u>4,104,000</u>
Projected inventory at May 1986	818,000
Less: Inventory objective	<u>620,000</u>
Excess	<u><u>198,000</u></u>

Funding of the 569,000 cartridges in the fiscal year 1985 program would increase the excess to 767,000 cartridges.

Army officials said that there would be a severe inventory degradation in fiscal years 1986-90 and the fiscal year 1985 program should not be cut.

4ball/1tracer; ball, linked; tracer, linked

The requests for these cartridges are only partially justified because the quantities requested would result in excess inventory, as demonstrated by the following Army receipt, loss, and inventory data.

Army officials said that inventories of the linked ball and tracer cartridges would not exceed requirements on the basis of the latest data, i.e., 5 year defense plan. We did not have access to this data and are not in a position to assess its credibility. The Army has reduced the 4ball/1tracer program by \$7.8 million in its fiscal year 1985 amended budget.

40-mm. practice low velocity cartridges

The \$6.7 million request for 3.2 million of these 40-mm. cartridges is not fully justified because the quantities requested would result in excess inventory at the end of the funded delivery period in September 1986. However, the Army plans to reduce program quantities to balance inventory needs with depot level requirements.

On the basis of Army receipt, loss, and inventory data, the quantity requested would result in excess inventory of 2.6 million cartridges at the end of the funded delivery period in September 1986, as follows:

	<u>Quantity</u>
Inventory at September 30, 1983	988,000
Due in	6,002,000
Fiscal year 1985 request	<u>3,210,000</u>
Total	10,200,000
Less: Estimated losses through September 1986	<u>6,415,000</u>
Projected inventory at September 1986	3,785,000
Less: Inventory objective	<u>1,182,000</u>
Excess	<u><u>2,603,000</u></u>

Also, the Army's inventory objective includes 63,000 cartridges for Mobilization B requirements that should not be funded, according to Army officials. Therefore, the projected excess inventory is 2,666,000 cartridges, which represents \$5.6 million of the fiscal year 1985 request.

However, since submission of the fiscal year 1985 request, the Army has informed the Committees that the fiscal year 1984 procurement of 3,982,000 cartridges will be eliminated and the fiscal year 1985 request will be reduced by about 700,000 cartridges, depending on contractor bid prices. This reduction would invalidate our projection of excess inventory, which is based on program quantities in the Army's fiscal year 1985 submission. Elimination of the fiscal year 1984 program will cause a production break of 1 year but, according to the Army, the break will not result in increased costs because the cartridge is commercially produced and competitively procured.

Army officials said that inventory would not exceed requirements. Since the Army plans to reduce its fiscal year 1985 program by 700,000 cartridges estimated to cost \$1.5 million, the request should be cut by that amount.

22-mm. subcaliber practice cartridges

The \$6.3 million request for 22-mm. subcaliber practice cartridges (M744, M745, M746, and M747) is not fully justified because the quantities requested for three types would result in excess inventory at the end of the funded delivery period in September 1986. The entire request is questionable because projected training requirements appear to be overstated.

As shown below, the requested quantities would result in excess inventory at the end of the funded delivery period.

	<u>Quantities</u>		
	<u>M744</u>	<u>M746</u>	<u>M747</u>
	--(thousands)--		
Inventory at September 30, 1983	195	155	196
Due in	256	288	249
Fiscal year 1985 request	<u>147</u>	<u>147</u>	<u>178</u>
Total	598	590	623
Less: Estimated losses through September 1986	<u>496</u>	<u>482</u>	<u>477</u>
Projected inventory	102	108	146
Less: Inventory objective	<u>69</u>	<u>67</u>	<u>67</u>
Excess	<u>33</u>	<u>41</u>	<u>79</u>

	Quantity		
	<u>4ball/ 1tracer</u>	<u>Ball, linked</u>	<u>Tracer</u>
Inventory at September 30, 1983	18,724,000	2,424,000	338,000
Due in	2,942,000	4,607,000	2,417,000
Fiscal year 1985 request	<u>11,849,000</u>	<u>2,198,000</u>	<u>791,000</u>
Total	33,515,000	9,229,000	3,546,000
Less: Estimated losses through May 1986	<u>23,977,000</u>	<u>7,544,000</u>	<u>2,810,000</u>
Projected inventory at May 1986	9,538,000	1,685,000	736,000
Less: Inventory objective	<u>2,641,000</u>	<u>820,000</u>	<u>343,000</u>
Excess	<u><u>6,897,000</u></u>	<u><u>865,000</u></u>	<u><u>393,000</u></u>

The inventory objective for the 4ball/1tracer cartridge includes 608,000 cartridges for a mobilization requirement that should not be funded, according to Army officials. Therefore, the excess is 7,505,000 cartridges.

Further, the Army's projected training requirements for all three cartridges appear overstated on the basis of past actual consumption, as follows:

<u>Cartridge</u>	<u>Average monthly consumption</u>				
	<u>Projected</u>	<u>Actual in fiscal year</u>			
		<u>1983</u>	<u>1982</u>	<u>1981</u>	<u>1980</u>
	----- (thousands) -----				
4ball/1tracer:					
Training requirement	748	858	1,362	968	1,368
Training authorization	-	494	586	1,200	241
Actual consumption	-	448	526	533	206
Ball, linked:					
Training requirement	210	234	245	125	20
Training authorization	-	65	100	242	28
Actual consumption	-	66	79	68	18
Tracer, linked:					
Training requirement	87	383	84	125	39
Training authorization	-	5	14	10	165
Actual consumption	-	4	9	18	37

Our analysis of inventory records shows that sufficient inventory was available to train at the authorized level. Further, the Army has sufficient inventory on hand and due in to train at 612,000 per month with 4ball/1tracer cartridges, at 168,000 per month with linked ball cartridges, and at 75,000 per month with tracer cartridges. Such quantities are well above the actual usage in recent years.

Program reductions of 7.5 million 4ball/1tracer cartridges estimated to cost \$9.6 million, 865,000 linked ball cartridges estimated to cost \$1.2 million, and 393,000 tracer cartridges estimated to cost \$.8 million appear to be warranted. The Committees may wish to consider additional reductions up to and including the entire requests because training requirements may be overstated.

The Army's projected training losses may be overstated on the basis of actual usage in recent years. The Army has advised the Committees that training requirement projections for the cartridges have increased because the rounds enable more training at a cost less than that for full-size rounds. However, the existing inventory and quantities due in seem adequate to support higher levels of training usage than occurred in recent fiscal years, as follows:

	<u>M744</u>	<u>M746</u>	<u>M747</u>
Inventory at September 30, 1983	195	155	196
Due in	<u>256</u>	<u>288</u>	<u>249</u>
Total	451	443	445
Less: Inventory objective	<u>69</u>	<u>67</u>	<u>67</u>
Available for training	<u>382</u>	<u>376</u>	<u>378</u>
Average annual availability through funded delivery period	127	125	126
Authorized for fiscal year 1984	88	98	97
Average usage in fiscal years 1982 and 1983	58	47	46

Further, the mortar program organizational structure is still under review by the Army to determine which mix should be deployed to satisfy requirements. The 22-mm. subcaliber practice cartridges are used to simulate 81-mm. mortar training.

A reduction of \$1.5 million in the Army's request for these items appears to be warranted, as follows:

Model	Quantity	Amount
M744	33,000	\$ 314,000
M746	41,000	390,000
M747	79,000	<u>754,000</u>
Total		<u>\$1,458,000</u>

The Committees may wish to consider further reductions up to and including the entire request for each model because the Army's estimated training losses may be overstated.

Army officials said there would be a severe inventory degradation in fiscal years 1986-90; therefore, the fiscal year 1985 program should not be cut.

105-mm. target practice cartridges

The \$72.5 million request is for 444,000 105-mm. M490 target practice cartridges used in tank cannons for training.

The request could be reduced by \$12.2 million to prevent accumulation of excess inventory at the end of the funded delivery period in September 1986.

Army receipt, requirement, and inventory objective data shows that there will be an inventory deficit of 20,000 cartridges at the end of the funded delivery period if the request is approved. However, the inventory objective includes 95,000 cartridges for Mobilization B training requirements which should not be funded, according to Army officials. Approval of the fiscal year 1985 request would result in an excess inventory of 75,000 cartridges at September 1986 after adjusting the inventory objective to exclude the mobilization requirements.

A program reduction of 75,000 cartridges represents \$12.2 million of the Army's request. The reduction should not result in less economical production levels at the load plant or at metal parts producers. The load plant produces other items on the same line to maintain a minimum sustaining rate. The reduced DOD-wide program would support metal parts production at greater than 1-8-5 rates.

Army officials said that because the total ammunition program had to be reduced the Army deleted \$9.4 million for this item from its original budget.

Signals (HC smoke pots)

The \$26.7 million request for signals includes \$9.5 million for 62,000 thirty-pound smoke pots. The request does not appear to be justified because inventory on hand and quantities due in should be sufficient to meet probable actual training consumption and attain the inventory objective.

The Army has informed the Committees that previous and current training with the smoke pots has been constrained because of production difficulties and that the proposed fiscal year 1985 procurement is required to support fiscal year 1986 training needs.

The Army plans to discontinue production of the smoke pots from August 1984 to May 1985 because of a shortage of metal parts. Production will be suspended until the contractor can produce enough metal parts to resume loading at Pine Bluff Arsenal. Shortly after resumption in May 1985, the Army plans to increase production from the minimum sustaining rate to a 1-8-5 monthly rate. On the basis of that schedule, delivery of the fiscal year 1984 and 1985 quantities will be accomplished by May and August 1986, respectively.

We were informed that training consumption during fiscal years 1984 and 1985 would be limited to production quantities because a large share of the existing inventory was not accessible. We were informed further that about 50,000 smoke pots would be produced and available for training during the 2 fiscal years--about 313,000 less than the projected requirements. The training requirement for fiscal year 1986 is 105,000 smoke pots, which is 4 times the authorized training level for fiscal year 1984 and 10 times actual usage in fiscal years 1982 and 1983.

Our analysis indicates that the Army has sufficient inventory on hand and quantities due in to support probable training losses through the funded delivery period, as follows:

	<u>Quantity</u>
Inventory at September 30, 1983	57,000
Due in	<u>191,000</u>
Total	248,000
Less: GAO estimated losses through September 1986	<u>157,000</u>
Projected inventory at September 1986	91,000
Less: Inventory objective	<u>59,000</u>
Excess	<u><u>32,000</u></u>

Army officials said there would be a severe inventory degradation in the fiscal years 1986-90 period and the fiscal year 1985 program should not be cut.

Antitank simulator cartridges

The Army's \$14.1 million request for simulators includes \$4.6 million for 890,000 ATWESS antitank simulator training cartridges. The request appears justified on the basis of supporting Army data but may not be necessary because projected training requirements appear to be overstated.

Training consumption through the funded delivery period could be substantially lower than Army requirements projections. With the quantity requested, the Army could train at the rate of 2,228,000 cartridges in the 3 fiscal years through September 1986. The Army could train at the rate of 1,932,000 cartridges during the 3 years and still attain the inventory objective if the request was not approved. That consumption rate would be about six times greater than actual training usage in fiscal years 1982 and 1983 and more than twice the authorized level for fiscal year 1984.

Disapproval of the request would not necessarily adversely affect the production base. The fiscal year 1984 quantity of 2,822,000 cartridges is scheduled for delivery at a rate of 235,000 cartridges per month. The fiscal year 1985 quantity is scheduled at a monthly rate of 75,000 cartridges. The fiscal year 1984 quantity could be stretched over 24 months at a monthly rate of 117,500 cartridges--slightly greater than the 1-8-5 rate of 112,000 cartridges per month at the load plant.

The Army has informed the Committees that past training usage has been substantially less than the program quantity requested, first, because of insufficient assets and low monthly rates of production and, second, because the MILES system in which the cartridge is extensively used has not been fully fielded. The Army is projecting training consumption in excess of 3 million cartridges per year during fiscal years 1986-89.

Army officials said there would be a severe inventory degradation in fiscal years 1986-90 and the fiscal year 1985 program should not be cut.

IMBALANCE BETWEEN PROPELLING CHARGES AND PROJECTILES

The \$44.9 million request for 990,000 155-mm. M4A2 white bag propelling charges is questionable because the quantity requested is not balanced to projectiles in which the charge is used and would result in excess inventory at the end of the funded delivery period.

The Army has informed the Committees that there will be an excess inventory of 569,000 propelling charges at the end of the funded delivery period because requirements were significantly reduced subsequent to submission of the budget request.

A reduction of 569,000 propelling charges estimated to cost \$25.8 million therefore appears warranted. The reduction should not adversely affect production since the total Defense program quantity for fiscal year 1985 would still support a 1-8-5 production rate.

Army officials said that the total ammunition program had to be reduced and that the program was reduced by \$17.8 million in the Army's revised budget.

PREMATURE PROCUREMENT

The Army's \$10.2 million request for 79,000 4.2-inch mortar smoke cartridges may be 1 year early. It could be more economical to defer this procurement for consolidation with future fiscal year program quantities. Deferral would give the Army time to resolve potential procurement problems, modify the smoke cartridge to achieve greater performance, and reach firm decisions on the future status of all mortar programs.

If the request is funded, the inventory position for this cartridge will be below the required level at the end of the funded delivery period in May 1987. However, there is sufficient inventory to satisfy training requirements until then.

The total program quantity for fiscal years 1985-89 is 324,000 cartridges. The fiscal year 1985 program quantity will support production at the minimum sustaining rate for only 5 months. Annual program quantities in fiscal years 1986-89 are less than those for the fiscal year 1985 program.

A consolidated procurement for the fiscal years 1985-89 program quantities seems advisable for several reasons.

