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BY THE U.S. GENERAL ACCOUNTING OFFICE

Report To The Secretary Of The Army

The Army Can Do More To Assure War Reserve Funds Are Spent Effectively

This report discusses a number of ways that the Army can improve its war reserve program. For example, improvements are needed in

- selecting items for inclusion as war reserves,
- balancing low priority and high priority stocks,
- deleting assets that exceed computed requirements,
- using general issue long supply assets to meet unfilled war reserve requirements, and
- establishing criteria for preparing and using war reserve studies.

GAO makes several recommendations designed to improve the Army's war reserve program. DOD agreed with GAO's findings and recommendations and will direct the Army to develop a plan to implement them.



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GAO/NSIAD-84-50
FEBRUARY 17, 1984

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

NATIONAL SECURITY AND
INTERNATIONAL AFFAIRS DIVISION

B-214126

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

Attention: The Inspector General
DAIG-PA

Dear Mr. Secretary:

This report discusses ways to improve the Army's war reserve program. We discussed a draft of this report with representatives of the Department of Defense and have incorporated their comments in the report.

The report contains recommendations to you on pages 6, 12, 15, and 23. As you know, 31 U.S.C. § 720 requires the head of a Federal agency to submit a written statement on actions taken on our recommendations to the House Committee on Government Operations and the Senate Committee on Governmental Affairs not later than 60 days after the date of the report and to the House and Senate Committees on Appropriations with the agency's first request for appropriations made more than 60 days after the date of the report.

We are sending copies of this report to the Director, Office of Management and Budget; the Chairmen, House Committee on Government Operations, Senate Committee on Governmental Affairs, and House and Senate Committees on Appropriations and on Armed Services; and the Secretary of Defense.

Sincerely yours,

A handwritten signature in cursive script that reads "Frank C. Conahan".

Frank C. Conahan *for*
Director



D I G E S T

A primary element of the military capability to effectively defend our Nation is the availability of adequate materiel to support our armed forces during wartime. Accordingly, each military service establishes a system to calculate and maintain war reserve stocks to meet expanded consumption rates until the industrial base and resupply capability can meet the increased requirements.

The Army Materiel Development and Readiness Command (DARCOM) reported an investment of about \$2.3 billion in war reserve assets as of August 1982. GAO wanted to determine the adequacy of Army efforts to manage its war reserve program. To do that GAO visited two of the five major subordinate commands, or wholesale activities, under DARCOM. When appropriate, GAO visited numerous other defense installations to obtain needed information.

EFFORTS TO IMPROVE WAR
RESERVE COMPUTATIONS

DARCOM reports war reserve requirements far in excess of the \$2.3 billion on hand. The Army has a major effort underway to improve its process for computing war reserve requirements. (See p. 2.) Therefore, GAO's review did not emphasize this aspect of the war reserve program. Discussed below, however, are several other aspects where improvements are needed.

IDENTIFICATION AND SELECTION
PROCEDURES NEED IMPROVEMENT

Current Army war reserve practices result in the inclusion of items that do not meet selection criteria. As an example, items that appear to be for comfort, convenience, or morale are included

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as war reserves, as well as commercial items which are available in sufficient quantities to meet wartime demands and low demand and low dollar value items. This causes requirements to be overstated and results in retention of unnecessary assets in war reserve inventories. (See p. 4.)

SUSTAINABILITY IS REDUCED
BECAUSE WAR RESERVE
STOCKS ARE IMBALANCED

The Army's war reserve requirements significantly exceed its current assets. Further, the war reserve inventory is imbalanced; there are large quantities of stock for some items while in other instances virtually no stock exists. Although war reserve funding will probably remain well below the level needed for existing requirements, the Army can increase its combat sustainability by balancing existing war reserves.

In 1979 the Department of Defense (DOD) issued directions calling for the balancing of war reserve stock. This can be done by issuing (selling) stock with significant days of supply thereby generating reimbursement funds and acquiring higher priority items that have fewer days of supply.

GAO found that DARCOM did not emphasize the importance of the DOD policy to balance war reserves, and as a result there was no attempt to sell low priority war reserves. Instead, at one subordinate command, investments were being made in low priority war reserve items which met the DOD sale criteria.

To provide a more balanced stock position, DARCOM was directed in 1979 to circulate lists of low priority war reserve items in the United States to major commands for possible transfer to higher priority locations overseas. This resulted in one-time physical transfers which helped to improve the Army's ability to fight. GAO believes the overall war reserve position can be improved by routinely comparing shortages in high priority locations with existing assets that are considered low priority in their present locations. (See p. 8.)

WAR RESERVE POSITION
CAN BE IMPROVED

The war reserve inventory contains assets that exceed their computed war reserve requirements. For example, one of DARCOM's subordinate commands reported over \$21 million in excess assets in a quarterly war reserve status report. The excess should be recategorized for general issue and the proceeds used to acquire war reserve items with unfilled requirements. Unfilled war reserve requirements also could be met by using available general issue long supply assets. (See p. 13.)

THE ARMY NEEDS TO ESTABLISH
CRITERIA FOR PREPARING AND
USING WAR RESERVE STUDIES

Much of the justification for war reserve requirements and factors used in computing those requirements are complex and require the use of sophisticated analytical techniques. The assumptions and methodologies used in preparing these studies should be extensively documented. Without such documentation, these studies can be misinterpreted. Currently, there are no procedures or regulations specifying what information should be disclosed about complex analyses.

