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BY THE U.S. GENERAL ACCOUNTING OFFICE

## Report To The Secretary Of The Air Force

# Excessive Air Force Inventories Result From Duplicative Spare Parts Requirements

The Air Force manages, buys, and stocks spare parts at five logistics centers/depots to support Air Force weapons systems. The five logistics centers manage consumable parts valued at over \$3 billion. Each depot also operates a maintenance activity to repair weapons systems and their components. This report contains recommendations for eliminating duplicative depot maintenance requirements from spare parts inventories.

Programming logic used to compute total Air Force consumable spare parts requirements results in some depot maintenance requirements being counted twice. As of March 31, 1983, the Air Force was investing \$119 million in unnecessary inventory because of this duplication and about \$21.5 million annually in maintaining this inventory.



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

NATIONAL SECURITY AND  
INTERNATIONAL AFFAIRS DIVISION

B-215989

The Honorable Verne Orr  
The Secretary of the Air Force

Dear Mr. Secretary:

This report discusses excessive spare parts inventories that result from duplicative depot supply level requirements.

The report contains recommendations to you on page 12. 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  
Director



D I G E S T

The Air Force Logistics Command manages, buys, and stocks spare parts at five logistics centers/depots to support Air Force weapons systems. A maintenance activity located at each depot makes major repairs to weapon systems and their components. The centers manage over 385,000 active consumable parts--those parts not repaired when they fail--valued at \$3.2 billion.

The centers have computer systems that help managers determine when and what quantities of parts to buy. One system estimates how many consumable parts are needed to meet Air Force-wide requirements. Another system, the depot system, estimates the quantity of such parts needed by the maintenance activity. Periodically, the maintenance activity usage data is input to the Air Force-wide system, where it is recorded and used as part of the worldwide usage history on which requirements and reorder levels are based. The maintenance activity also computes stockage objectives, called depot supply levels, which are input to the Air Force-wide system.

GAO made this review to assess the validity of the factors used to compute the maintenance needs and to determine how these needs are included in the Air Force-wide requirements. GAO did not examine war reserve material requirements as they are intended as an additive to peacetime needs and are not available to fill routine peacetime requirements.

DUPLICATED REQUIREMENTS

GAO's analysis showed that programming logic used to compute Air Force-wide requirements resulted in some maintenance requirements being counted twice. All maintenance requirements are included in Air Force-wide forecasts of usage.

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Then through the computer logic, some of the same requirements, in the form of a depot supply level, are added to compute a systemwide reorder point. (See pp. 5 to 7.)

Consumable parts are purchased when established reorder levels are reached. Duplicating requirements causes reorder points to be reached prematurely. Purchasing parts before they are needed creates excessive inventory investment and the accompanying costs of maintaining that inventory.

As of March 31, 1983, the total Air Force-wide requirements for consumable parts included \$192.5 million as depot supply levels. GAO identified, through analysis of computer tapes, that the Air Force was investing about \$119 million in unnecessary inventory. It costs about \$21.5 million annually to maintain this inventory. The cost of maintaining the inventory was computed using a Logistics Command factor expressed as a percent of inventory costs. The following example illustrates how requirements are overstated.

In April 1983, the depot system computed a depot supply level of 20 valve assemblies based on maintenance activities usage for the previous 12 months. Maintenance activities were the only users of this assembly. The Air Force-wide system collected the same usage data to estimate its requirements. The Air Force-wide system then added the depot supply level to its estimate, thus duplicating total requirements by 20 assemblies costing \$8,122. (See p. 7.)

As a result of GAO's finding, the air logistics centers took action to reduce requirements by \$3.6 million, resulting in a corresponding reduction in inventory and a yearly savings of \$612,000 in holding costs. However, the major issue of duplication requires action at Headquarters, Air Force Logistics Command, or higher to eliminate excesses of about \$115.4 million. (See p. 8.)

OVERSTATED DATA ELEMENTS USED  
IN DEPOT SUPPLY LEVELS

GAO also found that depot supply levels were overstated. Since these overstated levels were added to the reorder level in the Air Force-wide

requirements system, they actually increased the amount of the excess caused by the system programming logic. Correcting the programming logic can prevent future overprocurements; however, inventory management problems, e.g, unnecessary backorders, will still exist unless overstated data elements are corrected.