First, the cartridge may not be ready for procurement in fiscal year 1985. The Army has not produced this item for 12 years. There may be problems in getting the M48A3 point detonating fuze used on the smoke cartridge in time for the fiscal year 1985 program. Since the fuze has not been produced since the 1960's, the technical data package must be updated and production capability established. It is not unusual to experience significant delays in locating a qualified producer, obtaining the necessary production and testing tooling, and passing first article testing. The Army has informed the Committees that a technical data package could be updated in time but would not be certified for production under current safety standards. The Army also stated that the fiscal year 1985 buy could be produced if an exception to the safety standards were authorized.

Secondly, the Army would have additional time for modifying the cartridge to achieve a greater firing range comparable to that of the 4.2-inch M329A2 high-explosive cartridge. The Army has modified the predecessor of the smoke cartridge, the model M329A1, to increase its range. However, we were informed that the smoke cartridge had not been modified because of the uncertain future of the 4.2-inch mortar. The smoke cartridge has a firing range shorter than that of the M329A2 cartridge but equal to the M329A1. Army officials estimate about 3 years will be needed to modify the smoke cartridge to achieve the longer firing range of the M329A2 cartridge. The Army has informed the Committees that a new research, development, test, and evaluation program would be required to get a better match of the firing ranges, but there is no firm required operational capability at this time.

Finally, the Army is still reviewing the mortar program organizational structure to determine the best mix of mortar deployment for Army requirements. Requirements for the smoke cartridge might be changed. Deferral of the procurement for the smoke cartridge until firm mortar program decisions are made seems reasonable.

REQUIREMENTS NOT FIRM

The Army is requesting \$42.8 million in fiscal year 1985 to procure 267,000 of the following 181-mm. mortar cartridges.

<u>Type of 181-mm. mortar cartridge</u>	<u>Quantity</u>	<u>Cost</u> (millions)
High explosive (XM821)	160,000	\$29.4
Practice (XM879)	94,000	7.9
Illuminating (XM853)	9,000	2.2
Smoke (XM819)	<u>4,000</u>	<u>3.3</u>
Total	<u>267,000</u>	<u>\$42.8</u>

Because the Army has not decided on how the 181-mm. mortar will be used in its force structure, the fiscal year 1985 funding request is premature. Further, the type classification date of March 1985 for the XM879 would generally preclude its procurement in fiscal year 1985, according to Army policy.

normally would preclude procuring of the XM879 in fiscal year 1985, according to Army policy. This 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. An exception to this policy has not been obtained for the XM879 cartridge. Therefore, unless the XM879 type classification date is moved to December 31, 1984, it cannot be scheduled for procurement in fiscal year 1985.

The Army is still uncertain about mortar requirements. A May 23, 1983, mortar study resulted in a decision to field only about 19 percent of the 60-mm. lightweight company mortar systems purchased and to reduce the I81-mm. program quantities by about 72 percent. Proposed force structure changes, if approved, would eliminate the I81-mm. mortars from the Army structure. The Army is concerned that if this occurred, the \$35 million spent on developing the I81-mm. mortar would be lost and a commitment to procure the system from the United Kingdom could not be fulfilled.

On October 20, 1983, the House Committee on Appropriations expressed concern over the Army's changing mortar requirements and directed that

--the Army submit a long range program for mortars, which addresses all mortar requirements and

--the I81-mm. not be procured until such a plan is submitted.

In response, the Army's Training and Doctrine Command was asked to review the Army mortar structure and recommend a plan by December 16, 1983. According to the I81-mm. project office, that date was postponed to the middle of January 1984 and then canceled. As of March 1984, the project office was not aware of any decision based on the requested plan or even that this plan had been completed.

In our opinion, until the Army develops a plan for using mortars, there is no justification for procuring these mortar munitions.

In its response to Committee questions, the Army acknowledged that fiscal year 1985 funding for the XM879 should be deleted. The Army's revised budget deleted \$7.9 million for the XM879.

The 181-mm. mortar cartridges are for use in the XM252 mortar, which is part of the 181-mm. mortar system. The 181-mm. mortar system is an adaptation of the United Kingdom's L16A2 mortar and the XL31E2 cartridges for the same mortar.

The adaptation efforts used United States 81-mm. and 60-mm. components. The new mortar and cartridges are to replace the currently fielded M29A1 81-mm. mortar and M374A3 cartridges and United States developmental smoke and illuminating cartridges. The new cartridges are required to be interchangeable in the XM252 and M29A1 mortars.

According to Army budget planning documents, the new cartridges should provide the following improvements over the currently fielded cartridges:

- The high-explosive XM821 cartridge is to increase the range by about 17 percent and increase lethality by 32 percent.
- The practice XM879 cartridge is a low-cost full-range round that provides an inexpensive means of training.
- The illuminating XM853 cartridge is to burn with 33 percent greater light and have a 55 percent greater range.
- The smoke XM819 cartridge is to increase the range by 10 percent and the duration of ground-screening smoke by 500 percent.

The following chart provides the status of development testing II for all cartridges and their scheduled type classification dates:

<u>Cartridge</u>	<u>Development testing II</u>		<u>Scheduled type classification</u>
	<u>Start</u>	<u>Complete</u>	
XM821	Apr. 1982	Dec. 1982	Dec. 1983
XM879	Sep. 1984	Jan. 1985	Mar. 1985
XM853	Jan. 1984	Jul. 1984	Nov. 1984
XM819	Nov. 1983	Jul. 1984	Aug. 1984

As shown in the chart above, testing plans for the XM879 practice cartridge show type classification for this cartridge is scheduled in March 1985. This late type classification date

exercised by May 31, 1984. The three options provide for a total of 808,782 cartridges at an estimated cost of \$156.4 million.

The Army plans to procure 618 Sergeant York Defense Gun systems through 1987, of which 532 will be deployed to 42 United States and overseas batteries. Deployment will begin in September 1985 and continue until early 1990. To support these units the Army has established an Army acquisition objective (AAO) for 1,043,000 proximity fuzed cartridges and 728,000 point detonating fuzed cartridges. These requirements are based on a need for about 25,000 proximity fuzed cartridges and 17,000 point detonating fuzed cartridges for each Sergeant York battery.

Our analysis of the Sergeant York's deployment schedule compared with the combat ammunition delivery schedule indicates that about 175,000 cartridges exceed the Army's needs and 173,000 of these, estimated to cost about \$26.1 million, could be eliminated from the fiscal year 1985 buy. This includes about 52,000 proximity fuzed cartridges for \$11.3 million and 121,000 point detonating fuzed cartridges for \$14.8 million.

The following table contrasts combat ammunition requirements versus cumulative ammunition deliveries through the fiscal year 1985 procurement.

<u>Cartridge type</u>	<u>Fielding date</u>	<u>Sergeant York batteries</u>		<u>Cumulative cartridge deliveries</u>	<u>Excess</u>
		<u>No.</u>	<u>Cartridges required</u>		
Proximity fuzed	Jul. 1987	17	422,161	476,000	53,839
Point detonating fuze	Jan. 1987	9	155,977	307,000	151,003

While there are 53,839 excess proximity fuzed cartridges, the reduction should be limited to 52,000 cartridges to prevent production from dropping below the minimum sustaining rate.

The 151,003 excess point detonating fuzed cartridges is about 30,000 more than the fiscal year 1985 planned buy. Consequently, the entire buy, estimated to cost \$14.8 million, can be deleted from the fiscal year 1985 request. However, this reduction would require closing the point detonating fuze production facility. The Army estimates such action would cost about \$1.75 million. We did not have time to assess the accuracy of this figure but it appears high.

AMMUNITION AND WEAPON SYSTEM
PROGRAMS NOT SYNCHRONIZED

The Army is requesting \$92.1 million to buy 722,000 cartridges of 40-mm. ammunition for use in the Sergeant York Air Defense Gun System. The Sergeant York is scheduled to be deployed in September 1985 and will replace the Vulcan Air Defense Gun System fielded in 1968. The Sergeant York is designed to provide significantly greater range, lethality, and armor protection than the Vulcan gun. It is mounted on an M48A5 tank chassis and uses a derivative of the F-16 aircraft radar and a twin 40-mm. BOFORS L70 gun.

The following chart shows the type of ammunition and funding requested in fiscal year 1985 and similar information for prior fiscal years.

<u>Cartridge</u>	<u>Fiscal year</u>			
	<u>1982-84</u>		<u>1985</u>	
	<u>Quantities</u>	<u>Cost</u>	<u>Quantities</u>	<u>Cost</u>
Point detonating fuzed cartridge (M811)	207,290	(millions) \$35.4	121,000	(millions) \$14.8
Proximity fuzed cartridge (M822)	294,420	92.4	220,000	48.0
Target practice cartridge (M813)	307,072	28.6	381,000	29.3
Total	808,782	\$156.4	722,000	\$92.1

We believe that the need for \$26.1 million of this request in fiscal year 1985 is questionable because it will provide more proximity fuzed and point detonating fuzed cartridges than are necessary for the units expected to be fielded when planned fiscal year 1985 deliveries to these units are expected to be completed.

The Army has a contract with Ford Aerospace and Communications Corporation for Sergeant York fire units and ammunition which includes three options funded in fiscal years 1982-84. All three options have been exercised for proximity fuzed cartridges. Only the first two options for the point detonating and target practice cartridges have been exercised. The third option for these cartridges is scheduled to be

<u>Type of cartridge</u>	<u>Fiscal year 1985</u>	
	<u>Quantity</u>	<u>Estimated cost</u> (millions)
Armor piercing (XM829)	9,700	\$20.9
High explosive (XM830)	13,100	31.9
Armor piercing target practice (XM865)	53,800	52.7
High explosive target practice (XM831)	20,000	30.5

The cartridges the Army intends to buy that required special attention are discussed below.

Armor-piercing cartridge (XM829)

This cartridge, which contains a depleted uranium penetrator, is critical to the M1E1's effectiveness because it is designed to defeat future enemy armor threats.

An In-Process Review, held in December 1983, found that the XM829 met all performance requirements except round-to-round dispersion, which was inconsistent and unpredictable. According to Army representatives, the unacceptable dispersion reduces first round hit probability, causes uncertainty for tank operators when firing at a target, and could reduce tank survivability. The Army's program manager for tank ammunition believed the cause for not meeting the dispersion requirement was poor obturator performance and the mechanics of sabot disengagement. Army representatives informed us that the Program Manager had established a team to investigate this deficiency composed of contractor (Honeywell), Army Research and Development Center, and Ballistics Research Laboratory scientists/engineers. The team designed six different models of the XM829 with some variation of each. A sample of these rounds was fired. Three of the six models did meet the dispersion requirement; however, only eighteen rounds were fired and they were fired at only one temperature (49 degrees centigrade). Fifty cartridges using the best features of the three successful models were scheduled for delivery to Aberdeen Proving Ground in April 1984 for further testing.

Army officials did not agree with our conclusions. However, they said a reduction of \$15.5 million in the target practice program was warranted and that such amount had been cut from the Army's revised budget.

ADVANCED PROCUREMENT OF COMPONENTS

This request is for advance procurement of 155-mm. binary projectile (M687) components with 15- to 18-months lead times and purification of methylphosphonic dichloride (DC) stored at Rocky Mountain Arsenal. Army officials stated that enough DC can be recovered to prove out the methylphosphonic difluoride (DF) manufacturing and canister-filling facility at Pine Bluff Arsenal and to support the M687's first year of production.

According to a briefing provided by a Production Base Modernization Agency official and budget documents, the Army plans to request funding for complete M687 projectiles in fiscal year 1986 and use DC purified with fiscal year 1985 funding. After the first year, M687 production is expected to use DC supplied by a new facility.

The Army's M687 production strategy appears to involve a phased approach involving projectile long lead items, an existing supply of DC, and funding over several years. Before the fiscal year 1985 request, Production Base Modernization Agency projects costing \$35.08 million were funded to support the M687. The Army plans to request an additional \$27.7 million for the DC facility project and a projectile metal parts expansion project in fiscal year 1986.

To implement this approach in accordance with its current schedule, the Army would have to deviate from congressional guidance. In fiscal year 1984 hearings, it was stated that advance procurement of components would not be provided for ammunition items. The fiscal year 1985 request seeks such funding.

Army officials did not take a position on this item and suggested that the Office of the Secretary of Defense would have to provide comments.

ITEMS REQUIRING SPECIAL ATTENTION (120-mm. ammunition)

The Army requested \$136 million for various types of 120-mm. ammunition for use in the M1E1 tanks. The types, quantities, and estimated costs for the planned fiscal year 1985 buy follow:

High explosive (XM830)

The XM830 is designed for use against lightly armored vehicles and personnel. It has a fuze with both nose and shoulder activation capability to provide full frontal and graze initiation.

The XM830 was scheduled to undergo testing at Aberdeen Proving Ground, with results available in August 1984. The XM830 is viewed as an interim round because its range is unacceptable. A new cartridge (XM859) is being designed to meet the Army's range requirements. The XM859 is expected to be ready for production in January 1988.

ENCLOSURE 2

NAVY AMMUNITION PROGRAM

The Navy's fiscal year 1985 request includes \$836.9 million for 28 ammunition budget lines. Appendix II shows the items reviewed and our suggested adjustments to the request. We examined the Navy's justification for 54 items within these budget lines representing \$590.9 million, or 71 percent of the total request.

We believe that \$88.4 million of the request is questionable for the following reasons:

- \$20.7 million is for FMU-139 fuzes that cannot be delivered until after the fiscal year 1985 funded delivery period.
- \$24.4 million is the net overstated amount for eight budget line items that have more current prices available.
- \$4.2 million is for buying Skipper components that could be satisfied by retrofit of components from Navy inventory.
- \$12.9 million for the 5-inch/54-caliber guided projectile is to increase the production capacity of the current producer to the maximum quantity needed even though a second source is anticipated.
- \$6.5 million is for 30-mm. ammunition war reserve requirements, but the necessary retrofit program has not yet been implemented.
- \$19.7 million may be premature for Bigeye bombs because the request is limited to bomb components, production facilities are not available, and there are technical problems with the bomb.