GAO reviewed certain war game and combat damage studies and found that the explanatory documentation could be improved. Because the Army plans to spend several billion dollars on war reserves over the next few years, the potential exists for waste if the justifying analyses and studies are used improperly because of inadequate information on their use and limitations. GAO believes a full discussion of the analyses, to include their limitations and strengths, between the preparing and using agencies would reduce the opportunity for error or faulty use of the data. (See p. 16.)

RECOMMENDATIONS TO THE
SECRETARY OF THE ARMY

GAO recommends that the Secretary direct DARCOM to

--comply with existing regulations when identifying and selecting war reserve items in order to exclude unnecessary items and reduce requirements,

- screen existing war reserve items to eliminate requirements and inventories which do not meet established selection criteria and sell the unnecessary assets to buy needed war reserves,
- comply with the 1979 DOD guidance which requires balancing of war reserve inventories,
- periodically meet with representatives from the major commands to ensure existing low priority war reserves are screened for possible physical transfer to higher priority locations,
- transfer excess war reserve assets to general issue and use the proceeds to acquire war reserve items that have unfilled requirements, and
- use long supply general issue assets to meet war reserve requirements.

GAO also recommends that the Secretary develop and publish minimum criteria for use in reporting on the results of complex analyses.

AGENCY COMMENTS

On December 19, 1983, GAO met with Department of Defense officials to obtain their official oral comments on a draft of this report. They agreed with each of the GAO recommendations and stated that action would be taken to direct the Army to develop a plan to implement them.

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ABBREVIATIONS

AMSAA	Army Materiel Systems Analysis Activity
APA	Army procurement appropriations
CAA	Concepts Analysis Agency
CONUS	continental United States
DARCOM	Army Materiel Development and Readiness Command
DCSLOG	Deputy Chief of Staff for Logistics
DCSOPS	Deputy Chief of Staff for Operations
DOD	Department of Defense
GAO	General Accounting Office
MICOM	Missile Command
MSC	major subordinate command
NATO	North Atlantic Treaty Organization
OSD	Office of the Secretary of Defense
SPARC	Sustainability Prediction for Army Spare Components for Combat
TSARCOM	Troop Support and Aviation Materiel Readiness Command

CHAPTER 1

INTRODUCTION

The basic objective of the Department of Defense (DOD) is to be prepared to support national policies and to defend and uphold the national security. As a part of this preparedness the military must have on hand adequate stocks of materiel to support our armed forces during wartime. Accordingly, each military service establishes and maintains a war reserve program that reflects policies established by the Secretary of Defense.

To meet the war reserve requirements, the services must acquire and store large quantities of combat equipment and essential supplies sufficient for expanded wartime consumption until the industrial base and resupply capability can respond to the increased requirements. These war reserve stocks are an essential part of a credible conventional deterrent as they directly affect force capability to sustain conventional and nuclear conflict.

Each DOD component is responsible for establishing systems to compute war reserve requirements and program the procurement of war reserve stocks in accordance with DOD guidance. War reserve items are composed of principal and secondary items. Principal items include major weapons, such as helicopters, jeeps, or tanks. Secondary items include spares, repair parts, and expendable items and are financed with Army procurement appropriations (APA) if they cost more than \$1,000 or are repairable components. Otherwise, secondary items are financed through stock fund accounts.

War reserve materiel is managed to support two types of requirements which relate to a war situation. The first type, prepositioned war reserves, are supplies and equipment positioned (1) as near as possible to the point of potential need and (2) in stateside warehouses to be used as the initial resupply support for forces engaged in combat. The second type, general mobilization reserves, are supplies required to support or sustain the approved forces through the remaining period of combat.

The total war reserve requirements reported by the U.S. Army Materiel Development and Readiness Command (DARCOM) to the Department of the Army as of August 1982 (latest available data) totaled \$17,598,260,000. Assets on hand to meet this requirement totaled \$2,297,270,000. These figures result in a fill rate (i.e., assets divided by requirements) of 13.1 percent.

EFFORTS UNDERWAY TO REVISE
SYSTEM FOR COMPUTING
WAR RESERVE REQUIREMENTS

The Army has an extensive program underway to revise the system for computing war reserve materiel requirements. A major phase of this effort involves updating computer programs to comply with DOD Instruction 4140.47, entitled "Secondary Item War Reserve Requirements Development."

The new system is to have a standard computational methodology for war reserve materiel needs and is to enable all Army commands to perform required computations and produce output reports required by current policy and guidance for all stock classes managed. This system will result in requirements based on specific troop strengths, their deployments, authorized equipment, densities, and planned wartime support period. The requirements are to be computed by 30-day increments and summarized by materiel and budget category. Peacetime assets are to be used as an offset to both the wholesale and retail requirements.

The effort to revise the system is a major effort designed to significantly change the computational methodology. Plans are for the Army to generate war reserve requirements using the new computational methodology for the first time in February 1985.

OBJECTIVES, SCOPE, AND METHODOLOGY

Our objectives were to identify current war reserve concerns and to inquire into the Army's effort to revise the war reserve requirements computation system. Also, we wanted to follow up on recommendations made in a December 14, 1978, GAO report entitled Army's Requirements for War Reserve Materiel Can Be Reduced Without Impairing Combat Effectiveness (LCD-78-422).

We reviewed the Army's procedures for management reporting, funding, and item identification and selection of war reserve items. We emphasized funding of existing war reserve stocks and management resource issues since they are considered high priority matters by the Secretary of Defense and Army staff.