GAO quantified the overstatement at the Oklahoma City center. Tests showed that requirements were overstated by \$15.8 million. Although GAO did not perform similar tests at the other centers, the Oklahoma City results show this is a serious problem. (See pp. 8 and 9.)

The overstatements were caused by:

- Inflated order and shipping time. Parts needed for the depot maintenance activity and other Air Force-wide requirements are located in the same warehouse. Therefore, order and shipping time for depot items is the time involved to make an accounting allocation from one depot account to another, usually 1 or 2 days. However, sometimes abnormal delays are incurred in making the accounting transaction when the needed item is being held for higher priority use or is out of stock. In those circumstances the depot system is recording the abnormal transfer time. Adjustments are made in the Air Force-wide system for the conditions causing the abnormal transfer time. The use of abnormal order and shipping time in the depot system overstates the need for items.
- Unwarranted safety levels. Safety levels are used by the depot maintenance activity to provide insurance against running out of stock. This can be caused by fluctuations in order and shipping times and demands while transferring assets from one depot account to another. With no physical movement of parts involved, little variation in time is required for the transaction. Furthermore, a safety level in the Air Force-wide computation helps ensure that adequate assets will be on hand in case of unforeseen circumstances. Therefore, safety levels at the depot appear to be unwarranted.
- Invalid backorders. Invalid backorders occur because maintenance activity requisitioners

use backorders to document roback actions.<sup>1</sup> This is done by requisitioners issuing additional orders for parts if initial orders are not filled on time. Such backorders increase the reorder levels which cause item managers to buy additional quantities. Requisitioners cancel the invalid backorders when needed stock becomes available. This reduces estimated requirements and causes the quantities of parts on hand or on order to be excessive.

#### CONCLUSIONS AND RECOMMENDATIONS

The air logistics centers took action to reduce depot supply level requirements by about \$3.6 million. GAO believes the Air Force can further reduce inventories and procurement obligations by about \$115.4 million, reduce inventory holding costs by about \$21 million, and improve inventory management. To achieve these savings GAO recommends that the Secretary of the Air Force direct the Commander, Air Force Logistics Command, to

- correct system logic to prevent the duplication of depot requirements in Air Force-wide requirements and
- reduce the overstated depot supply levels by (1) excluding atypical data, which unduly impacts order and shipping time quantities, from actual time required to allocate assets from one depot account to another, (2) eliminating unwarranted safety levels in estimating depot supply level requirements, and (3) eliminating the practice of using backorders to document roback actions.

#### AGENCY COMMENTS AND GAO's EVALUATION

Department of Defense officials reviewed a draft of this report and provided their official oral comments. Based on these comments, GAO has revised the report, where appropriate, to clarify its position and recommendations.

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<sup>1</sup>Removal of parts from components in an early stage of repair to use on components more nearly completely repaired.

Defense officials agreed that depot supply level and depot demands are both used in Air Force-wide requirements computations. However, they contend that this does not result in excessive inventories because the Air Force system automatically applies depot assets to offset depot supply requirements in the computation. GAO recognizes that assets are applied against reorder levels when determining the need for procurement actions. However, by including depot requirements twice, reorder levels and inventory levels are unduly increased. Offsetting duplicated requirements with assets does not remedy the excessive inventory position. The assets are merely bought and carried in inventory to cover a higher reorder level.

Defense officials took exception to GAO's draft proposals to limit order and ship times to 1 or 2 days and to eliminate safety levels in estimating depot requirements. GAO has considered their comments and clarified its position and recommendations to address their concerns. However, GAO has not altered its basic position that these factors are overstated and result in excessive inventories. These officials agreed to eliminate the practice of using backorders to document roback actions and discussed actions planned to implement GAO's recommendation. (See pp. 12 to 14.)



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<u>ABBREVIATIONS</u>	
AFLC	Air Force Logistics Command
EOQ	economic order quantity
GAO	General Accounting Office



## CHAPTER 1

### INTRODUCTION

The Air Force Logistics Command (AFLC) manages, buys, and stocks spare parts to support Air Force weapons systems. AFLC carries out its responsibilities at its headquarters at Wright-Patterson Air Force Base, Ohio, and at five air logistics centers. These centers have computerized systems for determining requirements for reparable and consumable spare parts.