In addition, there are unresolved problems and issues with both low-level laser-guided bomb (LLGGB) kits and 25-mm. ammunition that require special attention by the Committees.

DELIVERIES NOT WITHIN
FUNDED DELIVERY PERIOD

The Navy's \$121.9 million request for general-purpose bombs includes \$75.3 million for 99,000 FMU-139 fuzes. The Air Force requested \$42.7 million for 56,350 fuzes for a total program

quantity of 155,350. Our analysis indicates that funding for 42,850 fuzes is questionable because they cannot be delivered within the funded delivery period, which we estimate ends in February 1987.

The start of the funded delivery period varies directly with procurement lead times, which changed several times during our review. Air Force and Navy budget backup data shows lead times of 10 and 12 months, respectively. We originally thought, on the basis of these lead times, that very substantial reductions were in order. However, Air Force and Navy responses to Committee questions specify lead times of 15 and 17 months, respectively. The Air Force and Navy now estimate that the lead time is 20 months because responsibility for procuring the fuze is being transferred from the Navy to the Army's single manager for conventional ammunition, which adds 2 months to the process. They contend that with a 20-month lead time, their programs should be fully funded. The question is: What is the most realistic estimate of lead time?

Procurement lead time includes the time needed to award contracts and obtain the materials needed to produce the end items. In the case of the FMU-139 fuze, however, the lead time appears to be driven by the delivery schedule of the fiscal year 1984 program. For example, in responding to the Committees' questions, the Navy specified a 17-month lead time based on completion of the fiscal year 1984 program in February 1986. In commenting on our draft report, the Navy said a 20-month lead time was needed and the fiscal year 1984 program would be completed in May 1986.

Typically, the lead time for the first year buy is a few months longer than that for subsequent years. Since the procurement lead time for the fiscal year 1984 program is 21 months, a fiscal year 1985 program lead time of 17 to 18 months could be expected with additional decreases in subsequent years, barring unusual circumstances. The Navy's contention that 2 months must be added to the procurement lead time because the fuze will be procured by the single manager for conventional ammunition may be valid. If it is, the 2-month increment should be added to all Air Force and Navy items procured by the single manager, not just selected items.

While we cannot determine the precise lead time, the Navy estimate of 17 months in its response to Committee questions appears reasonable. Therefore, the total request could be the quantity needed to maintain production through February 1987.

Since the contractor is scheduled to produce fiscal year 1984 program quantities through May 1986, the total fiscal year request should provide funds for 9 months' production at the contractor's capacity of 12,500 fuzes per month. This computes to 112,500 fuzes, or 42,850 less than the total request of 155,350 fuzes.

The reduction could be split between the Navy and Air Force in the ratio of each service's request to the total program. This would result in the Navy program being reduced by 27,306 fuzes estimated to cost \$20.7 million and the Air Force program being reduced by 15,543 fuzes estimated to cost \$11.8 million.

OVERSTATED UNIT COST ESTIMATES

The Navy's request for many items is based on prices quoted by the single manager for conventional ammunition in September and October 1983. For some of these items, the unit prices differ from later price estimates. Our review showed the cumulative effect due to price differences is an overstated request of \$24.4 million, as follows:

<u>Item</u>	<u>Amount</u> (millions)
Two general-purpose bombs	+\$3.0
Two 2.75-in rocket components	+\$0.8
25mm. machine gun ammunition	+ 3.5
Three practice bombs	+ 5.9
MK25 rocket motors	+ 2.9
Two 5-inch/54-caliber projectiles	+13.2
MK46 flares	- 3.2
20mm. MK149 cartridges	- <u>1.7</u>
Total	+ <u>\$24.4</u>

General-purpose bombs

The \$121.9 million requested for general purpose bombs could be reduced by a net amount of \$3 million for the following two items:

- The \$22.1 million request for 10,000 MK83 bombs at a unit cost of \$2,214.50 is based on a Navy adjustment of the single manager's September 1983 price estimate. The unit price estimate forwarded to the Navy on January 11, 1984, was \$1,491.10. However, the price estimate increased to \$1,854.41 on February 28, 1984, because of a configuration change. Based on this latest price, the request is overstated by \$3.6 million.
- The \$1.4 million request for over 78,000 solid nose plugs at a unit cost of \$18.26 is based on a Navy adjustment of the single manager's price estimate of September 1983. The unit price estimate at February 1, 1984, was \$25.78. On the basis of the unit cost increase of \$7.52, the request is understated by \$0.6 million.

2.75-inch rockets

The \$25.5 million requested for 2.75-inch rockets could be reduced by a net amount of \$0.8 million for the following two items:

- The \$4.5 million request for 40,400 M-156 marker heads is based on a unit cost estimate of \$111.19. The estimated cost at February 1, 1984, was \$71.62. On the basis of the unit price difference of \$39.57, the request is overstated by \$1.6 million.
- The \$20.2 million request for 90,000 MK66 motors at a unit cost of \$224.47 is based on a Navy adjustment of the single manager's price estimate of September 1983. However, on the basis of the February 1, 1984, estimate of \$233, the request is understated by \$0.8 million.

Machine gun ammunition

The \$36.5 million requested for machine gun ammunition includes \$17.6 million for 886,000 rounds of 25-mm. target practice (TP) ammunition. The request is overstated and could be reduced by \$3.5 million. The request is based on a September 1983 unit price estimate of \$19.81. However, the estimated price on January 23, 1984, was \$15.81.

Practice bombs

The \$64.1 million requested for practice bombs should be reduced by \$5.9 million for the following three items.

- The \$23.7 million requested for 55,200 MK82 nonthermal protected bombs at a unit price of \$430 is based on a Navy adjustment of the single manager's estimate of September 1983. On the basis of the February 1, 1984, estimate of \$387.04, the request for MK82 bombs is overstated by \$2.4 million.
- The \$12.7 million requested for 9,900 MK83 inert nonthermal protected bombs is overstated by \$2.7 million. The request is based on a unit price estimate of \$1,282.69; the February 1, 1984, estimate is \$1,011.17.
- The \$5.1 million requested for 1,100 Rockeye practice bombs is overstated by \$0.8 million. The request is based on a unit price estimate of \$4,605.45; the February 1, 1984, estimate is \$3,910.99.

JATO rocket motors

The \$15 million request for JATO rocket motors includes \$12.4 million for 1,635 MK25 motors. The request could be reduced by about \$2.9 million. The unit cost of \$7,574 is a Navy adjustment of the single manager's September 1983 cost estimate. The February 1, 1984, estimate is \$5,804.74.

5-inch/54-caliber ammunition

The \$91.1 million requested for 5-inch/54-caliber ammunition components should be reduced by \$13.2 million for the following two items.

- The request for \$23 million to purchase 23,415 5-inch/54-caliber HIFRAG projectiles is based on a unit cost estimate of \$980.98 while the February 1, 1984, estimate is \$594.32. However, Navy officials informed us that this lower price did not include a cost of about \$50 a projectile for Bis/acetal used in the explosive. Therefore, the price difference is \$336.66 and the budget request is overstated by \$7.9 million.
- The request for \$15.2 million to buy 14,000 5-inch/54-caliber illuminating projectiles is overstated by \$5.3 million. It is based on a unit cost estimate of

\$1082.14; the February 1, 1984, estimate is \$700.61. Therefore, the Navy's request is overstated by \$381.53 per unit.

Airborne expendable countermeasures

The \$50.6 million requested for airborne expendable countermeasures program includes \$4.8 million for 163,900 MK46 flares. On the basis of a revised price, the request is understated by \$3.2 million. The request is based on the unit price estimate of \$29.24 while the February 1, 1984, estimate is \$48.50.

Close-In Weapon System ammunition

The \$28.8 million requested for Close-In Weapon System ammunition includes \$26.1 million for 1,826,000 20-mm. MK149 cartridges. On the basis of a revised estimate, the request is understated by \$1.7 million. The request is based on a unit price estimate of \$14.30; however, the February 1, 1984, estimate is \$15.24.

Navy comments

In all cases, the Navy concurred in our findings regarding unit price changes and proposed that the net overstatement be used to fund other items.

COMPONENTS AVAILABLE FROM INVENTORY

The Skipper is a boosted laser-guided bomb (LGB) consisting of a guidance control unit, an airfoil group, an MK83 (1,000-pound) bomb, and a rocket motor.

The Navy's request for \$14.3 million to purchase Skipper hardware bomb kits could be reduced by \$4.2 million if the Navy would retrofit guidance control units and airfoil groups available from inventory.

In the fiscal year 1984 House of Representatives Defense appropriation hearings, the Navy reported that it was considering a fiscal year 1983 reprogramming action to purchase 2,250 Skipper units. The Navy also reported that it had recently initiated a development program for a redesigned boosted LLLGB that would be ready for production in January 1985 with deliveries planned for mid-fiscal year 1986. According to the Navy, this redesigned version will provide greater launch range than that of the Skipper, improvement in the laser seeker field of

view, greater flexibility in delivery tactics, and a decrease in the delivery aircraft's exposure to the enemy's defense weapon systems. The deputy program manager told us fiscal year 1984 research and development funds for the boosted LLLGB program had been terminated and, as a result, the Navy was requesting fiscal year 1985 procurement funds for the Skipper.

The fiscal year 1983 Skipper procurement features retrofit of guidance control units and airfoil groups from Navy inventory and new procurement of rocket booster motors for a combined unit cost of \$10,230. The fiscal year 1985 request is based on new procurement of guidance control units, airfoil groups, and rocket motors at a unit cost of \$19,872. The deputy program manager told us the Navy had enough guidance control units on hand or due in from prior year procurements to complete the fiscal year 1985 Skipper requirement by retrofit. We estimate that, if the Navy would retrofit guidance control units from existing inventory, the fiscal year 1985 unit price would be about \$11,458, on the basis of a 12-percent inflation markup from fiscal year 1983 to fiscal year 1985. This would permit a budget reduction of \$4.2 million.

Navy comments

The Navy agreed to retrofit units for fiscal year 1985 if the \$4.2 million savings could be used for the boosted LLLGB development program. According to the deputy program manager, the Navy's research and development budget does not provide funding for the boosted program until fiscal year 1986. Because the redesigned boosted model is expected to provide improved operational capabilities (longer launch range and greater laser sensitivity than the Skipper), the Committees may want to consider transferring the savings from the fiscal year 1985 Skipper program to the development program for boosted LLLGBs.

UNNECESSARY PRODUCTION CAPACITY BEING DEVELOPED

The 5-inch guided projectile is a gun-launched rocket-sustained terminally guided projectile designed to be fired from a modified 5-inch/54-caliber MK45 gun mount. A propelling charge fires the projectile from the gun, and a rocket motor supplies the added energy to achieve the desired range. Terminal guidance is provided by a semiactive laser target illumination system. On November 29, 1982, the Chief of Naval Operations granted approval to proceed with production of this projectile.

The Navy's \$68.2 million request for fiscal year 1985 includes \$12.9 million for establishing a maximum rate production facility at the development contractor's plant. This may not be appropriate since the Congress has directed the Navy to obtain necessary technical data and documentation for soliciting a second production source.

The Navy received preproduction procurement funding of \$35 million in fiscal year 1983 and \$43.9 million in fiscal year 1984. The 1983 funds will generally be used to establish a 5-round per month pilot production line, and the 1984 funds will be used primarily to establish a 100-round per month facility. The Navy's fiscal year 1985 request of \$68.2 million will be used to assemble 59 preproduction test rounds and buy additional tools and test equipment to reach the maximum required production rate of 225 rounds per month.

The Navy plans to request 500 rounds in fiscal year 1986 and 2,000 in fiscal year 1987. According to Navy's program manager, \$12.9 million of the 1985 budget request will be used to acquire plant equipment to increase the monthly production rate from 100 to the maximum planned rate of 225 rounds. According to the Navy's program manager, the 225-round per month production rate was required for timely delivery of the planned fiscal year 1987 procurement of 2,000 rounds. The manufacturing lead time for 5-inch projectiles is 24 months after the production line is in place.

The fiscal year 1984 Defense Authorization Bill stipulates that none of the funds may be obligated or expended for purchasing the 5-inch semiactive laser guided projectile until the Secretary of the Navy has acquired a technical data package for that projectile and has determined that the package (1) does not contain proprietary data and (2) can be used to solicit a second production source.

Navy officials commented that the data package will not be available until the end of calendar year 1985 and that a delay in the planned acquisition of the 225-round per month production rate might adversely affect planned deliveries in the outyears. Also, the Navy contends that if a decision is made to second source, the major portion of production equipment at the developer's plant could be moved to the second source plant.

Since the Congress believes establishing a second source for the 5-inch guided projectile is appropriate, the \$12.9 million for production equipment to establish maximum rate production at the development contractor's plant (with a future transfer to a second source plant) seems questionable.

QUESTIONABLE PROCUREMENT OF WAR RESERVE STOCK

The \$36.5 million request for machine gun ammunition includes \$6.5 million for 30-mm. cartridges that is questionable because it would provide war reserve stock for a program that has not yet been funded. Further, the budget backup does not include documentation supporting the request; e.g., the quantity and types of 30-mm. rounds to be purchased, procurement history and planning data, production schedules, or requirement studies pertaining to the \$6.5 million request.

A NAVAIR official told us that the 30-mm. ammunition was to be used on the A-4 and F-4 aircraft but that the research and development program to retrofit 30-mm. guns on these aircraft had not yet been funded. Since the retrofit program is still unfunded, it is questionable that funds are needed to establish war reserve stocks.

The Navy agrees and suggests the \$6.5 million be used to fund other items.

PREMATURE PROCUREMENT OF BIGEYE BOMBS

The Bigeye bomb is a binary chemical weapon that is aircraft delivered and similar in size and weight to the Rockeye II weapon system. It contains two nonlethal chemicals (QL and sulfur) which, when mixed, form a toxic nerve agent (VX).