Our inquiry into actions taken on recommendations in the 1978 GAO report was not emphasized in view of the extensive efforts underway to change the war reserve requirements computation system and the fact that most of the recommendations in that report dealt with aspects of this system.

Our review, which dealt primarily with secondary war reserve items, was centered at the Army Troop Support and Aviation Materiel Readiness Command (TSARCOM), St. Louis, Missouri, and the Missile Command (MICOM), Huntsville, Alabama, which are two of five major subordinate commands (MSCs) within DARCOM that provide logistical management. These commands manage the wholesale war reserves made up primarily of aircraft and missile spares and repair parts, both appropriation and stock fund financed. We did not audit the retail level war reserves which are those held by the major Army commands, e.g., European and Forces Commands.

TSARCOM was reviewed because planned expenditures for secondary war reserve items over the next several years will be larger at this command than at any of the other MSCs. MICOM was selected because of the critical nature of the items managed and the magnitude of the proposed funding.

We interviewed officials involved in war reserve requirements computation, procurement, and management; obtained documents, such as briefings, status reports, and budget support data; and developed schedules and conducted analyses as appropriate. Our examination also included visits to these locations: Headquarters, Department of the Army, Washington, D.C.; DARCOM, Alexandria, Virginia; U.S. Army Inventory Research Office, Philadelphia, Pennsylvania; U.S. Army Logistics Evaluation Agency, New Cumberland, Pennsylvania; U.S. Army Concepts Analysis Agency, Bethesda, Maryland; U.S. Army Materiel Systems Analysis Activity, Aberdeen, Maryland; U.S. Army Logistics Management Systems Activity, St. Louis, Missouri; and Office of the Secretary of Defense, Manpower, Reserve Affairs and Logistics, Washington, D.C.

We did not make an extensive verification of data, such as data in inventory and management reports. And we did not perform any reliability assessments on the computerized data bases used to generate information for war reserves stockage and management decisions. We relied on data generated by the Army's Commodity Command Standard Management Information System which is used by the Army on a recurring basis in managing war reserves. Except as noted above, our review was performed in accordance with generally accepted government auditing standards. It was conducted during the period March 1982 to November 1983.

Although our review centered on two of the five MSCs, we believe that the shortcomings noted may exist at the other MSCs as well, since all DARCOM components use a standard Army system to compute requirements and manage war reserve inventories.

CHAPTER 2

WAR RESERVE ITEM IDENTIFICATION AND SELECTION PROCEDURES NEED IMPROVEMENT

The Army has established criteria for including items in the war reserve inventory. Primarily, these criteria provide that war reserves be established for items whose absence or failure makes an essential weapon system or combat force inoperative or impairs its effectiveness. Items required solely for comfort, convenience, and morale or items available from commercial sources in sufficient quantities to meet a wartime requirement should not be included. We identified items at both TSARCOM and MICOM being managed in the war reserve inventory that do not meet the essentiality criteria. As a result, the Army has overstated its war reserve requirements and is retaining unnecessary assets, while other requirements remain unfilled.

CURRENT SELECTION CRITERIA

Army Regulation 710-1 lists several criteria that must be met for an item to be included in the war reserve inventory. They are:

- Items whose lack or failure renders inoperative or seriously impairs the operational effectiveness of an essential weapon system.
- Items required for survival and protection of personnel; e.g., medical supplies and equipment, peculiar air/sea rescue items, and specialized protective clothing and equipment.
- Items that are essential (1) for combat forces to destroy the enemy or his capacity to continue war, (2) for providing battlefield protection of personnel, and (3) for detecting, locating, and maintaining surveillance of the enemy and communicating under war conditions.

Conversely, Army Regulation 710-1 states that items which meet certain criteria should not be selected as war reserves. They are:

- items required solely for comfort, convenience, or morale;
- items normally available from commercial sources in sufficient quantities in the time required to meet wartime military demands; and

--repair parts in quantities of five or less with an extended dollar value of \$100 or less, except on a case-by-case basis upon request of the supported commander.

WAR RESERVES CONTAIN NONCRITICAL,
COMMERCIALY AVAILABLE, LOW
DEMAND, AND LOW DOLLAR VALUE ITEMS

At both TSARCOM and MICOM, we identified by screening the war reserve list a number of items that appeared to be solely for comfort, convenience, and morale or did not appear to cause failure, render a system inoperative, or impair its operational effectiveness. Examples are shown in the following table.

<u>Description</u>	<u>Unit value</u>	<u>Value of</u>	
		<u>Requirements</u>	<u>Assets</u>
TSARCOM			
Ashtray	\$ 3.92	\$ 1,831	\$ 557
Arm rest stop	38.13	2,365	153
Seat cushion assembly	27.05	16,095	11,064
Ashtray support	4.31	517	125
Arm rest cover	13.36	908	53
Aircraft curtain	60.42	906	121
Pop-out lighter	1.05	146	55
MICOM			
Brush	23.65	875	876
Visor, meter	257.00	2,570	771
Cover	1.93	756	186
Adhesive	22.44	45	44
Sealing compound	40.34	40	40
Cushioning material	.42	2	2

At both MSCs we discussed with responsible engineers the inclusion of these and similar items in the war reserve stocks. They told us that 14 of the 20 (70 percent) TSARCOM items and 9 of the 19 (47 percent) MICOM items should not have been included in war reserves and that they would take action to remove the requirements.