One system, the Retail Stock Control and Distribution Locator System (D033), computes levels of consumable inventories needed to support maintenance activities and tenant organizations at the centers. These inventories are known as depot supply levels. The D033 system automatically inputs data into another system--the Economic Order Quantity Requirements Computation System (D062). Item managers use the data from these two systems to make decisions on which consumable items to buy, retain, and dispose of.

This report concerns the use of depot supply levels in establishing consumable parts requirements in the D062 system. It excludes war reserve material requirements and assets as they are additive to the peacetime operating stocks discussed in the report. War reserve material assets are contingency assets set aside to support the increased level of activity that would occur in the event of an outbreak of hostilities. These assets are not available to fill routine peacetime operating requirements.

As of March 31, 1983, the five air logistics centers were managing over 385,000 active consumable parts valued at \$3.2 billion. This included depot supply level requirements valued at over \$192 million.

#### HOW INVENTORY LEVELS ARE DETERMINED

The D062 system computes wholesale stock levels and material requirements for consumable items from worldwide demand history. If for some reason the demand history cannot be used, item managers manually compute the requirements. The D062 system develops reorder levels, which indicate when additional stocks should be ordered. The system also provides a buy computation that the item managers review to decide the quantities to buy.

The D033 system is used to manage and control the receipt, storage, and issuance of parts used to support depot maintenance, other AFLC activities, and tenant organizations located at each air logistics center. When a depot user requisitions consumable parts, the quantity is recorded as a demand in the D033 system. Periodically, the D033 system inputs these demands

into the D062 system where they are recorded and used as part of the worldwide demand history on which requirements and reorder levels are based.

The D033 system also computes stockage objectives for the depot activities and inputs them to the D062 system which records them as depot supply levels. (See fig. 1.)

#### OBJECTIVES, SCOPE, AND METHODOLOGY

Our objectives were to determine (1) how depot supply levels were included in Air Force-wide requirements and (2) the validity of the data elements used to compute depot supply levels.

We reviewed Air Force policies, procedures, and practices used at the following air logistics centers for computing the depot supply level requirements.