The Navy's request of \$19.7 million for the Bigeye bombs may be premature because (1) funding is limited to bomb components, (2) chemical munitions production facilities are not available, and (3) there are continuing technical problems with the bomb.

Background

Technological effort necessary for developing the Bigeye weapon system began in 1959 at the Army's Edgewood Arsenal and continued into exploratory development with Navy funding. Testing of full-scale weapons was in progress in 1969 when the program was terminated. After a 7-year suspension, engineering development of the Bigeye weapon system was resumed in October 1976.

The Bigeye has a temperature/pressure problem that can cause internal damage. The first all-up weapon test, conducted on October 7, 1982, disclosed that when the two chemicals mix, the interior temperature and pressure rises. This can cause the

Bigeye to rupture at the tail end. The problem has not been solved, and since such a rupture could expose the pilot and aircraft to the nerve agent, the mixing/delivery method has been changed from on-aircraft mixing with low level delivery to mixing the chemicals after the Bigeye bomb is released from the aircraft. Delivery has been changed to the level/loft method. This method requires the aircraft to fly in low in order to avoid enemy antiaircraft fire and just before releasing the bomb, the aircraft quickly climbs from about 200 feet to about 700 feet. The release point is determined by the aircraft's computer and occurs about 2 to 3 miles from the target area. The aircraft continues to climb to 1,200 to 1,400 feet before it can resume low level flight.

Under the new mixing method, the pilot and aircraft are in less danger of being exposed to the nerve agent, but the new delivery technique may cause the aircraft to be more vulnerable to enemy antiaircraft fire.

Under the current level/loft delivery method, the weapon will have between 10 and 35 seconds after release for the two chemicals to properly mix and spray over the target area.

Developmental Testing and Evaluation (DT&E) was scheduled for May 1984.

Funding request limited to components

The documentation supporting the Navy's fiscal year 1985 budget request of \$19.7 million indicates the Navy plans an advanced procurement of long-lead-time metal parts for 899 bombs. Further, the Navy's backup documents indicate that \$21.6 million more will be needed in fiscal year 1986 to complete the 899 bombs. The documents do not generally indicate how the funds would be used.

When we questioned the Bigeye program manager about the fiscal year 1985 funding, he said that the fiscal year 1985 request had been incorrectly stated. He explained that the \$19.7 million in the fiscal year 1985 request was principally for 449 empty Bigeye bomb bodies (total unit price, \$43,425) which would be ready for filling with QL when such approval was granted by the Congress. The program manager advised us that the unit price estimate had been developed by The Marquardt Company without the benefit of a should-cost study.

The Navy anticipates a contract for 899 empty Bigeye bomb bodies to be awarded in January 1985. This procurement includes

449 empty bomb bodies for the Navy and 450 empty bomb bodies for the Air Force. The Navy anticipates first delivery in July 1986 with final delivery in January 1987.

Chemical munitions production/
facilities not available

Bigeye production facilities are not available. The Congress deleted the services' fiscal year 1984 requests for the Bigeye and related production facilities. The Army is requesting fiscal year 1985 funding for three production facilities needed to produce the Bigeye. If funded, such facilities will not be available for production until some time in the future. For example, the QL production facility will not be available until about October 1987 with QL production about November 1987. It seems appropriate to request funding for the bomb after the facilities are approved and funded.

Continuing technical problems

Technical problems still plague the Bigeye bomb development. Test failures occurred on January 18, 1984 (test L-28), and February 14, 1984 (test L-29). These tests were intended to evaluate the chemical and mechanical effects of functioning a Bigeye bomb at 120 degrees Fahrenheit.

Due to the failures that occurred during test L-29, it was concluded that no evaluation of the chemical and mechanical effects of functioning a Bigeye bomb at 120 degrees Fahrenheit could be made. Test L-29 was a repeat of test L-28 and basically disclosed the same failures.

On March 14, 1984, another 120-degree Fahrenheit test was conducted; however, test data was unavailable during our review. Further, the Bigeye bomb cannot meet the operational temperature requirement (minus 40 degrees Fahrenheit to 140 degrees Fahrenheit) for producing VX with the minimum purity percentage. Currently, the minimum VX purity can be obtained only between minus 20 degrees Fahrenheit and 120 degrees Fahrenheit.

Finally, the Bigeye's proximity fuze, the FMU-140, failed an electromagnetic test. The Bigeye program manager advised us that the fuze problem should be corrected by May 1984 but that if it was not, then no satisfactory fuze would be available for the Bigeye DT&E, which was also scheduled for May 1984.

Considering that QL will not be available for months after the bomb bodies are delivered and in view of the still unresolved technical problems, the Navy's request for \$19.7 million for empty bomb bodies is questionable.

Navy comments

The Bigeye program manager commented that the Navy's fiscal year 1985 request for \$19.7 million had been revised to 425 metal parts sets (unfilled Bigeye bombs) at \$46,353 each. Also, he commented that the QL facility would be available in July 1987 and that both it and the load, assemble, and pack (LAP) facility were sized to produce QL at a rate much greater than the metal parts could be produced. Therefore, metal parts sets must be stockpiled. Furthermore, the Navy now expects delivery of the first metal parts sets from fiscal year 1985 procurement in November 1986 with final delivery in May 1987.

Regarding the unresolved technical problems, he commented that the March 14, 1984, 120 degree Fahrenheit test was fully successful with valid data obtained on the chemical reaction. Further, he informed us that preliminary testing of the FMU-140 fuze with a fix installed for the electromagnetic problem was successful and there would be no impact due to the fuze problem on the Bigeye DT&E program. Also, with regard to the loft delivery of the Bigeye, he commented that the vulnerability of the pilot and aircraft was no different than would be experienced with any other weapon in any operational scenario.

Navy officials essentially endorsed the project manager's comments in its response to our draft report.

Although we did not have time to verify and evaluate some of the program manager's comments, we did visit the Army test facility to obtain additional data. At the facility, we were informed that although construction of the QL facility would be completed in July 1987, QL would not be available until October 1987, or several months after final delivery of the metal parts sets. Further, the March 14, 1984, 120-degree Fahrenheit test was not fully successful because the minimum VX purity was not obtained, but a subsequent test in April 1984 was successful. However, testing to date has not demonstrated that the Bigeye is operational within the required temperature range of minus 40 degrees and 140 degrees Fahrenheit. Therefore, we believe that it is not prudent to fund the procurement and stockpiling of metal parts sets until testing is complete, the design is stable, and the Congress gives approval for the production facilities.

ITEMS REQUIRING SPECIAL ATTENTION

The Navy is requesting \$60.5 million for LLLGB kits and 25-mm. machine gun ammunition. We believe these requests bear close monitoring by the Committees for reasons explained below.

LLLGB kits

The Navy is requesting \$37.7 million to buy 1,353 LLLGB kits for use with MK-82 (500-pound) bombs. This request bears close monitoring because (1) operational testing is not scheduled for completion until May 1985, (2) the production decision is not scheduled until July 1985, and (3) the contractor does not now have capacity to produce all the requested units within the funded delivery period. The LLLGB kits, also called Paveway III, are replacements for Paveway II laser guided bomb kits. The LLLGB provides greater launch range, increased accuracy, and capability for low-level launch.

The Navy's fiscal year 1984 request included \$9.7 million to buy 350 LLLGB kits. As of January 1983, when the fiscal year 1984 budget was submitted, the Navy planned operational testing and evaluation of the LLLGB between March and May 1983 and anticipated approval for service use in June 1983. Because of delays in the development program, the Navy's fiscal year 1984 program was revised to include 350 Paveway II kits for a total cost of \$3.3 million.

The Navy's fiscal year 1985 budget request indicates that the Navy's development testing of LLLGB is now scheduled from September 1984 through January 1985 and operational testing and evaluation is scheduled from February through May 1985. The Navy expects to grant approval for service use about July 1985 or about 2 years later than anticipated.

The Air Force plans to award a fiscal year 1985 production contract for 3,500 LLLGB kits in January 1985. If operational testing is completed and approval for service use is granted as scheduled, the Navy plans to order its 1,353 kits as a modification to the Air Force's fiscal year 1985 production contract. At the time of our review, the Air Force's supplier for LLLGB kits had a monthly production capacity of 200 kits per month, or a maximum of 2,400 kits per year. The Navy's production schedule in the budget backup calls for an 18-month procurement lead time and deliveries of the fiscal year 1985 program beginning April 1986 and ending September 1986 at a monthly rate of about 250 units.

Although the Navy's deputy program manager did not have a firm production schedule from the Air Force, we were informed that the Navy expected delivery within the normal funded delivery period. Navy program officials told us the Air Force was planning to increase production capability starting in June 1984 and by December 1985 the supplier should be capable of producing 500 kits per month.

If the current production capacity of 200 units per month is not increased, some of the Navy's fiscal year 1985 request will probably be delivered outside the normal funded delivery period.

Additionally, the Navy's plan to purchase 1,353 LLLGB kits in fiscal year 1985 seems optimistic and bears close monitoring for the following reasons:

- Developmental testing is not scheduled for completion until the second quarter of fiscal year 1985.
- Operational testing is not scheduled for completion until the third quarter of fiscal year 1985.
- Approval to proceed to full production is planned for the fourth quarter of fiscal year 1985. Generally, Navy policy provides that the production decision should be reached during the first quarter in the fiscal year for which procurement funds are requested.

Navy program officials believe successful completion of developmental and operational tests are low risk areas due to prior tests conducted by the Air Force. However, the Navy plans that, if the Air Force's production of LLLGB kits is delayed, it will delay the LLLGB procurement until fiscal year 1986. However, the dollars requested for fiscal year 1985 will be used to purchase 2,259 Paveway II kits, or 906 more than the number of Paveway III kits it planned to buy. Although the Navy can justify its planned procurement of the additional Paveway II kits on the basis of the requirements computation, it may be prudent to postpone procurement of the additional 906 Paveway II kits until the more desirable Paveway III is available.

25-mm. machine gun ammunition

The Navy's \$36.5 million request for machine gun ammunition includes \$25.1 million for 25-mm. cartridges. The request bears close scrutiny because there are unresolved technical problems with the GAU-12/A gun system which is the intended application of this ammunition. Navy officials told us that the cartridges could also be used in ground/surface applications.

The Navy is developing an armor-piercing incendiary (API) cartridge for the GAU-12/A gun system, which is being developed by the Navy for the AV-8B aircraft. This cartridge is expected to give the Navy a capability to defeat light to medium armor. The gun system will also use two Army-developed items, which include a high-explosive incendiary cartridge for use against "soft" targets, such as trucks, and a target practice cartridge.

Unresolved technical problems

The GAU-12/A 25-mm. gun system has technical problems that adversely affect the safety of the aircraft and mission accomplishment.

The Naval Air Test Center, Patuxent River, Maryland, conducted a test to assess the AV-8B/GAU-12/A gun system performance and accuracy for the attack mission and to determine its readiness for operational evaluation. The test report, dated August 10, 1983, states that within the scope of the test, the AV-8B/GAU-12/A gun system exhibited excellent potential and will be satisfactory for both the air-to-ground and air-to-air missions upon correction of the deficiencies that adversely affect the safety of the aircraft and mission accomplishment. These deficiencies include (1) extremely limited ranging capability of the air-to-air gun sight, (2) aircraft skin cracks during 25-mm. firing, and (3) low reliability of the 25-mm. gun feed system. An additional problem concerned the weight of the gun system, which was over the maximum weight allowance of 1,250 pounds. The report concluded that even upon correction of the deficiencies identified, the gun system was not ready for operational evaluation.

A subsequent test report in January 1984 states that the AV-8B with the inlet mod and GAU-12/A gun retains potential to be operationally effective and suitable for the Marine Corps light attack mission. However, under certain operating conditions, target penetration and gun accuracy can be degraded and the probability of fragmentation damage to the aircraft can increase significantly. Further, the report states that the ammunition cross-feed mechanism is not satisfactory.

The report recommends approval of the AV-8B aircraft for limited fleet introduction with flight restrictions but also recommends that test deficiencies be corrected before operational testing.

In view of the test results discussed above, there may be no need to provide funding in fiscal year 1985.

A Navy official provided the following comments regarding our findings.

- All Navy technical problems will be resolved before operational evaluation.
- The extremely limited range capability of the air-to-air gun sight is being corrected during technical evaluation.

- The aircraft skin is being strengthened around the gun area, and the blast deflector has been redesigned to lessen overpressure.
- The gun feed system has been strengthened, which has vastly improved reliability, and this has been tested by the contractor.
- The gun system is only 11 pounds over the maximum weight requirement of 1,250 pounds. Further, the contractor is also in the process of submitting an engineering change proposal to NAVAIR which would further reduce the weight to under 1,250 pounds.
- Concerning fragmentation damage to the aircraft, the redesign of the blast deflector has reduced the probability of aircraft damage.
- The cross-feed mechanism has been improved to increase reliability.

Despite the above statements, the Navy still has not tested the GAU-12/A gun system to determine whether deficiencies disclosed by previous testing have been corrected. A Navy official advised us that this would be done during operational evaluation, which is scheduled to begin on August 1, 1984. We did not have time to evaluate this information. However, since there are still uncorrected technical problems and the Navy has not conducted tests to determine the status of those problems, which it believes have been corrected, we believe that this item needs close monitoring by the Committees.

ENCLOSURE 3

AIR FORCE AMMUNITION PROGRAM

The Air Force requested \$1.4 billion for ammunition in its fiscal year 1985 program. We reviewed the justification for 27 items representing \$1.3 billion, or 93 percent of the request. Appendix III shows the items reviewed and our suggested adjustments to the request. We believe the requests for nine items could be reduced by a total of \$106.3 million for the following reasons:

- A total of \$43.2 million of the \$148.2 million requested for two items is not needed because deliveries extend beyond the fiscal year 1985 funded delivery period.
- A total of \$10.5 million of the \$98.2 million requested for four items is not needed because unit cost estimates are overstated.
- \$8.7 million is not needed for BDU-33 practice bombs because the Air Force did not consider all assets in determining the fiscal year 1985 program quantity.
- \$24.1 million for the Durandal airfield attack weapon is questionable because it is relatively ineffective and is being replaced.
- \$19.8 million may be premature for Bigeye bombs because the request is limited to bomb components, production facilities are not available, and there are technical problems with the bomb.