Additionally, we found that there were 5,206 of 14,905 and 1,673 of 4,007 items with assets totaling about \$706,000 and \$30,300 respectively, at TSARCOM and MICOM that had quantities of five or less with an extended dollar value of \$100 or less. According to existing criteria, such items should not be included as war reserves unless requested on a case-by-case basis by the supported commander. We were told at both MSCs

that field commanders had not indicated war reserve requirements by specific national stock number.

Also, we noted numerous low dollar value items were included in the war reserve stocks which should be readily available in sufficient quantities from commercial sources to meet wartime demands and thus do not warrant stockpiling as war reserves. Examples are shown in the following table.

<u>Description</u>	<u>Unit value</u>	<u>Value of</u>	
		<u>Requirements</u>	<u>Assets</u>
TSARCOM:			
Bolt	\$.71	\$ 16.33	\$ 14.91
Gasket	.50	18.00	12.00
Flat washer	1.02	96.90	5.10
Balance weight	.17	10.03	4.93
Protective dust cap	.10	18.00	5.00
Washer	1.02	96.90	5.10
MICOM:			
Splice clamp	.05	299.00	13.00
Cable	.47	504.78	504.78
Flat washer	.12	30.00	9.96
Cable	.89	970.99	519.76
Crimp sleeve	.56	43.68	35.84

It was not practical to identify and trace at each command all the low dollar value commercially available items in the war reserve inventory. Rather, we discussed with maintenance officials 20 selected items at TSARCOM and 17 at MICOM. At TSARCOM, 80 percent of these items were considered unnecessary for inclusion in the war reserve inventory due to their commercial availability, while at MICOM 59 percent of the items were said to be unnecessary as war reserve items for the same reason.

CONCLUSIONS

Army regulations specify what criteria must be met for an item to warrant inclusion in the war reserve inventory. But the Army is stocking war reserve items that do not meet these criteria. As a result, war reserve requirements are overstated and unnecessary war reserve inventories are being held. This situation exists while valid requirements remain unfilled due to the scarcity of war reserve funds.

RECOMMENDATIONS

We recommend the Secretary of the Army direct DARCOM to:

--Comply with existing regulations when identifying and selecting war reserve items. This would exclude unnecessary items and reduce requirements.

--Screen existing war reserve items to eliminate requirements and inventories which do not meet selection criteria and sell the unnecessary assets to buy needed war reserves.

AGENCY COMMENTS

On December 19, 1983, we met with DOD officials to obtain their official oral comments on a draft of this report. They concurred in each of the findings and recommendations contained in the draft report and stated that action would be taken to direct the Army to develop, within 60 days, a plan to implement the recommendations.

CHAPTER 3

WAR RESERVE STOCKS ARE IMBALANCED AND LOW

PRIORITY ASSETS ARE NOT REDISTRIBUTED OVERSEAS

The Army's current investment in war reserve stocks is small when compared to requirements. Further, the stocks on hand are imbalanced, resulting in large quantities or days of supply for some items while virtually no stock exists for others. Also, low priority stocks stored in CONUS are not redistributed to higher priority locations overseas where they are needed. Although information on how such imbalances affect combat sustainability¹ is not clearly known, a DOD representative said the Army's combat capability is significantly reduced.

Reduced sustainability results largely from a lack of resources devoted to war reserves. However, budget constraints will apparently inhibit full funding of war reserve requirements for some time. Thus, the Army should do more to improve sustainability by better managing its existing war reserve assets. Specifically, MSCs need to comply with a DOD policy for balancing war reserve stocks based on when the stocks are scheduled for use during the war planning scenario and to comply with a policy to redistribute low priority war reserves held in CONUS to major overseas commands. We found that the Army is not now implementing these policies.

AVAILABLE WAR RESERVE STOCKS ARE NOT BALANCED

The Deputy Assistant Secretary of Defense for Manpower, Reserve Affairs and Logistics on June 1, 1979, notified all the military services, including the Assistant Secretary of the Army (Installations, Logistics and Financial Management), that war reserve stock fund items should be balanced by transferring low priority war reserve assets to meet existing peacetime demands and then using the funds generated from this transaction to obtain other war reserve assets needed during the early stages of the war planning scenario.

The Deputy Assistant Secretary noted that some imbalances existed in war reserve inventories and a keystone to the readiness of operating forces was the immediate availability of supplies needed until follow-on support could be accomplished. The Army was directed to develop a system for determining priorities of secondary item war reserve deficiencies in order to ensure an overall balanced war reserve stockage position. Funding of war reserve deficiencies for specific line items was

¹Sustainability is the ability to maintain the necessary level and duration of combat activity to achieve national objectives. Army officials defined it quite succinctly as "staying power."

not to exceed the authorized support periods defined by the Secretary of Defense.

Also, a Department of Defense Instruction 4140.47, dated July 11, 1979, stated that funding of war reserve deficiencies should be structured to provide balanced wartime support of secondary items, munitions, and equipment items for the approved force structure. The DOD Defense Guidance established specific criteria in days of supply for purchased shortage items.

The DARCOM MSCs we visited were not complying with the DOD guidance to draw down their inventory balances in relatively low priority war reserve items. Instead, at TSARCOM new funds were being committed for low priority war reserve assets. Our work at TSARCOM and MICOM indicated that about \$47 million was being kept in low priority war reserve inventory when the assets should have been released for general peacetime use and the funds generated used to purchase stock for high priority war reserve items in short supply.

In this connection we noted that as of October 1982 the Contingency Support Stocks for repair parts (a high priority war reserve category) at TSARCOM and MICOM had only small percentages of the stock requirements filled.