--Oklahoma City Air Logistics Center  
Tinker Air Force Base, Oklahoma

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

--San Antonio Air Logistics Center  
Kelly Air Force Base, Texas

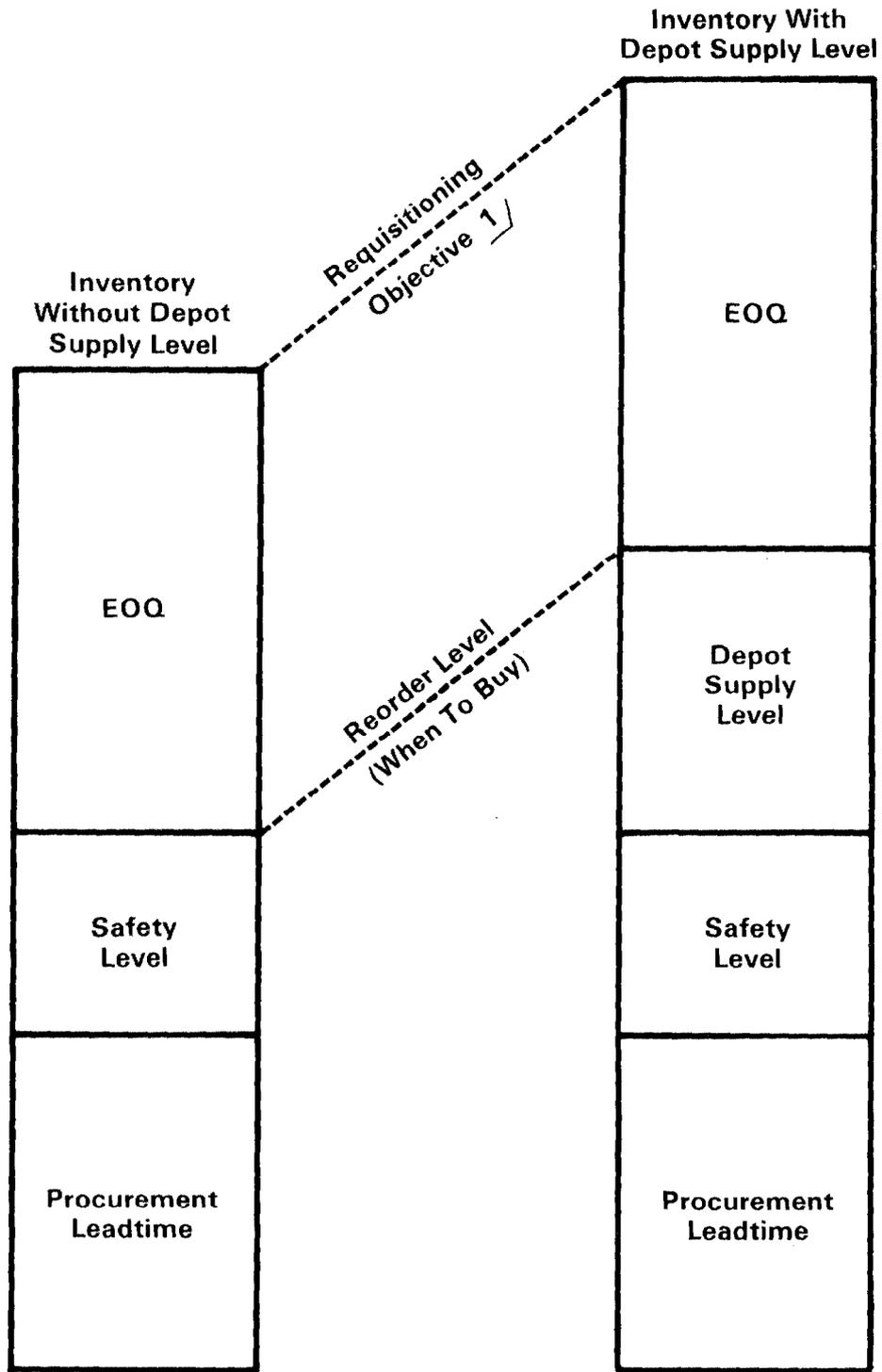
We interviewed AFLC and center officials responsible for carrying out these activities and made computer analyses to select random samples.

We obtained computer tapes from all five air logistics centers as of March 31, 1983. We analyzed the D033 tapes and identified 75,342 items with depot supply levels valued at \$192.5 million. Of this amount, \$126.9 million was demand-based, \$22.3 million was non-demand-based, and \$43.3 million was attributable to backorders.

This report discusses the results of our review of the demand-based depot supply levels and backorders. We did not evaluate the non-demand-based depot supply levels in the D033 system. To determine whether there was a duplication of requirements between the D062 and demand-based requirements in the D033 system, we analyzed in detail how depot maintenance requirements are used in each. For items in which the demand-based portion of the depot supply level duplicated the depot maintenance portion of the Air Force-wide requirements in the D062 system, we examined the tapes from all five centers and identified 100 percent of the items with duplicative quantities. We multiplied these quantities by their respective unit cost to determine the dollar value of the duplication. Inventory holding costs were computed using an AFLC-provided factor expressed as a percent of inventory costs by logistics centers.

FIGURE 1

**EFFECT OF DEPOT SUPPLY LEVEL  
REQUIREMENTS ON INVENTORY LEVELS**



1 | War reserve materials and backorder situations are not shown for the sake of clarity. Such factors do not affect how the system works. This chart shows the effect of depot supply levels in increasing inventory and reorder levels.

We also determined the validity of the data elements used to compute depot supply level requirements, but limited our examination to Oklahoma City. At Oklahoma City, we analyzed in detail the depot supply levels for the 150 items selected for our sample. If the individual data elements lacked adequate justification and, therefore, resulted in excessive quantities, we determined the impact on inventory levels and future procurements by multiplying the excess quantity by the unit cost for the item and, when appropriate, by the daily demand rate. This computation was designed to provide a measure of how much the supply level requirements were overstated.