In addition, the \$36.2 million request for 30-mm. high-explosive incendiary cartridges is not needed because the fiscal year 1984 program will generate on-hand assets exceeding inventory objectives. However, deleting this program could adversely affect an ongoing multiyear contract. Therefore, it may be advisable to apply the \$36.2 million to the 30-mm. armor-piercing incendiary cartridge.

DELIVERIES NOT WITHIN
FUNDED DELIVERY PERIOD

A total of \$43.2 million of the request for the following items could be deleted because requested quantities cannot be delivered within the fiscal year 1985 funded delivery period.

- \$31.4 million for LLLGB kits.

--\$11.8 million for FMU-139 fuzes.

LLLGB kits

About \$31.4 million of the \$105.5 million request for LLLGB kits is questionable because the contractor does not have sufficient production capacity to meet the delivery schedule. As a result, the Air Force probably will not be able to acquire all the requested 3,500 kits within the fiscal year funded delivery period.

Preliminary results of a recent capability assessment disclosed several bottlenecks in the contractor's production line, which limit monthly capacity to 200 units instead of the required 500. Additional tooling and test equipment are needed to produce 500 units per month. However, the Air Force and the contractor have not agreed who should fund the additional tooling and test equipment. The Air Force feels that sufficient funding was provided in the initial production contract for tools and equipment to establish 500 units per month capacity. However, the contractor feels that the funding was insufficient and that the Air Force should provide additional funding. According to the deputy director of the LLLGB program, a legal decision will probably be necessary to resolve the issue. If the issue is not resolved soon, however, the contractor will not be able to produce all 3,500 kits within the fiscal year 1985 funded delivery period.

Air Force officials told us that a reduction was necessary and that 1,500 kits estimated to cost \$44 million had been deleted from the revised budget request.

FMU-139 fuzes

As discussed on pages 2-1 to 2-3 in enclosure 2, the \$42.7 million request for 56,350 FMU-139 fuzes could be reduced by \$11.8 million because 15,543 cannot be delivered within the funded delivery period.

The Air Force contends that a 20-month lead time is appropriate and that the program should be fully funded. As discussed in enclosure 2, we believe a 17-month lead time is appropriate and that \$11.8 million could be deleted.

OVERSTATED UNIT COST ESTIMATES

A total of \$10.5 million of the request for the following items is not needed because unit cost estimates are overstated:

--\$4.8 million for MJU-2B IR flares.

--\$2.8 million for MJU-7B IR flares.

--\$2.9 million for BSU-49 and BSU-50 inflatable retarders.

MJU-2B IR flares

The \$7 million request for 100,022 flares could be reduced by about \$4.8 million because the unit cost estimate is overstated.

The Air Force based its fiscal year 1985 budget request on a unit cost estimate of \$69.95 provided by the Army's single manager. However, an \$18.84 unit price was established in a Navy contract awarded for the fiscal year 1981 program. Army officials said they were unaware of this contract and did not consider the lower unit cost in developing the fiscal year 1985 estimated unit cost.

The estimated fiscal year 1985 unit cost of \$69.95 is 19 percent higher than the estimated fiscal year 1981 unit cost of \$58.75. By applying the same percentage of increase to the actual unit cost of \$18.84 obtained under the fiscal year 1981 program, a reasonable unit cost for the fiscal year 1985 program apparently would be about \$22.40. At this unit cost, the request could be reduced by about \$4.8 million.

Air Force officials said they doubt that the flare could be produced at the lower cost. However, if it could be, they preferred an increase in program quantity rather than a program cut.

MJU-7B IR flares

The \$13.7 million request for 563,040 flares could be reduced by about \$2.8 million because the unit cost estimate is overstated. The unit cost includes the cost of a safe and ignition device, which could be eliminated without affecting the flare's performance.

There are two manufacturing processes for the MJU-7B flare: an extrusion process and a process of pressing the flare pellets in a mold. As a result of Air Force tests, elimination of the safe and ignition device was approved for extruded flares but not for the pressed pellet flares. Air Force officials estimated that elimination of the safe and ignition device would reduce the unit cost by about \$5. Proposals, including those for flares with and without the safe and ignition device, have been received from the two manufacturing sources for this

flare. Therefore, the Air Force has the opportunity to buy flares with safe and ignition devices eliminated for its fiscal year 1985 program and thus save about \$2.8 million.

Air Force officials told us that a reduction was necessary and that the program had been decreased by \$2.8 million in the revised budget request.

BSU-49 and BSU-50 air inflatable retarders

The request for BSU-49 and BSU-50 air-inflatable retarders could be reduced by about \$2.9 million because unit costs appear too high. The fiscal year 1985 budget request includes \$77.5 million for retarders and is based on unit cost estimates provided by the Army's single manager, as follows:

<u>Item</u>	<u>Quantity</u>	<u>Unit cost estimate</u>	<u>Amount of request</u> (millions)
BSU-49	86,004	\$ 753.00	\$64.8
BSU-50	9,300	1,370.00	12.7

In requesting proposals for a BSU-49 multiyear contract for fiscal years 1983-85, the single manager received a price proposal of \$680.02 for the fiscal year 1985 program. The multi-year contract was not awarded; however, the single manager plans a contract for the fiscal year 1984 program with an option for the 1985 program. On the basis of a 1985 price proposal for the BSU-49 and a fiscal year 1983 program price proposal of \$963.68 for the BSU-50, unit prices of \$726 for the BSU-49 and \$1,305 for the BSU-50 appear more reasonable than those in the request. However, firm prices for retarders and containers have not yet been established; thus, the unit costs we calculated may still be somewhat high. Use of unit costs of \$726 for the BSU-49 and \$1,305 for the BSU-50 would result in a \$2.9 million reduction in the required fiscal year 1985 funding request.

Air Force officials told us that a reduction was necessary and that the revised budget had decreased the BSU-49 and BSU-50 programs by \$7.7 million and \$2.8 million, respectively.

AVAILABLE ASSETS NOT CONSIDERED

The \$21.8 million request for 1,154,000 BDU-33 practice bombs¹ could be reduced by \$8.7 million because about 461,000 bombs that had been contracted for were not considered when the Air Force determined its fiscal year 1985 program requirements.

In computing fiscal year 1985 requirements for the BDU-33 practice bomb, the item manager excluded the balance outstanding under a contract with a producer that had failed to meet delivery schedules since filing for Chapter 11 bankruptcy. However, about 66,000 bombs were subsequently received from the producer, and the Army's single manager indicated that the remaining 395,000 bombs would also be delivered to the Air Force. Therefore, the fiscal year 1985 program could be reduced by 461,000 bombs estimated to cost \$8.7 million.

Air Force officials agreed that all assets should have been considered; however, the program was reduced by only \$4.8 million.

INEFFECTIVE WEAPON BEING REPLACED

The request for continued procurement of the Durandal airfield attack weapon is questionable because its effectiveness is limited and it will be used only as an interim weapon. The fiscal year 1985 budget request includes \$48.3 million for 1,850 of these bombs.

The Air Force is procuring Durandal only as an interim weapon because it does not fully satisfy the Air Force's needs. Air Force officials have told the Congress that the Durandal is a near-term solution to airfield attack until better systems are developed. An Air Force study shows the Durandal is one of the most costly options evaluated for airfield attack when aircraft attrition is considered as part of the system's cost. The delivery aircraft must fly directly over the target, making the planes more vulnerable to enemy fire. Additionally, a 1982 nonnuclear armament plan shows that Durandal provides only about a 13-percent increase in the Air Force's capability to achieve its airfield closure objective.

¹The Air Force fiscal year 1985 request includes \$21.8 million for 1,115,719 BDU-33 practice bombs; however, the quantity is erroneous. An Air Force official stated that the quantity should be 1,154,000 and that the funds requested were sufficient for the correct quantity.

Air Force officials stated that Durandal was not the preferred weapon and that they would like to replace it with a more effective weapon in the near future. One of the candidate delivery systems for replacing Durandal uses a Boosted Kinetic Energy Penetrator which craters runways much like Durandal but should provide enhanced effectiveness through using multiple submunitions rather than a single warhead. Air Force officials stated that while the submunition itself could be ready for production by fiscal year 1986, the availability of a carrier for these submunitions was uncertain. The Air Force is currently evaluating carriers for the Boosted Kinetic Energy Penetrator.

Because the Durandal does not fully satisfy the Air Force needs and a new weapon is being developed, the Committees may wish to delete or significantly reduce the request in favor of new, improved weapons. A 50-percent reduction of \$24.1 million would maintain the program at about the level of the fiscal year 1984 program.

According to Air Force officials, the program should be fully funded because a replacement weapon cannot be expected from production until 1990.

PREMATURE PROCUREMENT OF BIGEYE BOMBS

The entire request for Bigeye bombs may be premature because (1) funding is limited to bomb components, (2) chemical munition production facilities are not available, and (3) there are technical problems with the bomb.

The Air Force fiscal year 1985 budget request includes \$19.8 million for 434 Bigeye bombs,² broken out as follows:

²The President's budget does not show any quantity for the Bigeye bomb. According to an Air Force official, proposed funding for fiscal year 1985 is intended to procure unfilled bomb bodies (complete units minus the chemical fill). Funding for the chemical fill for both fiscal years 1985 and 1986 requirements will be requested in fiscal year 1986. This exception to the full funding policy was approved by the Assistant Secretary of Defense, Comptroller, on January 6, 1984. The fiscal year 1985 quantity of 434 is included with the fiscal year 1986 program in the President's budget.

<u>Element of cost</u>	<u>Quantity</u>	<u>Cost</u> (millions)
BLU-80/B (Bigeye)	434	\$17.491
QL procurement (chemical)		-
Containers	434	.735
Data		.600
ECO/ECP		<u>.928</u>
Total cost		<u>\$19.754</u>

As discussed on page 2-11 in enclosure 2, the Congress deleted fiscal year 1984 requests for chemical munitions production facilities and technical problems encountered during development remain unresolved.

Air Force officials neither agreed nor disagreed with our assessment.

INVENTORY WILL EXCEED INVENTORY OBJECTIVES

The 30-mm. HEI cartridge is an explosive shell designed to destroy unarmored or lightly armored vehicles, personnel, or other targets. Its use is either with API cartridges in a combat mix when tanks are anticipated targets or alone when antiarmor capability is not needed. The API cartridge is a nonexplosive shell designed to destroy tanks. It is used only in the combat mix, which consists of five rounds of API for each round of HEI.

The request for 30-mm. cartridges is questionable because it includes about \$36.2 million for 2.288 million individual-use HEI cartridges when the asset position for these will exceed the inventory objective at the end of the fiscal year 1984 program. Instead of reducing the request by \$36.2 million, it may be possible to adjust the program and buy needed combat-mix cartridges. Also, we advised Air Force officials of a computation error that could have resulted in the request being overstated by about \$8 million for the armor-piercing incendiary round. They reduced the request by this amount.

The request includes the following quantities and costs for individual use and combat-mix cartridges.

<u>Type</u>	<u>Quantity requested for</u>		<u>Total request</u>	
	<u>Individual</u>	<u>Combat</u>	<u>Quantity</u>	<u>Cost</u>
				(millions)
HEI	2,288,000	550,000	2,838,000	\$ 45.0
API	-	<u>2,750,000</u>	<u>2,750,000</u>	<u>61.5</u>
Total	<u>2,288,000</u>	<u>3,300,000</u>	<u>5,588,000</u>	<u>\$106.5</u>

At the end of the fiscal year 1984 program, the asset position for individual-use HEI cartridges will exceed the inventory objective by about 750,000 rounds, and the procurement of an additional 2.288 million rounds under the fiscal year 1985 program will result in an asset position that will exceed the inventory objective by about 3 million rounds.

The requirement for 2.288 million rounds of individual-use cartridges is included in existing multiyear contracts, and contract prices will probably be subject to increases if the requirement is not funded. However, an alternative to not funding the requirement may exist. The asset position for combat-mix cartridges is well below its inventory objective and the contractors may be able to produce additional combat-mix cartridges at about the same total program production level and prices. For example, about 1,450,000 API and 290,000 HEI cartridges could be produced as combat-mix with the \$36.2 million requested for individual-use HEI cartridges. This would result in a fiscal year 1985 program of 5,040,000 combat-mix cartridges (4,200,000 API and 840,000 HEI) compared with the 2,750,000 API and 2,838,000 HEI cartridges in the request and included on the multiyear contracts. Air Force officials agreed that action should be taken to reduce the contract quantities for individual-use HEI cartridges and to increase the combat-mix quantity, provided this action does not increase contract prices unreasonably.

Since the asset position for the individual-use HEI will exceed its inventory objective by about 3 million rounds if the request is funded as presented, the Committees may wish to direct the Air Force to determine (1) whether the contractors can produce additional combat-mix rounds at about the same

program level as the fiscal year 1985 request and (2) whether the fiscal year 1984 program for individual-use HEI rounds can be reduced.

If the Air Force cannot make any contract adjustments, the Committees may wish to reduce the request by about \$36.2 million representing 2.288 million rounds of individual-use HEI cartridges.

Air Force officials said that while the fiscal year 1985 program will result in excess inventory, funding should not be diverted or deleted. They base this conclusion on disruption of the multiyear contract and production schedules. They suggest that the excess HEI cartridges be used as government-furnished material in the fiscal year 1986 API program.