TSARCOM and MICOM have significant and apparently growing investments in low priority war reserve items. The following table gives the low priority assets for stock fund items as of October 1982.

Assets for Stock Fund Items

	Assets (note a)
	(000 omitted)
TSARCOM:	
General Mobilization - Stock Fund	\$43,036
Special Contingency - Stock Fund	<u>1,266</u>
Total	44,302
MICOM:	
General Mobilization - Stock Fund	<u>2,247</u>
Total TSARCOM and MICOM	<u><u>\$46,549</u></u>

^a Assets exclude any due-ins, which may be substantial. For example, TSARCOM General Mobilization had due-ins of about \$14 million as of October 1982.

These assets can be considered potential "drawdown" stocks. To illustrate the potential for balancing, we selected nine low priority war reserve items with high value due-ins and/or assets to determine if they could have been used to fill current peacetime requirements. We identified the following four items at TSARCOM with a due-in or an on-hand value of \$1.8 million that were included in the general mobilization stock (low priority war reserves) which were also being purchased for general issue.

<u>Item</u>	<u>General mobilization</u> <u>war reserves</u>	<u>Peacetime use</u> <u>information</u>
	<u>On hand</u> <u>and due in</u>	<u>General issue</u> <u>due in</u>
Rotary rudder blade	\$ 305,230	\$3,024,340
Flutter damper	839,496	884,184
Rotary compressor	554,016	2,775,851
Assembly platform	<u>119,691</u>	<u>239,382</u>
Total	<u>\$1,818,433</u>	<u>\$6,923,757</u>

Under the DOD policy, these items should have been "drawn down" from the existing war reserve stock and the assets released for general issue. The funds conserved by using existing low priority war reserve assets to meet general issue requirements could then be used to obtain high priority war reserves.

The remaining five items in our sample had assets valued at \$5.2 million in general mobilization stock and \$10.2 million available for general issue. While there were no due-ins for the general issue stocks, the existing war reserve assets possibly could have been used to reduce prior procurements of some of the general issue stocks.

Responsible TSARCOM war reserve officials said they had no knowledge of the DOD guidance of June 1, 1979, or the general philosophy that low priority items of supply were to be sold and the funds generated used to buy high priority items.

LOW PRIORITY WAR RESERVE ASSETS ARE NOT BEING REDISTRIBUTED

DOD officials, in response to our 1978 report on war reserves, agreed to place more emphasis on the stock fund war reserve program; specifically the services would be required to coordinate and transfer assets to fill priority shortages. In response to the report and previous Office of the Secretary of Defense (OSD) concerns, OSD issued a memorandum in 1979 directing greater balancing. The Army was to balance its war reserves and transfer assets from low priority storage in the United States to higher priority overseas commands whenever practical. DARCOM identified at least \$27.4 million of supplies from low priority CONUS-based assets which could be transferred to higher priority locations managed by the major commands. A DARCOM representative said that this effort resulted in increased combat capability for the overseas major commands because materiel was moved to overseas locations where the Army is expecting to fight. Further such actions eliminate possible attrition losses and transit delays expected when materiel is transferred from CONUS depots during wartime.

After the initial effort to redistribute assets, no other lists were prepared and circulated in subsequent years as required by the DOD guidance. After our inquiry, DARCOM in December 1982 asked the major commands to submit a list of shortage items. A DARCOM official said DARCOM had done this in lieu of sending a list of low priority items to the major commands because DARCOM feared that these locations would select goods they could not use or store adequately. He said they were considering the alternative of selling low priority assets for peacetime use and then applying the proceeds to purchase high priority war reserves in short supply. But currently there is no aggressive plan to begin drawing down these low priority items.

CONCLUSIONS

The Army is not complying with 1979 DOD guidance requiring the balancing of war reserve inventories. We identified instances where TSARCOM is currently purchasing war reserve items which the OSD guidance indicates should be sold. Further, the two MSCs visited have no active programs to sell low priority war reserves for peacetime use and then apply the proceeds to acquire higher priority war reserve items that are in a shortage position.

Physically transferring existing low priority war reserves to higher priority prepositioned locations may be helpful.

Current DARCOM plans for comparing major command shortages with DARCOM assets should assist the Army's balancing efforts. However, it seems to us that a final decision on the procedure for physically transferring DARCOM owned low priority assets to higher priority war reserves should involve input from DARCOM and the affected major commands.

RECOMMENDATIONS

To improve the management of the Army's war reserve program, we recommend that the Secretary of the Army direct DARCOM to:

- Comply with the 1979 DOD guidance on balancing the war reserve inventories. Specifically, discontinue buying low priority war reserve items and actively pursue the sale of items for peacetime use. The resulting conserved funds could then be used to acquire high priority war reserve items.
- Periodically meet with representatives from the major commands to ensure existing low priority war reserves are screened for possible physical transfer to higher priority locations. The type of screening process used-- providing major-command-computed shortages for DARCOM's screening or having DARCOM provide lists of currently owned low priority war reserve assets for major command screening--should be jointly determined by all affected parties.

AGENCY COMMENTS

DOD officials agreed with each of our recommendations and stated that action would be taken to direct the Army to develop a plan to implement them.

CHAPTER 4

DELETING EXCESS ASSETS AND

ADDING PEACETIME LONG SUPPLY ASSETS

WOULD IMPROVE WAR RESERVE POSITION

The war reserve inventory contains assets that exceed the computed maximum war reserve requirements for the assets. The excess should be recategorized for general issue and the proceeds used to acquire war reserve items with unfilled requirements. Unfilled war reserve requirements also could be met by using available general issue long supply assets, as required by Army guidance.