The system for computing requirements for system support stock fund items (DO62 system) automatically receives input from several subsystems, such as the DO33 system and the Acquisition and Due-In System Requirements Computation (JO41 system). We considered it impractical to analyze each subsystem to determine the reliability of data included in the DO62 system. As an alternative, we determined that our universe data generally agreed with Air Force economic order quantity (EOQ) requirements inventory analysis reports for March 31, 1983, and we interviewed item managers and supervisors responsible for our sample items who confirmed the accuracy of our sample data. Thus, we insured that we used the same data that the Air Force uses in managing these items. Our review was performed in accordance with generally accepted government audit standards and covered the period January to October 1983.

## CHAPTER 2

### DEPOT SUPPLY LEVEL

#### REQUIREMENTS ARE EXCESSIVE

The air logistics centers routinely compute, buy, and maintain excessive levels of spare parts for maintenance activities. This occurs because many depot supply level requirements duplicate Air Force-wide requirements computed in the D062 system. The effect of duplication is compounded because some of the depot supply level requirements are overstated.

#### DEPOT SUPPLY LEVEL

##### REQUIREMENTS ARE DUPLICATED

As of March 31, 1983, spare parts requirements at the five air logistics centers included about \$192.5 million for depot supply levels. About \$119 million of this total was duplicative, and consequently excessive. Excessive depot supply level requirements result in unnecessary investment in inventory and increased holding costs. Annual holding costs on the \$119 million, which the Air Force estimates at 16 to 23 percent of inventory value a year, are about \$21.5 million. These excessive inventories and holding costs for the five logistics centers are shown in appendix I.

The D062 Air Force-wide requirements for consumable spare parts are computed automatically on the basis of historical demands. Under some circumstances, item managers compute the requirements manually on some other basis. Such circumstances include, for example, the need to support new projects. Under either method, depot supply level requirements are included twice in Air Force-wide requirements. Of the \$119 million, \$115.4 million was duplicated in the demand-based requirements of the D062 system and \$3.6 million was duplicated in the non-demand-based requirements of the D062 system.

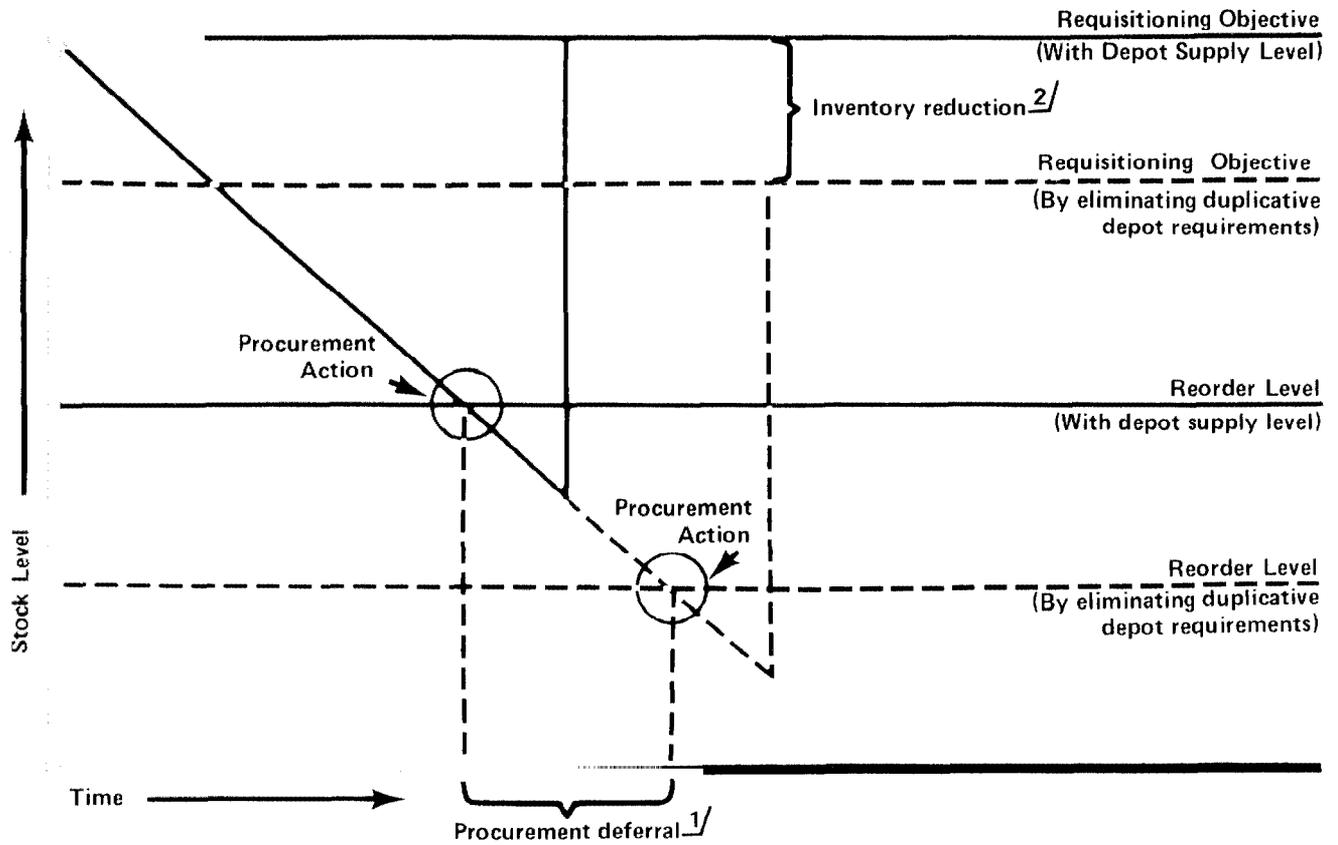
Both the D033 and D062 computer systems use demand history of the depot repair activity for estimating future requirements. The duplication in requirements occurs when the depot supply level calculated by the D033 system is added to the Air Force-wide requirements computation in the D062 system which already includes maintenance requirements. In the D062 system, this duplication increases the reorder level and causes the item manager to order additional quantities earlier than necessary. Therefore, Air Force investment in inventory and attendant holding costs are increased. (See fig. 2.)

