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UNITED STATES GENERAL ACCOUNTING OFFICE
WASHINGTON, D.C. 20548

PROCUREMENT, LOGISTICS,
AND READINESS DIVISION

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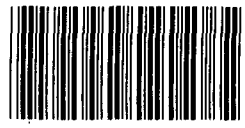
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The Honorable John O. Marsh, Jr.
The Secretary of the Army

Dear Mr. Secretary:

Subject: Observations Regarding the Ammunition Production Base (GAO/PLRD-83-38)

We have completed our review of the Army's modernization and expansion program for the ammunition production base. Our principal objectives were to determine the status of the program, identify production base deficiencies, and evaluate the effectiveness of ongoing and planned actions to overcome the problems.

We performed our work primarily at the U.S. Army Armament Materiel Readiness Command, Rock Island, Illinois; the U.S. Army Munitions Production Base Modernization Agency, Dover, New Jersey; and six Army ammunition plants. We reviewed the Army's production base plan and ongoing and planned actions to establish an industrial base capability to meet projected peacetime and mobilization requirements for conventional ammunition. Our review was performed in accordance with generally accepted government audit standards.

The Army's goal is to have a modern, balanced, and responsive production base capable of meeting peacetime and wartime needs in the most efficient and economic manner. The modernized facilities were expected to require less time to start up; reduce unit production costs; and eliminate numerous environmental, health, and safety hazards associated with older production facilities.

We found that although the U.S. production base has a tremendous capability and can generally produce the planned peacetime procurements of ammunition, it lacks the capacity to produce a large part of the projected mobilization requirements for many newer, more sophisticated ammunition items. Moreover, some existing facilities could not be fully used, if needed in wartime, because of significant imbalances in capacities for various components required for end-item assembly. These shortfalls and imbalances affect numerous items the Army considers critical. In addition, many inactive production lines could not be reactivated as quickly as desired for mobilization because of equipment voids and other deficiencies.

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The Department of Defense (DOD) and the Army are well aware of the industrial base shortfalls for mobilization. In our May 1981 report 1/ on the industrial preparedness program, we pointed out that DOD officials recognize the importance of planning and funding corrective actions to ensure a responsive industrial base for mobilization. However, DOD program guidance in effect at the time and budgetary constraints dictated that emphasis be placed on other programs that contribute more to initial combat capability.

In March 1982, DOD issued new program guidance for fiscal years 1984 to 1988 which, according to DOD, is intended to reverse years of limited funding and management neglect. The objectives of the new guidance are to:

--Develop an industrial base capable of producing and delivering the 5-year defense program effectively and as quickly as possible.

--Establish an industrial base capable of providing surge responsiveness for selected critical systems and items.

--Develop an industrial base capability which will permit accelerating the attainment of DOD's programed sustainability levels for selected critical systems and items.

--Increase funding for industrial preparedness planning to levels required to accomplish the first three objectives and to integrate industrial preparedness resource requirements into the Planning, Programming, and Budgeting System.

As discussed in the following sections, we identified some serious problems with the ammunition production base. Many of these problems seem to have resulted from implementation of DOD program guidance which has been, or is currently being, changed, or from budgetary constraints. Therefore, in view of the recent DOD initiatives to improve the base, we are not making recommendations at this time. We believe our observations will be useful to those responsible for implementing the new DOD guidance.

1/"DOD's Industrial Preparedness Program Needs National Policy to Effectively Meet Emergency Needs" (PLRD-81-22, May 27, 1981).

CURRENT CAPACITY SHORTFALLS

The capacity of the ammunition production base is much less than what the military services estimate they would need to sustain combat. As summarized in the following table, there is insufficient production capacity for 105 of the 311 critical ammunition end items listed in the fiscal year 1981 production base plan for production during mobilization.

	No. of items	Percent of total
Sufficient capacity	206	66
Insufficient capacity	105	34
Total	311	100

Of the 105 critical items with insufficient capacity, 78 items have an existing capacity shortfall greater than 75 percent of the estimated monthly mobilization requirement.

Capacity shortfalls also exist in 46 percent of the critical component groups. This is especially significant in the propellants and explosives component groups. For example, the most critical shortage is in the explosive RDX/HMX, which will constrain production of the 155-mm. M483, improved conventional munition, as well as other new munitions. The monthly mobilization requirement for the M483 is 643,000 rounds. When the Mississippi Army Ammunition Plant is completed, the Army expects to be able to load, assemble, and pack up to 204,000 rounds monthly at this plant and other plants; however, production will be limited to about 44,000 rounds a month unless the Army increases its production capacity for RDX/HMX.

There does not appear to be any near term solution to this problem. In March 1982, Army representatives estimated that it would cost $800 million and take at least 6 to 8 years to design and build an RDX/HMX facility. They stated that the design for the new facility would not be completed until fiscal year 1986.

Although consideration has been given to using alternative explosives, such as TNT, Army representatives contend that the use of alternatives will degrade the effectiveness of the round. Furthermore, even if TNT could be used, there is a shortage of oleum needed to fully use all of the existing TNT production capacity.

The current capacity shortfalls seem to be largely attributable to the past DOD program guidance and budgetary constraints which dictated that emphasis be placed on other programs that contribute more to initial combat capability. With the new guidance, the Army may have the opportunity to address some of the shortfalls, at least for the more critical items.