These conditions are in addition to the problems discussed in the preceding chapters. Chapter 2 pointed out that the Army was stocking war reserve items that do not meet the essentiality selection criteria for inclusion in the war reserve inventory. Chapter 3 pointed out that the Army was not drawing down its inventory balances in relatively low priority war reserve items and using the funds generated to acquire higher priority war reserve items that are in a shortage position.

EXCESS ASSETS SHOULD BE DELETED

The following table shows the excess assets reported by TSARCOM and MICOM in their quarterly war reserve status reports to DARCOM.

Excess War Reserve Assets--1982

----- (000 omitted) -----

	<u>National stock</u> <u>numbers</u>	<u>Amount</u>
TSARCOM:		
March report	514	\$21,029
June report	460	9,440
October report	189	8,106
MICOM:		
June report	143	244
October report	78	232

This table shows that both MSCs are inflating war reserve inventories by including assets that are excess to computed requirements. There were no computed requirements for some assets. For example, in the March TSARCOM report, there were 61 national stock numbers with \$56,000 in assets that had no requirements.

Army officials said existing guidance required that excess assets not be included in the quarterly reports to DARCOM. These assets should be recategorized for general issue. Each MSC item manager is responsible for initiating the action to recategorize the excess assets. A command official expressed the belief the item managers may be protecting their excess stock by including them in the war reserve inventory.

By including excess assets in the war reserve inventory, the MSCs are missing opportunities to transfer the assets for general issue and use the proceeds to satisfy unfilled war reserve requirements.

LONG SUPPLY ASSETS SHOULD BE TRANSFERRED TO WAR RESERVES

Army guidance for the automated inventory control system states that available long supply assets should be used to meet war reserve requirements. Although an automated system exists to transfer general issue long supply assets to war reserves, both MSCs had long supply assets that were not used to meet existing war reserve requirements. Had these long supply items been added to the war reserve inventory, the asset positions would have been increased, thereby improving the fill rate for meeting war reserve requirements.

At TSARCOM we reviewed 224 items randomly selected from long supply reports and found that 28 had unfilled war reserve requirements. For these 28 items, a total of 368 long supply assets valued at about \$163,000 were available to fill the reported war reserve requirements. Our test at MICOM of 240 items resulted in identifying 5 with unfilled requirements. A total of 21 assets costing about \$44,700 were reported in long supply and could have been used to meet the unfilled war reserve requirements.

CONCLUSIONS

The MSCs' war reserve position could be improved by

--transferring assets that exceed war reserve requirements to general issue and using the proceeds to satisfy unfilled requirements and

--using long supply general issue items to meet war reserve requirements.

RECOMMENDATIONS

We recommend the Secretary of the Army direct DARCOM to:

- Transfer excess war reserve assets to general issue and use the proceeds to acquire war reserve items that have unfilled requirements.
- Require that the MSCs use long supply general issue assets to meet war reserve requirements.

AGENCY COMMENTS

DOD officials agreed with our recommendations and stated that actions would be taken to direct the Army to develop a plan to implement them.

CHAPTER 5

THE ARMY NEEDS TO ESTABLISH CRITERIA FOR PREPARING AND USING WAR RESERVE STUDIES

The Army uses several large-scale analytical efforts, such as the Concepts Analysis Agency (CAA) war games and the Army Materiel System Analysis Activity's (AMSAA's) Sustainability Prediction for Army Spare Components for Combat (SPARC) analyses to help them develop war reserve requirements. These studies simulate warfare and are used to determine how such warfare affects materiel requirements. Our review and discussions indicate documentation for such reports needs improvement. Improved documentation would enable those preparing the reports and the users to better understand report accuracy and limitations when computing war reserve requirements.

Many of the justifications for the war reserve requirements and factors used in computing them are exceedingly complex, require extensive analysis, and should have extensive documentation explaining how they are prepared. Such studies/analyses can be easily misinterpreted unless the documentation completely discloses assumptions and methodologies. We did not audit the accuracy of the analyses used to compute war reserve requirements but did review two types of studies/analyses to determine what information had been provided those persons who compute war reserve requirements.

Currently, no regulations or procedures exist specifying what information regarding these complex analyses should be disclosed. Thus, we developed a set of suggested minimum criteria that we believe will be useful in assuring that users of the war reserve studies and analyses are fully informed.

The Army plans to spend many billions of dollars over the next several years for war reserves. We believe, based on previous work we have done on this subject, that great potential exists for waste should the justifying analyses and studies be used improperly because sufficient information on their use and limitations was not disclosed. Full discussion of the analyses, both their limitations and strengths, between the agency that prepared them and the users should reduce the opportunity for errors or faulty use of the data.

MINIMUM CRITERIA FOR DOCUMENTING STUDIES AND ANALYSES

Currently no regulations or procedures exist specifying how analyses should be presented. Conversations with Office of Management and Budget, Office of the Secretary of Defense, and

Army representatives substantiate the lack of regulations.¹ We found no consensus on whether additional regulations were necessary or what they should contain.

We believe the purpose of any regulations covering analysis preparation and dissemination should be to encourage discussion over the model output accuracy and how the data should be used. Discussions have occurred and will occur to some extent on this subject. However, due to the complexity of the analysis involved, some documentation is necessary.