#### Duplicated demand-based requirements

Analysis of Air Force-wide requirements computed by the five centers showed that the depot supply level duplication had

FIGURE 2

ILLUSTRATION OF THE EFFECT OF  
ELIMINATING DUPLICATIVE DEPOT REQUIREMENTS  
IN WHOLESALE REQUIREMENTS COMPUTATIONS



LEGEND: 1/ Eliminating duplicative depot requirements results in a deferral of procurement action. The time involved depends on the number of days worth of supply that makes up the depot supply level.

2/ Eliminating duplicative depot requirements results in a one-time inventory reduction in the amount of the unnecessary depot requirements.

increased demand-based requirements about \$115.4 million. The following examples illustrate the impact of using the same depot maintenance requirements twice in the demand-based computations.

--Stock No. 2915-00-992-7652 RU, valve assembly. Depot maintenance was the sole user of this part. On April 6, 1983, the D033 system used demands from maintenance during the previous 12 months to compute a depot supply level of 20 items. The same demands were also used in the D062 system to compute the Air Force-wide requirements. The depot supply level requirements were then added by system logic to the D062 computed requirements which already included maintenance requirements. As a result, the item's reorder level and inventory requirements were unnecessarily increased by 20 items costing \$8,122.

--Stock No. 2915-00-985-4616 PQ, body assembly. Depot maintenance was the sole user of this part. On April 6, 1983, the D033 system used demands from maintenance during the previous 12 months to compute a depot supply level of one item. The same demands were also used on the D062 system to compute the Air Force-wide requirements. The depot supply level requirements were then added by system logic to the D062 computed requirements which already included maintenance requirements. As a result, the item's reorder level and inventory requirements were unnecessarily increased by one item costing \$1,718.

The Oklahoma City center was aware of the duplication and was manually adjusting requirements to remove the depot supply levels before buying some items. This adjustment was made when known future requirements for maintenance were greater than requirements supported by past demand history causing manual computation of requirements. The center had reduced requirements about \$7.9 million as of March 31, 1983, by eliminating the depot supply level for these items. The other two centers we visited (Ogden and San Antonio) were not removing depot supply levels under similar circumstances. We did not determine whether similar adjustments were made at Sacramento and Warner Robins.