ENCLOSURE 4

AMMUNITION PLANT MODERNIZATION
AND EXPANSION PROGRAM

The Army's fiscal year 1985 request for production base support totals \$302.2 million--\$250.2 million for 31 projects to modernize and expand the ammunition production base and the balance for plant layaway and production support equipment. We obtained information on eight projects representing \$97.0 million, or 39 percent of the total. Funding for all eight projects appears questionable for the following reasons:

- \$44 million is premature for four RDS/HMX--related projects at the Holston AAP because designs are incomplete.
- \$42 million is premature for three binary-munitions related projects because designs are incomplete and the request is limited to long-lead-time equipment for two projects, and technical problems involving the Bigeye bomb should be resolved before the third project.
- \$11 million is premature for design of an HMX facility until numerous questions are answered.

PROJECTS AT THE HOLSTON
AAP

The Holston AAP at Kingsport, Tennessee, is the only U.S. producer of the compounds RDX and HMX, which are used as the basic ingredients for numerous other explosives. Four projects in the fiscal year 1985 request are to modernize and improve facilities at this plant as shown below:

<u>Project Number</u>	<u>Project</u>	<u>Amount requested</u> (millions)
5852199	Coal handling improvements	\$ 9.0
5852447B	Modify, convert, and reactivate RDX/HMX lines	20.0
5852054	Modernization of composition C-4 facility	12.0
5852439 B-1	Expansion of lacquer preparation facility	<u>3.0</u>
Total		<u><u>\$44.0</u></u>

Based on 1976 congressional guidance that precludes funding projects when final design is not complete prior to budget submission, these projects should not be funded in fiscal year 1985. This guidance states

"... the Committee believes ... completion of final design of each modernization and expansion project prior to submission of the appropriation request will provide a more sound basis for determining the scopes of projects and estimating costs...."

A Production Base Modernization Agency official told us that the four Holston projects were accelerated to fiscal year 1985 at Department of the Army direction and do not adhere to this established guidance. Therefore, the Agency was directed to request that the Army's Materiel Development and Readiness Command obtain an exception. An Army letter, dated December 12, 1983, states a waiver should be obtained in order to start immediate modifications of Holston's manufacturing facilities to meet increased Five Year Defense Plan requirements to stockpile RDX and HMX-based explosive. Specific discussions of the projects follow.

Project 5852199
(coal handling improvements)

This \$9 million modernization project is to provide new coal handling systems for two steam plants at the Holston AAP. According to the Army, this project is needed because the existing coal handling systems are about 42 years old; the quantity of coal to be handled by fiscal year 1988 is expected to increase; and maintenance costs are steadily rising. Further, the Army stated that the existing equipment is getting more difficult to repair and this project is essential to insure continued effective steam plant operations to support Holston's capability to produce explosives.

We believe that the acceleration of this project's funding to fiscal year 1985 appears questionable because:

- the final design, as required by congressional guidance, was not complete when the budget was submitted. The design is not scheduled to be completed until November 1984, thus, requiring the Army to request a waiver.
- the steam plants' projected operations will run far below total capacity through fiscal year 1989--even considering the increased production requirements. In February 1984, Holston's coal boilers were operating at about 19 percent of their total capacity. By 1988, coal use is expected to increase 75 percent to 300 percent over 1984.

However, even this increase will use only between 24 and 37 percent of the steam boilers' capacity. Furthermore, maintenance costs are projected to increase by just 16 percent.

--historically, production interruptions have not occurred due to coal handling system downtime because coal reserves are maintained to feed the boilers. Holston officials stated there has never been an interruption to steam service at the plant due to inoperative boilers or coal handling systems, because each boiler has a storage bunker capable of providing coal for 20 hours. In addition, coal handling equipment downtime has averaged only about 1 hour per week, which does not concern Holston officials. However, they expressed concern that future repairs on the 42-year-old equipment might not be possible within a 20-hour period.

Project 5852447B
(RDX/HMX lines)

This \$20 million project is part of a 3-year, \$29 million effort to reactivate, restore, and realign production facilities at Holston. The effort includes an \$8 million fiscal year 1984 project (5842447A) included in the Production Base Modernization Agency's planned late start program and a fiscal year 1986 project (5862447C) estimated to cost \$1 million.

The estimated cost for this project is based on completed similar type work and engineering judgement. A final design, as required by congressional guidance, is not scheduled for completion until June 1985. Until a design is available, this project's estimated cost is subject to change. The Army estimates the actual cost will be within 20 percent of the requested amount or between \$16 million and \$24 million.

Project 5852054
(Composition C-4 facility)

The Army is requesting \$12 million for this project primarily to increase Holston's capacity for producing composition C-4 from 512,600 pounds to about 1.1 million pounds per month. This project, initially planned for fiscal year 1986, was accelerated to fiscal year 1985 because Five Year Defense Plan buys of composition C-4 are expected to increase significantly.

In our opinion, this project is premature in fiscal year 1985 because (1) a final design is not scheduled for completion until March 1985, and (2) there are uncertainties about the funding level required, production capability, and the type of C-4 to be produced.

According to Holston and Production Base Modernization Agency officials, the Army's request of \$12 million for this project is insufficient to achieve the additional 600,000 pounds per month capacity desired. We were told that \$4 million would be required to achieve this added capacity using multiple production lines or about \$14 million to achieve this capacity on a single line as originally planned.

The need for this project and the increased production capacity is apparently based on planned Army and Marine Corps procurements of the Mine Clearing Line Charge (MICLIC) system and the stockpiling of composition C-4. For example, during fiscal years 1988 and 1989, the MICLIC system will use over 93 percent of Holston's projected annual production of 13,200,000 pounds of composition C-4. A capacity of about 18 million pounds per year may be achievable if a less complex, nominal class 1 composition C-4 is produced for use in this system rather than the currently specified class 1/class 5. In March 1984, nominal class 1 producibility studies were ongoing at the Louisiana and Milan AAP. These studies are expected to provide interim results by June 30, 1984, and final results by June 30, 1985. Also, in March 1984, the Army's Research and Development Center was planning to evaluate the system's effectiveness using the nominal class 1 explosive.

Project 5852439 B-1
(lacquer preparation facility)

This \$3 million project is to expand the existing lacquer preparation facility to support requirements identified in the Five Year Defense Plan. According to the project engineer, the cost estimate is based on a design that is only 15 to 20 percent complete and, therefore, subject to change. A more solid cost estimate will be available when the final design is completed in October 1984.

The proposed expansion would increase the production of lacquer batches that are used for plastic bonded explosives. Composition C-4, we were told, is such an explosive and about 70 percent of the total lacquer production after this project's completion would be used to support the proposed increase in composition C-4 production. It would also provide increased raw material storage capability and increased efficiency in materials transfer and handling.

Army officials agree that our statements are correct. However, they state that an exception to normal congressional policy is warranted because of the pressing need for RDX/HMX explosives.

BIGEYE BOMB PROJECTS

The following three projects are for facilities needed to produce Bigeye bombs.

<u>Project Number</u>	<u>Description</u>	<u>Amount requested</u> (millions)
5850063	Long lead equipment for initial production facilities to load, assemble, and pack Bigeye bombs.	\$ 11.8
5850074A	Initial production facilities for Bigeye binary bomb metal parts.	16.7
5850079A	Long lead equipment for initial production facilities to produce QL used in Bigeye bombs.	<u>13.5</u>
Total		\$ <u>42.0</u>

We believe funding of the QL and LAP facilities could be deferred until design is complete and funds are requested for the total project rather than just long lead time equipment. We also believe that funding the metal parts facility could be deferred until value engineering is complete, technical problems with the end item are fully resolved, and companion facilities (QL and LAP) are ready for funding.

Funding of the first and third projects will require exceptions to congressional guidance because their final designs will not be completed until April 1985 and July 1985, respectively. To meet congressional guidance, final designs for these projects should have been completed in the January 1984 time frame or prior to submission of the fiscal year 1985 budget. The designs for these facilities would meet the guidance for the

Army's 1987 budget to be submitted in the January 1986 time frame. An agency official told us, however, that the QL facility design will be adequate for contract award at either Newport AAP or private industry in late fiscal year 1984 or early fiscal year 1985. Also, the long lead equipment fiscal year 1985 projects for the QL facility and fill and LAP facility violate congressional guidance, which discourages procurement of this type equipment and encourages full funding of a project in a single year.

The fiscal year 1985 initial production facilities for metal parts comply with congressional guidance because a final design was completed in June 1983. However, designs for the Bigeye bomb production facilities were undergoing a value engineering study to be completed in August 1984. According to the Production Base Modernization Agency, the engineering study will result in production cost savings if changes are made to the Bigeye bomb and the production facility. While the Navy agrees that potential savings could be realized, it cannot accept any changes to the bomb or first facility if program delays are caused. As a result, an agency official told us that only those changes that have no impact on program milestones will be incorporated into the initial production facility. Any other changes will be incorporated in the expansion facility programmed for fiscal year 1986. Further, there are technical problems with the Bigeye bomb, as discussed on page 2-11, which could impact facility design.

PROJECT 5852430
MUSALL COMPLEX

This \$11 million request is to begin the design of a new complex for producing the explosive HMX using a new process commonly referred to as MUSALL. This request follows a \$3 million project funded through Army reprogramming actions in fiscal year 1983 and a proposed late start fiscal year 1984 project for \$21 million.

The need for this new complex is based on an Army analysis of mobilization requirements data and manufacturing capabilities for RDX/HMX based explosives. This analysis, if accurate, projects a significant shortfall in production capacity for these explosives. However, there are many questions that should be answered before this project is funded. The balance of this section provides a status report of the MUSALL project.

Program history and status

The three projects discussed above are part of a planned effort to build an HMX complex which was to start in January 1984 and be completed in September 1992. The following chart provides the projects planned, the estimated costs, and planned completion dates.

<u>Project no.</u>	<u>Title</u>	<u>Estimated cost</u> (millions)	<u>Start date</u>	<u>Complete date</u>
5830117	Design, installation, and operation of MUSALL process demonstration pilot model	\$ 3.0	Jan. 1984	June 1985
5840117	Design, install, and operate MUSALL pilot plant	21.0	July 1984	Dec. 1986
FY85 Request (58522430A)	Design MUSALL complex Part I	11.0	Jan. 1985	Jan. 1986
5862430B	Design MUSALL complex part II	11.0	Jan. 1986	Dec. 1986
5872430C	Design MUSALL complex part III	12.0	Jan. 1987	June 1987
5872431A	Construct MUSALL complex, part I	58.0	Apr. 1987	Mar. 1988
5882431B	Construct MUSALL complex, part II	100.0	Jan. 1988	Mar. 1989
5892431C	Construct MUSALL complex, part III	91.0	Jan. 1989	June 1990
5902431D	Construct MUSALL complex, part IV	68.0	Jan. 1990	June 1991
5912431E	Construct MUSALL complex, part V	<u>38.0</u>	Jan. 1991	Sept. 1992
Total cost		<u>\$413.0</u>		

The compounds RDX/HMX are used as the basic ingredients for numerous other explosives, and are produced at the Holston AAP, which was built in the early 1940's. Holston currently uses a tried and true process, commonly referred to as the Bachmann process, to produce RDX/HMX. The Bachmann process, according to Production Base Modernization Agency officials, is inefficient for producing HMX. The ratio of RDX to HMX, which can be produced using a Holston Bachmann production line, is 9 to 1. That is, a production line at Holston can produce nine times as much RDX in the same period as it can HMX. With certain modifications, which the agency indicates are expensive and time consuming, this ratio can be reduced to 4 to 1. Although the MUSALL process is believed to be more efficient than the Bachmann process to produce HMX, it does not provide the flexibility of the other process, e.g., only HMX can be produced using the MUSALL process. Evidently an increased capacity for RDX is also needed; however, projects for this explosive are not planned for several years. Also, the Army would apparently select the Bachmann process if a new RDX facility were constructed.

The MUSALL process has not yet been used outside the laboratory and only small quantities of HMX have been made using this process. The Army's approach is to begin with a "glass-ware" pilot model estimated to cost \$3 million (project 5830117). This pilot model is to validate the MUSALL process for making HMX and is to be the basis of a pilot plant (Project 5840117) sized to a production rate that lends itself to an expanded production rate meeting the Army's requirements.

As of April 1984, the site for this facility had not been selected. One study showed that 71 potential candidate locations in 33 states were developed by DOD agencies. After screening these sites against minimal land and water requirements, 53 sites were eliminated leaving 17 candidates in 14 states. Further site analysis resulted in a conclusion that 16 sites throughout the continental U.S. could accommodate some or all of the options for manufacturing plants and finishing lines being considered. Further, funding for the fiscal year 1983 and 1984 projects has not been released. Consequently, no effort on the new MUSALL plant has been started. A Production Base Modernization Agency official stated that the \$3 million for the fiscal year 1983 project was being held at Department of Army levels because of a congressional directive over beginning a program with such large cost implications without receiving congressional review. This same agency official stated the fiscal year 1984 project was awaiting congressional approval and that even though the fiscal years 1983 and 1984 projects were delayed the fiscal year 1985 project can be executed in fiscal year 1985.

Questions regarding the MUSALL project

1. The fiscal year 1983 through 1987 projects are to design a pilot model to demonstrate the MUSALL process; design and operate a MUSALL pilot plant; and finally, design a full scale MUSALL complex. Further, the entire \$58 million for these projects is in modernization/expansion program funding.
 - a. Since omnibus funding is provided annually for project designs, why is the Army planning to use modernization and expansion funding for the design projects?
 - b. What are the funding sources for the fiscal years 1983 and 1984 projects and did this funding requirement impact on the Army's modernization/expansion program submitted for Congressional review? Why weren't these projects included in the Army's modernization and expansion program rather than diverting funds to these projects after the program was submitted for Congressional consideration?
 - c. What actions are required before the Army will release the fiscal year 1983 funding to begin the MUSALL complex?
 - d. What percentage of the fiscal year 1983 project, which is apparently going to start late, must be completed before the fiscal year 1984 project can be started? How much of the 1984 project should be completed before starting the 1985 one?
 - e. How critical is site selection for the pilot plant and full scale complex prior to contract award for the design effort? Will the location for the pilot plant have an advantage over the alternative sites, which meet Army criteria for the full scale facility?
 - f. Congressional guidance states that final designs for projects in the modernization/expansion program are to be completed prior to budget submission to provide a basis for a good cost estimate. Yet this criterion obviously could not be met on the first five projects for the MUSALL complex because they are for designs. What is the reason for this obvious inconsistency?