The suggested minimum criteria were taken from several previous GAO studies, the Operations Research Society of America's "Guidelines for Professional Practice," and from comments obtained from Army and DOD personnel.² We believe such documentation should include as a minimum the following.

- All assumptions and policy input data necessary for the analysis should be clearly specified and their sources should be included.
- The methodology should be clearly described. When the analysis is extensive, some sort of methodological critique should be made. Experts, separate from those who conducted the analysis, should review the methodology and offer comments. Further, model users should have input into the model development process at all times.
- Sensitivity analysis should be conducted to identify how variations in input data affect the final output. If large variations in input data have little impact on the final output, this should be so stated. Conversely, if changes in input data affect the output, this too should be stated.
- If circumstances permit, the model should be calibrated and verified to ensure its accuracy. Calibration involves using the model to forecast results for the period under historical review. Verification involves using the model to forecast to a new period, and then comparing the model results with the actual results for the new period. This is understandably difficult to do with war game models, especially ones dealing with large-scale wars.

¹National Bureau of Standards Federal Information Processing Standards Publication 38 and a DOD automated data systems documentation standard come closest to specifying how analyses should be presented. These regulations, however, relate to computer program documentation. In addition, DOD Instruction 7041.3 and DOD Directive 5010.22 discuss in a very general way how analyses are to be made but do not discuss in detail how they are to be documented.

²Appendix I lists several previous GAO reports on war reserves and other reports which evaluated complex analyses.

--Those making the analysis should clearly specify how accurate they consider the study to be and how it should be used. In some cases discussions may include a range of possible values with opinions stating why the most probable value was selected.

--The primary users of each product should document their files whenever they use numbers different from those produced in the analysis. The rationale for the changes should then be communicated to the technicians who prepared the analysis initially and any other users.

When it is not possible to follow the suggested criteria, the analysis report should discuss why not.

CASE STUDIES

The two specific examples of complex analyses we reviewed were CAA's war games and the SPARC analysis prepared by AMSAA. The war games are used to generate attrition rates for major end items and consumption rates for ammunition and, to a more limited extent, spare parts. The SPARC analysis is used for estimating combat damage to weapon system parts.

We did not evaluate the technical content or the accuracy of the output of these two complex analyses. Instead we reviewed the reports and then discussed the reports contents and how the data was used with the analysts and users. We wanted to know how analysts interact, if at all, with users. We did observe that the accuracy of much of the data resulting from such studies is not discussed in the reports. Inadequate discussion of this important topic raises the possibility that the studies may be used improperly.

GAO's review of selected CAA and AMSAA reports

We selected the most recent CAA war game report and four AMSAA combat damage studies. Essentially our review was to determine whether the reports followed our suggested criteria for acceptable documentation. Our review of the combat damage analyses and war game studies showed the following.

--Many of the assumptions and policy input values are clearly specified; however, they are not summarized in a report section indicating the most significant ones.

--There are rather involved discussions of the methodology used, but no reference to methodological critiques by outside groups.

- There is a very limited discussion of sensitivity analysis for the CAA model.
- There is no discussion of model calibration or verification.
- There is no discussion of model output accuracy.
- There is limited discussion about how the studies should be used.

Since the studies did not consider many of the suggested criteria we discussed the matter in greater detail with CAA and AMSAA representatives. (See below.)

CAA'S war games study

CAA's war games are used as a major input in computing ammunition and major end item requirements. To some extent they also help drive the models which will determine spare parts demand induced by combat damage. These requirements are used to justify billions of dollars in planned procurements.

The war games involve simulating battles between North Atlantic Treaty Organization (NATO) and Warsaw Pact forces.³ While these simulations are also run for Korea and Southwest Asia scenarios, the major simulation involves a theater level conflict in Europe. This war game involves the use of NATO forces in the last year of the current Program Objective Memorandum in conflict against Warsaw Pact forces expected at that time. Thus, the most recent study involves theater level conflict expected for the forces available at the end of fiscal year 1988.

We discussed the suggested documentation criteria as they apply to CAA's war games with CAA staff and Army Deputy Chief of Staff-Operations (DCSOPS) personnel. We then reviewed the study to see how closely it followed our suggested criteria and discussed the results with CAA representatives. Comments on each criterion follow.

Clear specification of assumptions and policy input data--CAA and DCSOPS representatives stated they made significant efforts to discuss the assumptions and policy input values with many responsible groups before they began their last published study. This information was then included in the report. For example, a DCSOPS representative noted that in November 1982 CAA held its first assumption seminar to discuss

³The major report we reviewed as reflective of CAA's war gaming output was Wartime Requirements, Programming Fiscal Year 1988 Europe (P88E) (U), Volumes I and II, dated June 10, 1982.

what policy input values and assumptions to use in the new war-time requirements study for Europe, fiscal year 1990 (P90).⁴

Methodology description--CAA describes its war games methodology extensively in its reports. Staff advisory groups have been established to review methodological techniques and monitor future studies. Recommendations resulting from such critiques are incorporated in later studies. However, the report actually reviewed does not mention the independent review or the changes that the review recommended.

Sensitivity analysis--A CAA representative said it is not practical to conduct more than one or two sensitivity analyses for each war gaming study, due to their complexity. Thus, CAA staff and users have no way to objectively evaluate how changes in the major assumptions or policy input values may affect the final model output. Extensive additional analysis, however, is conducted to test the impact changes have on the intermediate level output, such as the expected combat casualties. Such intermediate level evaluations, however, were not discussed in the final report.