#### Duplicated non-demand-based requirements

Analysis of Air Force-wide requirements computed by the five centers showed that the depot supply level duplication had increased non-demand-based D062 requirements for special projects, time change items, and insurance items about \$3.6 million. The impact of including depot supply levels in non-demand-based D062 requirements computations is shown below.

Oklahoma City item managers manually computed total Air Force-wide requirements for 13 items to fully support a special project in depot maintenance. Ogden item managers computed requirements for eight depot time change items, to cover 100 percent replacement (plus a cushion for defective parts). After the forecasts for these 21 items were input to the D062 system, programming logic added the depot supply level requirements computed by the D033 system. This duplicates requirements and overstates reorder levels about \$3.4 million.

Ogden and San Antonio item managers added depot supply levels to insurance levels causing overstated requirements and excessive inventory levels. Levels for insurance items are computed to cover total requirements for such items and according to Air Force regulations, should be kept to a minimum. We identified 67 Ogden insurance items with overstated requirements totaling \$194,800 and 25 San Antonio insurance items with overstated requirements of about \$62,900.

Analysis of Sacramento and Warner Robins computer tapes did not disclose significant problems with non-demand-based D062 requirements.

Action taken to correct  
non-demand-based requirements

Of the \$119 million in excessive depot supply level requirements, \$115.4 million was attributable to demand-based items and \$3.6 million to non-demand-based items. Oklahoma City and Ogden center officials directed item managers to remove duplications of \$3.6 million from non-demand-based, Air Force-wide requirements. Yearly holding costs associated with the corresponding inventory reduction amounts to about \$616,000. Although San Antonio officials agreed depot supply levels overstated requirements by \$62,900 for 25 non-demand-based insurance items, they said the amounts involved were not significant enough to warrant corrective action. Since the major issue of duplication requires action at Headquarters, Air Force Logistics Command, or higher, center officials took no action to eliminate the \$115.4 million in excess requirements attributable to demand-based items.

OVERSTATED DATA ELEMENTS USED  
IN DEPOT SUPPLY LEVELS

Tests at the Oklahoma City center showed that depot supply level requirements computed by the D033 system were overstated. These requirements are overstated because they are based on

- inflated order and shipping times,
- unwarranted safety levels, and

--invalid backorder demand data.

We did not perform similar tests at the other centers; therefore, we cannot estimate how much the centers were overstating their need for depot used items. However, all the centers use the same supply management systems and are guided by uniform policies issued by AFLC. Therefore, the Oklahoma City results indicate that depot level requirements may be overstated by all air logistics centers.

Our tests showed that overstated requirements at the Oklahoma City center were \$15.8 million. (See app. II.) Since these overstatements were included in the depot requirements added to the reorder level in the Air Force-wide requirements system, they increased the amount of the excess caused by the system programming logic. Correcting the programming logic can prevent future overprocurements by the D062 system. Nevertheless, depot supply levels in the D033 system would remain overstated, causing too many assets to be allocated to the depot supply account and too few assets in the depot additive account.<sup>2</sup> Although not automatically resulting in excess buys, unnecessary backorders can result when overstated depot supply levels cause too few assets to be available for issue to bases from the depot additive account.

#### Many order and shipping times are inflated

Order and shipping times used in the depot supply level computation represent the number of days required to record the allocation of parts from one depot account to another. At each of the five logistics centers, parts to cover the requirements computed by the D033 and D062 systems are physically located in the same warehouse. Therefore, the order and shipping function for depot supply is entirely an accounting transaction and does not involve the physical movement of items. Normally, no more than 1 or 2 days is required to complete the accounting transfer.

The D033 system is programmed, however, to compute the quantity of parts needed during the actual time elapsed between the date a transfer is initiated and the date it is completed. This practice overstates the order and shipping quantity when abnormal delays are experienced in making the transfer. These delays occur (1) if items are held for higher priority requirements or (2) if the center is out of stock. When such delays

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<sup>2</sup>Base requisitions are filled from assets allocated to the depot additive account. Maintenance requisitions are filled from assets allocated to the depot supply account.

occur, adjustments may be needed within the D062 system to recognize the condition causing the delay. However, if such delays are allowed to increase order and shipping time within the D033 system, overstated requirements will occur.

The following case illustrates how inclusion of an abnormal delay will distort the order and shipping time and result in excessive requirements.