- g. Does the Army plan to request congressional authorization for the MUSALL total complex and, if so, what is the status of this action?

POSSIBLE ADJUSTMENTS
TO THE ARMY'S AMMUNITION REQUEST

<u>Budget line number</u>	<u>Item description</u>	<u>Budget request</u>	<u>Possible^a adjustments</u>	<u>Adjusted^a request</u>	<u>Remarks</u>
		- - - - -	(millions)	- - - - -	
4	Cartridge, 5.56 mm. ball	\$57.2	\$-38.8 <-22.1>	\$18.4 <35.1>	Inventory will exceed needs. (See p. 1-10)
5	Cartridge, 5.56 mm. blank	13.3	-3.5	9.8	Inventory will exceed needs. (See p. 1-12)
8	Cartridge, 7.62 mm. linked	24.3	-	24.3	-
9	Cartridge, 7.62 mm. ball	9.9	-9.9 <-9.9>	- <->	Inventory will exceed needs. (See p. 1-13)
11	Cartridge, 7.62 mm. match	2.0	-	2.0	-
12	Cartridge, .22 cal. ball, long rifle	1.0	-.2	.8	Inventory will exceed needs. (See p. 1-14)
13	Cartridge, .22 cal. ball match	.4	-.4	-	Inventory will exceed needs. (See p. 1-15)
15	Cartridge, .45 cal. ball	1.4	-	1.4	-
18	Cartridge, .50 cal. 4ball/1tracer	15.1	-15.1 <-7.8>	- <7.3>	Inventory will exceed needs. (See p. 1-17)

a < > shows the May 3, 1984, Secretary of Defense proposed budget cuts.

<u>Budget line number</u>	<u>Item</u>	<u>Budget request</u>	<u>Possible adjustments</u>	<u>Adjusted^a request</u>	<u>Remarks</u>
			-(millions)-		
19	Cartridge, .50 cal. APIT	\$ 1.0	-\$1.0	\$ -	Inventory will exceed needs. (See p. 1-18)
20	Cartridge, .50 cal. ball	3.1	-3.1	-	Inventory will exceed needs. (See p. 1-17)
21	Cartridge, .50 cal. blank	13.9	-	\$13.9	-
23	Cartridge, .50 cal. tracer	1.7	-1.7	-	Inventory will exceed needs. (See p. 1-17)
30	Cartridge, 81 mm. im- proved training	7.9	-7.9 <-7.9>	- <->	Premature procurement. (See p. 1-29)
36	Cartridge, 40 mm. HEPD	14.8	-14.8	-	Imbalance be- tween ammuni- tion and weap- on system. (See p. 1-31)
37	Cartridge, 40 mm. TP	29.3	-	29.3	-
39	Cartridge, 40 mm. HEPX	48.0	-11.3	36.7	Imbalance between ammunition and weapon system. (See p. 1-31)

<u>Budget line number</u>	<u>Item</u>	<u>Budget request</u>	<u>Possible adjustments</u>	<u>Adjusted request</u>	<u>Remarks</u>
		- - - - - (millions) - - - - -			
40	Cartridge, 40 mm. HEDP	\$15.1	\$ -	\$15.1	-
42	Cartridge, 40 mm. practice	6.7	-1.5	5.2	Inventory will exceed needs. (See p. 1-21)
46	Cartridge, 81 mm. illum.	2.2	-2.2	-	Premature procurement. (See p. 1-28)
47	Cartridge, 81 mm. HE	29.4	-29.4	-	Premature procurement. (See p. 1-28)
48	Cartridge, subcal. 22 mm. pract chg=1	1.4	-1.4	-	Inventory will exceed needs. (See p. 1-22)
49	Cartridge, subcal. 22 mm. pract chg=2	1.8	-	1.8	-
50	Cartridge, subcal. 22 mm. pract chg=3	1.4	-1.4	-	Inventory will exceed needs. (See p. 1-22)
51	Cartridge, subcal. 22 mm. pract chg=4	1.7	-1.7	-	Inventory will exceed needs. (See p. 1-22)
52	Cartridge, 81 mm. smoke	3.3	-3.3	-	Premature procurement. (See p. 1-28)

<u>Budget line number</u>	<u>Item</u>	<u>Budget request</u>	<u>Possible adjustments</u>	<u>Adjusted request</u>	<u>Remarks</u>
		- - - - - millions - - - - -			
55	Cartridge, 4.2 in. smoke wp	\$ 10.2	-\$10.2	\$ -	Premature procurement. (See p. 1-27)
58	Cartridge, 105 mm. TP-T	72.5	-12.2 <-9.4>	60.3 <63.1>	Inventory will exceed needs. (See p. 1-24)
60	Cartridge, 105 mm. DS-TP	100.6	-	100.6	-
63	Cartridge, 120 mm. APFSDS-T	20.9	-	20.9	Requires special attention. (See p. 1-34)
64	Cartridge, 120 mm. HEAT	31.9	-	31.9	Requires special attention. (See p. 1-35)
65	Cartridge, 120 mm. TP-T	30.5	-	30.5	Requires special attention. (See p. 1-34)
66	Cartridge, 120 mm. TPCSDS-T	52.7	-	52.7	Requires special attention. (See p. 1-34)
67	Projectile 155 mm. HE ICM	252.0	-40.0	212.0	Deliveries not within funded delivery period (See p. 1-2)
69, 70	Projectiles, 155 mm. ADAM M692, M731	64.8	-25.1	39.7	Deliveries not within funded delivery period (See p. 1-3)

APPENDIX I

APPENDIX I

<u>Budget line number</u>	<u>Item</u>	<u>Budget request</u>	<u>Possible adjustments</u>	<u>Adjusted request</u>	<u>Remarks</u>
		- - - - - millions - - - - -			
71, 72	Projectiles, 155 mm. RAAMS M718, M741	\$ 96.7	\$-31.0 <-30.2>	\$ 65.7 <66.5>	Deliveries not within funded delivery period (See p. 1-5)
73	Projectile, 155 mm. HE, CPHD	102.8	-	102.8	-
75	Chemical munitions	b	b	b	(See p. 5-6)
78	Charge, propelling 155 mm. GB	30.7	-	30.7	-
79	Charge, propelling 155 mm. WB M4	44.9	-25.8 <-17.8>	19.1 <27.1>	Imbalance with projectiles. (See p. 1-26)
80	Charge, propelling 155 mm. RB	9.5	-	9.5	-
81	Charge, propelling 155 mm. WB M119	113.2	-	113.2	-
83	Projectile, 8 in. HE ICM	146.5	-98.0	48.5	Deliveries not within funded delivery period (See p. 1-6)
84	Projectile, 8 in. HE RAP	22.6	-	22.6	-

<u>Budget line number</u>	<u>Item</u>	<u>Budget request</u>	<u>Possible adjustments</u>	<u>Adjusted request</u>	<u>Remarks</u>
		- - - - - millions - - - - -			
85	Charge, propelling, 8 in., WB	\$30.4	\$ -	\$30.4	-
86	Fuze, proximity	47.7	-27.9	19.8	Deliveries not within funded delivery period (See p. 1-8)
88	Fuze, mechanical	40.4	-	40.4	-
89	Fuze, MTSQ	4.8	-	4.8	-
112	Hand grenades, all types	14.1	-	14.1	-
113	Signals, all types	26.7	-9.5	17.2	Inventory will exceed needs. (See p. 1-24)
116	Simulators, all types	14.1	-4.6	9.5	Inventory will exceed needs. (See p. 1-26)
118	Items less than \$900,000	5.5	-	5.5	-
	Total ^c	<u>1,694.0</u>	<u>-432.9</u>	<u>1,261.1</u>	
	Total ^d	<u>497.8</u>	<u>-</u>	<u>497.8</u>	
	Total	<u>2,191.8</u>	<u>-\$432.9</u>	<u>\$1,758.9</u>	

^b Dollar amounts are classified.

^c We reviewed requests for items totaling \$1,670 million under these budget lines.

^d Total for budget lines not reviewed by us but includes classified amount for chemical munitions.

POSSIBLE ADJUSTMENTS
TO THE NAVY'S AMMUNITION REQUEST

<u>Budget line number</u>	<u>Item</u>	<u>Budget request</u>	<u>Possible^a adjustments</u>	<u>Adjusted^a request</u>	<u>Remarks</u>
		----- (millions) -----			
225	Skipper	\$ 14.3	-\$ 4.2	\$10.1	Requirement could be satisfied by retrofit. (See p. 2-6)
226	General-purpose bombs	121.9	23.7	98.2	Net overstated cost estimate for MK83 bomb and solid nose plug (see p. 2-4) and FMJ-139 fuse cannot be delivered during funded delivery period. (See p. 2-1)
227	LLGB	37.7	-	37.7	Item requires special attention. (See p. 2-13)
230	Zuni rocket	39.0	-	39.0	-
231	2.75 inch rocket	25.5	-0.8	24.7	Net overstated cost estimate for MK66 rocket motor and M-156 marker. (See p. 2-4)
233	Machine gun ammunition	36.5	-10.0 <-6.5>	26.5 <30.5>	Overstated cost estimate for 25 mm. TP (see p. 2-14) and no support for 30 mm. (see p. 2-4)
234	Practice bombs	64.1	-5.9	58.2	Overstated cost estimates for Rockeye, MK82 NIP, and MK83 NIP. (See p. 2-5)
237	Airborne expendable countermeasures	50.6	+3.2	53.8	Understated cost estimate for MK46 flare. (See p. 2-6)
241	Bigeye chemical weapon	19.7	-19.7	0.0	Premature procurement. (see p. 2-11)

^a < > shows the May 3, 1984, Secretary of Defense proposed budget cuts.

<u>Budget line number</u>	<u>Item</u>	<u>Budget request</u>	<u>Possible adjustments</u>	<u>Adjusted request</u>	<u>Remarks</u>
		----- (millions) -----			
242	Jet-assisted take off	\$ 15.0	-\$2.9	\$ 12.1	Overstated cost estimate for MK25 motor. (See p. 2-5)
243	Gator	31.6	-	31.6	-
264	3-in./50 cal. gun ammunition	8.0	-	8.0	-
266	5-in./54 cal. gun ammunition	91.1	-13.2	77.9	Overstated cost estimate for HIFRAG and illuminating projectiles. (See p. 2-5)
267	5-in. guided projectile	68.2	-12.9	55.3	Premature request for maximum rate facility. (See p. 2-7)
269	CIWS ammunition	28.8	+1.7	30.5	Understated cost estimate for 20-mm MK149. (See p. 2-6)
270	76-mm gun ammunition	<u>24.7</u>	<u>-</u>	<u>24.7</u>	-
	Total ^b	676.7	-88.4	588.3	
	Total ^c	<u>160.2</u>	<u>-</u>	<u>160.2</u>	
		<u>\$836.9</u>	<u>-\$88.4</u>	<u>\$748.5</u>	

^b Total requested for these budget lines. We reviewed requests for items totaling \$590.9 million under these budget lines.

^c Total for items in budget lines not reviewed by us.

POSSIBLE ADJUSTMENTSTO THE AIR FORCE'S AMMUNITION REQUEST

<u>Budget line number</u>	<u>Item</u>	<u>Budget request</u>	<u>Possible^a adjustments</u>	<u>Adjusted^a request</u>	<u>Remarks</u>
		------(millions)-----			
1	2.75-in. rocket motor	\$ 23.5	\$ -	\$ 23.5	-
6	Cartridge, 20 mm. combat	7.7	-	7.7	-
7	Cartridge, 20 mm. training	.8	-	.8	-
8	Cartridge, 30 mm. training (MP)	102.8	-	102.8	-
9	Cartridge, 30 mm. HEI (MP)	45.0	-36.2	8.8	Inventory will exceed requirements. (See p. 3-8)
10	Cartridge, 30 mm. API (MP)	61.5	-	61.5	-
11	Cartridge, 40 mm. HEI (Gunship)	15.7	-	15.7	-
12	Cartridge, 40 mm. TP grenades	8.8	-	8.8	-
13	Cartridge, 40 mm. HE grenades	11.9	-	11.9	-
15	Cartridge, chaff, RR-170	16.0	-	16.0	-
24	MK-82 500-pound general-purpose bomb	6.0	-	6.0	-

^a < > shows the May 3, 1984 Secretary of Defense proposed budget cuts.