Calibration and verification--CAA does not calibrate and verify its models to ensure model accuracy. The CAA representative said it is very difficult to apply its model to current warfare since the recent wars do not reflect the type of war nor employ the types of sensors, weapon systems, and munitions expected in a future large-scale European conflict. DCSOPS staff said they simply do not have information on alternative wars similar to that expected in a future European war.

Study accuracy and report usability--CAA reports do not discuss their accuracy or how the data should be used, even though one CAA representative said that due to size and complexity of the studies, errors are made. But there is coordination between CAA and major users, such as DCSOPS staff, to be sure they understand and use the reports properly. When detected following publication of the report, significant errors are reported to the study proponent for dissemination to users. A CAA representative said CAA had no way to estimate output accuracy.

⁴We use assumptions in this discussion to refer to judgments the CAA analyst must make while policy input values refer to data obtained from other agencies; i.e., the Warsaw Pact threat analysis comes from other DOD intelligence organizations.

User feedback--A CAA representative said that changes made by DCSOPS personnel are not routinely communicated to CAA and other users. However, DCSOPS representatives said they are currently instituting a procedure to document the changes they make to the war game outputs. A memorandum is to be sent to those who receive the CAA studies explaining any changes.

General comments on the war game study

The representatives from CAA and DCSOPS generally believe that the current war game efforts could comply with the proposed criteria when more than the report is considered. CAA and DCSOPS staff have held extensive discussions and provided supplemental documentation explaining what they have done. This information represents compliance with our minimum criteria.

A DCSOPS representative said DCSOPS is undertaking a project to prepare an unclassified users manual for the CAA war game reports. He said the manual would be designed to improve the users' understanding of the war gaming process and would suggest how the reports could be used. This effort is designed to respond to the many questions DCSOPS receives about how to use the CAA war game output.

Sustainability predictions for Army spare components for combat (SPARC)

This AMSAA study of combat damage will be used as major input in computing requirements for spare parts induced by combat damage. Combat damages are not now generally considered in estimating the demand for spare parts. Army representatives believe inclusion of such damages could significantly increase requirements.

The SPARC analysis for spare parts consists of developing a computerized target description, identifying the threat weapons and assessing the threats capability, then developing a data base of hit probabilities for each part. This data base is used to estimate expected damages.

We discussed the suggested criteria for documenting studies as they apply to four of AMSAA's SPARC analyses. The reports were on the UH-60A Utility Helicopter, the Vulcan Air Defense System, the M60A1/M1 Tank, and the Improved TOW Vehicle.⁵

⁵The specific AMSAA report numbers used for this critique include Interim Note A-170 for the UH-60A, Technical Report 363 for the Vulcan Air Defense System, Interim Note C-101 for the M60A1/M1 Tank, and Interim Note G-112 for the Improved TOW Vehicle.

We then reviewed the four studies to see how closely they followed the suggested criteria and discussed the results with AMSAA representatives. Comments on each criterion are as follows.

Clear specification of assumptions and policy input data-- An AMSAA representative said the analysts who prepare the studies include their assumptions throughout the report. But there is no specific section in the studies which summarizes them and then indicates which are the most significant. The AMSAA representative said they try to brief study recipients and conduct planning conferences where assumptions can be challenged.

Methodology description--An AMSAA representative said the methodology was described throughout the studies. AMSAA does not, however, request critiques of the methodology used from outside agencies.

Sensitivity analyses--We were told by an AMSAA representative that extensive sensitivity analyses are conducted to evaluate how changes in the input data affect the final product. However, the studies did not discuss these sensitivity analyses.

Calibration and verification--The studies did not contain any information on calibration and verification. An AMSAA representative stressed that AMSAA has made continued efforts to obtain new battle damage information to compare against what it is now using. These efforts could be considered attempts at calibration and verification but are not discussed as such in the reports.

Study accuracy and report usability--The SPARC studies contained no discussion of accuracy or how the report should be used. According to an AMSAA representative, however, the analysts who work with SPARC consider it to be imprecise and to be primarily "trend" data or "areas to consider." The studies we reviewed, however, contained no qualifying statements or indications on how the studies should be used.

User feedback--Several different organizations either now use or will use the SPARC analyses; however, very little feedback is received on how they use them.

General comments on the SPARC analyses

An AMSAA representative said that due to the small number of SPARC analysis users, he was not sure extensive documentation would be worthwhile. However, he said that perhaps such documentation would facilitate discussions with users.

CONCLUSIONS

The CAA war games and AMSAA combat damage studies are simulations of large-scale conventional warfare and the impacts such warfare has on equipment. They are complex and because of the subject matter can only approximate expected real world conditions. This makes it even more important to be sure the analysts and the users understand their accuracy. Our review and discussions indicate report documentation should be improved significantly. While the reports did discuss their assumptions and methodology, we found no discussion of sensitivity analysis, model calibration and verification, and output accuracy and very limited discussion of how the users should use the studies. Even when methodologies were discussed, critiques by outside experts were not mentioned.

While no regulations require including the type of data discussed above, we believe such information is essential for any reports summarizing complex analysis.

RECOMMENDATION

We recommend that the Secretary of the Army develop and publish minimum criteria, such as suggested in this chapter, for use in reporting on the results of complex analyses. The standards prepared by the Operations Research Society of America and other organizations should also be considered in developing these criteria.

AGENCY COMMENTS

DOD officials concurred in our recommendation and stated that action would be taken to direct the Army to develop a plan to implement it.

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APPENDIX I

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