EXISTING FACILITIES COULD NOT BE REACTIVATED AS QUICKLY AS DESIRED

Given the shortfalls and imbalances in production capacities for various components, it is important to adequately maintain the existing facilities to assure that production can be increased rapidly, if necessary, to meet potential surge and mobilization needs. However, because of numerous premobilization day deficiencies, the Army may not be able to start up an inactive ammunition production base as quickly as desired.

The Army has identified $1.25 billion in deficiencies in ammunition production facilities and equipment. Approximately 73 percent of these deficiencies are categorized as premobilization day deficiencies, which will prevent the plants from meeting assigned production schedules if the deficiencies are not corrected before mobilization. Included in this amount are $36 million in equipment voids at Government-owned plants and $130 million in equipment voids at contractor plants.

These equipment voids need to be filled before the plants can produce assigned ammunition items. The Army estimates that $116 million worth of this equipment will have to be fabricated because it is not available from DOD equipment reserves or commercial inventories and that most of the fabrication will take more than a year. The following table shows the Army's estimated fabrication time for this $116 million of missing equipment.

	No. of projects	Estimated cost (millions)
Less than 6 months	158	$ 12.8
6 months to 1 year	258	20.9
More than 1 year	1,019	82.3
Total	1,435	$116.0

During our visits to six Army ammunition plants, plant operators expressed concerns about the deficiencies which need to be corrected to meet assigned mobilization production rates. In addition, plant representatives pointed out that many production lines required at mobilization have deficiencies that will take more than a year to correct. The table on the following page shows the estimated time and funds needed to correct identified premobilization deficiencies at the six plants.

Plant	Total deficiencies		Time needed to correct deficiencies: Less than 1 year		More than 1 year	
	No.	Value	No.	Value	No.	Value
		(millions)		(millions)		(millions)
Joliet, Ill.	34	$177.6	25	$15.7	9	$161.8
Lake City, Mo.	79	37.8	63	12.7	16	25.1
Lone Star, Tex.	74	33.5	69	13.6	5	19.9
Louisiana, La.	21	31.2	5	1.0	16	30.3
Radford, Va.	22	92.9	17	15.0	5	67.9
Sunflower, Kans.	46	57.2	31	7.9	15	49.3
Total	276	a/$420.1	210	a/$65.8	66	$354.3

a/Does not total due to rounding.

Our review disclosed that the Army has not made definite and practical plans to obtain maximum production from existing facilities during surge or mobilization. In our opinion, ways might be found to make existing plants more responsive by evaluating alternative means of rehabilitating them and developing reactivation procedures.

Ammunition plants have recommended various projects to correct deficiencies which preclude them from meeting assigned wartime production schedules. Because many of these projects would take years to implement, it would not be practical to wait until after a war starts before funding them, especially if the production lines are needed during the early months after mobilization. We are not advocating that all projects be fully funded, but we do believe that deficiencies should be evaluated and potential solutions should be developed so that actions can be planned to correct deficiencies, at least for the most critical items.

Plant officials at ammunition plants visited said that they believed some deficiencies could be corrected in an emergency. However, we found that (1) most existing facilities, such as those at the Sunflower Army Ammunition Plant, had not been surveyed to determine which equipment would have to be replaced or fabricated, (2) alternative solutions had not been evaluated, and (3) plans had not been prepared for needed construction and repairs.

The Sunflower Army Ammunition Plant's mobilization production schedule requires the plant to manufacture rocket and cannon propellants by the 5th month after mobilization. However, because of operational deficiencies in Sunflower's modernized ammonia

oxidation plant and modernized nitric and sulfuric concentrators, it may take up to 2 years to activate the plant. Although plant representatives said they may be able to repair and/or rehabilitate the older World War II vintage facilities, they disagreed on which means would be most feasible or responsive in the event that war started. The plant manager agreed that there is a need to evaluate the various alternatives and prepare a plan for using the older facilities during mobilization until the modernized facilities become available.

In addition to the above deficiencies, Sunflower's screening/glazing facilities are currently inoperable. Consequently, it cannot produce any cannon propellants. To correct this problem, plant officials have proposed that the Army spend about $5 million on a new facility which they estimate would take 3 years to construct. In the event of a near term conflict, plant officials told us they may be able to rehabilitate the old screening facilities. Even though they had not identified which parts and motors must be replaced or developed any plans to make necessary structural repairs, plant officials believed that with advanced planning the old facilities could be ready on 6 months notice. However, they did not know how long the older facilities could be operated under mobilization conditions.

PROBLEMS IN STORING ELECTRONIC PROCESS CONTROL SYSTEMS

The Army may not be able to quickly start up some modernized ammunition production facilities in layaway because electronic process control system components were not designed for layaway, documentation and startup procedures have not been developed, and equipment has not been adequately maintained or supported with spare parts. The deficiencies in these systems affect $913 million worth of the $2.4 billion invested in the modernization program.

The U.S. Army Armament Research and Development Command has been studying the problem and developing a layaway methodology for electronic process control systems for the past several years. A methodology developed and demonstrated for one system may have applicability to other electronic systems, but little emphasis has been placed on applying it to these other systems or on developing a layaway design criterion for future production lines using electronic process control equipment.

During the study, the Army primarily evaluated the degradation of layaway on components and developed a documentation package for the TNT line at the Joliet Army Ammunition Plant. The package included startup and checkout procedures as well as a functional description of the system. The functional description aids in