APPENDIX III

APPENDIX III

<u>Budget line number</u>	<u>Item</u>	<u>Budget request</u>	<u>Possible adjustments</u>	<u>Adjusted request</u>	<u>Remarks</u>
		----- (millions) -----			
25	MK-82 inert bomb, EDU-50	\$26.1	\$ -	\$26.1	-
26	Airfield attack	48.3	-24.1	24.2	Effectiveness is question- able and improved weapon system being developed (See p. 3-5)
27	BSU-49 inflatable	64.8	-2.3 <-7.7>	62.5 <57.1>	Overstated cost estimate. (See p. 3-4)
28	BSU-50 inflatable retarder	12.7	-0.6 <-2.8>	12.1 <9.9>	Overstated cost estimate. (See p. 3-4)
29	High-explosive bomb, 2,000-pound	19.6	-	19.6	-
30	Laser bomb guidance kit	105.5	-31.4 <-44.0>	74.1 <61.5>	Total quantity cannot be produced. (See p. 3-2)
31	GEU-15 guided weapon	127.3	-	127.3	-
32	Bomb, practice EDU-33	21.8	-8.7 <-4.8>	13.1 <17.0>	Not all assets considered. (See p. 3-5)
35	MK-84 bomb, empty	11.0	-	11.0	-
37	CEU-89, TMD/GATOR	207.4	-	207.4	-
38	CEU-87, combined effects munition	281.9	-	281.9	-
40	Bigeye bomb, advance procurement	19.8	-19.8	-	Premature procurement. (See p. 3-6)
45	Flare, IR MDU-7B	13.7	-2.8 <-2.8>	10.9 <10.9>	Overstated cost estimate. (See p. 3-3)

APPENDIX III

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<u>Budget line number</u>	<u>Item</u>	<u>Budget request</u>	<u>Possible adjustments</u>	<u>Adjusted request</u>	<u>Remarks</u>
		----- (millions) -----			
47	Flare, IR MU-2B	7.0	-4.8	2.2	Overstated cost estimate. (See p. 3-3)
48	Flare, IR MU-10B	16.8	-	16.8	-
64	Fuze, FMU-112/ FMU-139	42.7	-11.8	30.9	Total quantity cannot be produced. (See p. 3-1)
	Total ^b	<u>1,326.1</u>	<u>-142.5</u>	<u>1,183.6</u>	
	Total ^c	<u>91.8</u>	<u>-</u>	<u>91.8</u>	
	Total	<u>\$1,417.9</u>	<u>-\$142.5</u>	<u>\$1,275.4</u>	

^bTotal requested for these budget lines and reviewed by us.

^cTotal for items in budget lines not reviewed by us.



<u>Project number</u>	<u>Description</u>	<u>POSSIBLE ADJUSTMENTS TO THE ARMY'S</u>			<u>Remarks</u>
		<u>MODERNIZATION</u>	<u>EXPANSION PROGRAM REQUEST</u>	<u>REQUEST</u>	
		<u>Budget request</u>	<u>Recommended adjustments</u>	<u>Adjusted request</u>	
		----- (millions) -----			
5850063	Long-lead-time equipment for initial production facilities to load, assemble, and pack Bigeye bombs.	-\$11.8	\$-11.8	\$ -	Premature. Design not ready. Also, not fully funded. (See p. 4-5)
5850064	Initial production facilities to load, assemble, and pack red phosphorous smoke cartridges (XMB19) at Pine Bluff Arsenal.	3.1	-	3.1	-
5850070	Initial production facilities for Nitramine gun propellant, Naval Ordnance Station, Indian Head, Md.	3.0	-	3.0	-
5850074A	Initial production facilities for Bigeye binary bomb metal parts at the Marquardt Company, Van Nuys, Calif.	16.7	-16.7	-	Premature. Technical problems with Bigeye bomb. (See p. 4-5)
5850079A	Long-lead-time equipment for initial production facilities to produce QL used in Bigeye bombs.	13.5	-13.5	-	Premature. Design not ready. Also not fully funded. (See p. 4-5)
5850086	Modernization of 5.56-mm. squad, automatic tracer charging equipment at Lake City AAP.	2.3	-	2.3	-
5852054	Modernize and expand production facilities to produce composition C-4 at Holston AAP.	12.0	-12.0	-	Premature. Design not ready and cost uncertain. (See p. 4-3)
5852159	Modernization of 155-mm. 8-in. propelling charge qualification building at Indiana AAP.	2.2	-	2.2	-
5852199	Modernization of coal handling systems at Holston AAP.	9.0	-9.0	-	Premature. Design not ready and project urgency questionable. (See p. 4-2)
5852232	Modernization of equipment to produce 5.56-mm. blank cartridges at Lake City AAP.	1.4	-	1.4	-

<u>Project number</u>	<u>Description</u>	<u>Budget request</u>	<u>Recommended adjustments</u>	<u>Adjusted request</u>	<u>Remarks</u>
----- (millions) -----					
5852359	Modernization of water distribution system at Scranton AAP.	\$2.0	\$ -	\$2.0	-
5852371	Modernization of propelling charge can cradles at Indiana AAP.	0.9	-	0.9	-
5852507	Modernization of chemical laboratory at Morton Thiokol Corp.	1.6	-	1.6	-
5853230	Initial production facilities for 16-inch projectile metal parts and load, assemble, and pack at Crane Army Ammunition Activity, Crane, Indiana.	2.5	-	2.5	-
5853233	Modernization of XM763 and XM764 fuze production equipment at Bulova Instrument and Systems Corp.	1.9	-	1.9	-
5855160	Modernization of Jefferson Proving Ground testing capability.	1.8	-	1.8	-
5850003	Classified program.	64.4	-	64.4	-
5850050	Expansion of production facilities for tactical munitions dispenser metal parts in commercial industry.	17.2	-	17.2	-
5852386	Expansion of production facilities to load, assemble, and pack combined effects munitions at Kansas AAP.	10.0	-	10.0	-
5852391	Expansion of production facilities to load, assemble, and pack GATOR mines at Iowa AAP.	4.0	-	4.0	-
5853195	Expansion of production facilities to produce 81-mm. increment containers in commercial industry.	4.9	-	4.9	-

<u>Project number</u>	<u>Item</u>	<u>Budget request</u>	<u>Recommended adjustments</u>	<u>Adjusted request</u>	<u>Remarks</u>
----- (millions) -----					
5853199	Expansion of production facilities for the family of scatterable mine systems metal parts in commercial industry.	\$ 1.9	\$ -	\$ 1.9	-
5853551	Expansion of production facilities for assembling M223 fuzes in commercial industry.	2.2	-	2.2	-
5852430	Design of production facilities to produce HMX using MUSALL process.	11.0	-11.0	-	Premature. Too many unanswered questions. (See p. 4-6)
5853046	Preparation of equipment and construction design.	24.1	-	24.1	-
5852439	Expansion of lacquer preparation facility at Holston AAP.	3.0	-3.0	-	Premature. Design not ready. (See p. 4-4)
5852447B	Modernization, conversion, and reactivation of RDX/HMX lines at Holston APP.	20.0	-20.0	-	Premature. Design not ready and project scope and cost uncertain. (See p. 4-3)
5852410	Modernization of temperature and humidity controls for M549/650 delay assemblies.	.6	-	.6	-
5852229A	Expansion of production facilities for propellant blending, sorting, inspection, and packout of 120-mm. propellant.	.5	-	.5	-
5852240	Modernization of pyrotechnic vapor sensors at various locations.	.5	-	.5	-
5852389	Modernization of M483 expulsion charge load and assembly system at Kansas AAP.	.2	-	.2	-
	Total ^a	97.0	-\$97.0	-	
	Total ^b	<u>153.2</u>	<u>-</u>	<u>153.2</u>	
	Total	<u>\$250.2</u>	<u>-\$97.0</u>	<u>\$153.2</u>	

^aTotal for projects reviewed by us.

^bTotal for projects not reviewed by us.

DOD'S FISCAL YEAR 1985 PROGRAM

The military services' fiscal year 1985 appropriation request for ammunition was about \$5.2 billion, including the Army's request for production base support for \$302.2 million, as summarized below. In May 1984, DOD reduced the total request to \$4,757.2 million.

<u>Appropriations</u>	<u>Amount</u> (millions)
<u>Procurement of Ammunition, Army:</u>	
Conventional ammunition, chemical munitions, miscellaneous items, and nuclear materials	\$2,191.8
Production base support:	302.2
Modernization, expansion, an initial production facilities	(250.2)
Production support and equipment replacement	(32.0)
Layaway of industrial facilities	(20.0)
Total	<u>\$2,494.0</u>
DOD's May 1984 Reduction	185.1
Revised total	<u>\$2,308.9</u>
 <u>Other Procurement, Navy</u>	
Air-launched ordnance	548.6
Ship gun ammunition	235.1
Small arms ammunition	21.0
Pyrotechnics and demolition	<u>32.2</u>
Total	<u>836.9</u>
DOD's May 1984 Reduction	62.0
Revised Total	<u>774.9</u>
 <u>Procurement, Marine Corps</u>	
Conventional ammunition	<u>460.5</u>
<u>Other Procurement, Air Force</u>	
Rockets and launchers	26.7
Cartridges	289.7
Bombs	968.5
Targets	0.2
Fuzes	44.0
Other items	<u>88.8</u>
Total	<u>1,417.9</u>
DOD's May 1984 Reduction	205.0
Revised Total	<u>1,212.9</u>
Grand Total	<u>5,209.3</u>
DOD's May 1984 Reduction	452.1
Revised Grand Total	<u><u>4,757.2</u></u>

The services justified their ammunition requests on the basis of meeting training needs and building the war reserve stockpile. Production base support funds are for enhancing ammunition production capacity by modernizing existing facilities, building new ones, and protecting and preserving those no longer required for active production.

DEFINITION OF TERMS

The following five terms are used frequently throughout the report.

Procurement lead time

"Procurement lead time" is the interval between the start of the fiscal year and first receipt of the items in the supply system. It consists of administrative lead time (time needed for awarding contracts) and production lead time (time needed for obtaining raw materials and components).

Fiscal year funded delivery period

Simply stated, the "fiscal year funded delivery period" is the time (usually 12 months) during which quantities in a particular fiscal year program are delivered. It begins in the month following the procurement lead time interval and ends in the month when deliveries for a fiscal year program are completed.

According to Defense procurement procedures, funds should generally not be programmed in any fiscal year which could be deferred to a future fiscal year and still be available in time to support the scheduled production, lead times considered. In applying this to the fiscal year 1985 program, funds should not be programmed for fiscal year 1985 for items scheduled for delivery after the fiscal year 1985 funded delivery period, but rather should be programmed for future fiscal years.

Minimum sustaining rate

"Minimum sustaining rate" refers to the least number of items that can be produced on a single-shift basis and still avoid increasing the unit cost by more than 20 percent. It is computed on the basis of the number of items normally produced during one 8-hour shift operation, 5 days a week (1-8-5).

Conventional ammunition working capital fund

The "conventional ammunition working capital fund" is a new method of procuring conventional ammunition, which the Army implemented in October 1981. It is a revolving fund used to account for and control items procured until ownership is

transferred to the services. The Army's objectives in establishing the fund were to accelerate contract awards and consolidate procurements and thereby lower unit prices, stabilize production schedules, and reduce paperwork and administrative costs.

Single manager for conventional ammunition

In 1975 the Secretary of the Army was designated the single manager for conventional ammunition for all services. This was done to minimize duplication and achieve greater economies in ammunition procurement and production. In effect, the Army is the buyer for most conventional ammunition needed throughout DOD.

OBJECTIVES, SCOPE, AND METHODOLOGY

The Chairman, House Committee on Armed Services, and the Chairmen, Subcommittees on Defense, House and Senate Committees on Appropriations, asked us to assess the justification for the fiscal year 1985 ammunition and production base support programs.

As requested, we evaluated requests involving large dollar amounts, items being bought for the first time, items having production and/or performance problems, and projects to enhance the ammunition production base.

The number of items and limited access to budget support data until February 1984 precluded an in-depth review of each item. We reviewed factors such as requirements, inventory positions, production problems, quality, testing and development, funded program status, and field malfunctions for most items to identify those with potential problems.

We analyzed production schedules and procurement lead times to determine whether the programs could be executed efficiently and economically. We assessed projected receipt and loss data to ensure that inventory would not greatly exceed inventory objectives. We also determined whether programs for related ammunition end items, such as, propelling charges, projectiles, and fuzes, were in reasonable balance. We did not have time to verify the accuracy of all data we reviewed, such as inventory position, training losses, and cost estimates, but assured whether data was reasonable by contrasting it with data from prior years.

To evaluate the justifications for specific ammunition items and projects, we interviewed officials involved in ammunition management and procurement and obtained documents such as briefings, status reports, production problem meeting minutes, and budget support data from the services at these locations:

- Headquarters, Department of the Army, Washington, D.C.;
- U.S. Army Armament, Munitions and Chemical Command, Rock Island, Illinois;

- U.S. Army Research and Development Center, Dover, New Jersey;
- U.S. Army Test and Evaluation Command, Aberdeen Proving Ground, Maryland;
- U.S. Army Chemical Research and Development Center, Aberdeen Proving Ground, Maryland;
- U.S. Army Systems Analysis Activity, Aberdeen Proving Ground, Maryland;
- U.S. Army Munitions Production Base Modernization Agency, Dover, New Jersey;
- Project Manager Office, Sergeant York, Dover, New Jersey;
- Project Manager Office, Tank Main Armament Systems, Dover, New Jersey;
- Project Manager Office, Cannon Artillery Weapons Systems, Dover, New Jersey;
- U.S. Army Development Center, Ft. Belvoir, Virginia;
- Headquarters, U.S. Army Training and Doctrine Command, Ft. Lee, Virginia;
- Headquarters, U.S. Army Materiel Development and Readiness Command, Alexandria, Virginia;
- Holston Army Ammunition Plant, Kingsport, Tennessee;
- Headquarters, Department of the Navy, Washington, D.C.;
- Naval Air Systems Command, Washington, D.C.;
- Naval Sea Systems Command, Washington, D.C.;
- Ships Parts Control Center, Mechanicsburg, Pennsylvania;
- Headquarters, Department of the Air Force, Washington, D.C.;

--U.S. Air Force Systems Command, Armament Division, Eglin Air Force Base, Florida; and

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

We did not have time to review the Marine Corps request. As requested, we did not obtain agency comments on matters in this report, but we did discuss a draft with program officials of the Army's Office of the Deputy Chief of Staff for Research, Development, and Acquisition; the Navy's Office of the Deputy Chief of Naval Operations for Logistics; and the Air Force's Office of the Deputy Chief of Staff for Logistics and Engineering. We made changes to the report, where appropriate, to reflect the views of these officials.

Except as noted above, our review was performed in accordance with generally accepted government audit standards.

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