--Stock No. 2840-00-947-2470 PQ, blade. On June 23, 1982, the D033 system initiated transfer of 168 blades to the depot supply account. At that time, the wholesale system was out of stock and the entire quantity was backordered. Corrective action at the wholesale level was completed 141 days later when the items were available through stock replenishment action. The D033 system recorded the maximum allowable transaction time of 99 days for use in computing subsequent depot supply levels.

On March 31, 1983, the depot supply level was 251 items, including 116 items for the quantity needed while recording a transfer from one depot account to another. By using the excessive 99 days transaction time--based on an out-of-stock situation--depot supply level requirements were overstated by 114 items costing \$11,962. The next account transfer was initiated on June 10, 1983, and was completed in 1 day.

Order and shipping time used to compute depot supply levels at the Oklahoma City center was based on circumstances similar to those described above in 51 percent (76) of the cases reviewed. Depot supply levels for those 76 cases were overstated by \$2.7 million. Projecting our sample results, we estimate that using abnormal delays in calculating order and shipping times resulted in excessive depot supply level requirements of \$11.4 million at the Oklahoma City center.

#### Safety levels are not warranted

Safety levels used in the depot supply level are maintained to provide insurance against stock-out conditions caused by fluctuations in order and shipping times and demands while transferring assets from one depot account to another. Because no physical movement of parts is required for the transaction, little variation in time occurs. Moreover, a safety level is computed by the D062 system which considers the aggregate demand variation, including variation in maintenance demands. Therefore, safety levels in the D033 system appear unwarranted in view of the safety levels computed by the D062 system. For example:

--Stock No. 2840-00-533-5416 RU, blade. On March 31, 1983, the D062 system computed a safety level of 1,348 items

costing \$60,889. At the same time, the D062 system included in its reorder level a depot supply level of 414 items. This quantity included a safety level of 9 items. Inclusion of the 9 items, which cost \$407, appears unwarranted in view of the 1,348 items already being maintained as safety levels.

Unwarranted safety levels were computed for 59 percent (89) of the Oklahoma City cases reviewed, which overstated depot supply level requirements by \$630,000. Projecting our sample results, we estimated that unwarranted safety levels resulted in excessive depot supply level requirements at the Oklahoma City center of \$4.4 million.

Invalid backorders cause  
inflated depot supply levels

When items for routine maintenance requirements are not available in depot inventory, a backorder is placed against the supply system. When maintenance activities order the items over and over again, instead of waiting for their initial order to be filled, invalid backorders occur and backorder quantities are overstated. Because backorder quantities are added to the depot supply level, requirements are overstated.

Oklahoma City center management said that invalid backorders overstate requirements and are a major cause of the condition we previously reported<sup>3</sup> that the centers had quantities on contract in excess of their needs. This occurs because backorders are added to contract quantities. Once maintenance receives the parts initially requisitioned, it cancels the duplicate requisitions. This reduces the depot supply level and causes contract quantities to exceed actual requirements.

In an attempt to reduce unnecessary procurements and excess stocks, the Oklahoma City center established a 75-day ceiling on the depot supply level. This required item managers to manually limit the purchased depot supply level requirement to the estimated quantity needed for a 75-day period. Center officials said that this limitation would not prevent invalid demand transactions but would reduce the problems they cause.

As of March 31, 1983, about \$43.3 million in backordered requisitions from maintenance activities were included in the five centers' depot supply level requirements. We could not estimate with any reliability the number of these requisitions

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<sup>3</sup>Continued Improvements Needed in Air Force Procedures and Practices for Identifying and Canceling Excess on Order Stocks (GAO/PLRD-83-36, Feb. 7, 1983).

which were duplicates that maintenance requisitioners issued when earlier requisitions were not filled.

We found, however, that Oklahoma City was using backorders as a means of documenting robacks--that is, removing needed parts from items in an earlier stage of repair and using them for current needs. Oklahoma City officials said this procedure can be repeated a number of times. This practice will result in overstated requirements and excessive inventories.

#### CONCLUSIONS

Of the \$119 million in excessive depot supply level requirements that we identified, the air logistics centers took action to eliminate about \$3.6 million. We believe the Air Force can further reduce inventories and reduce or delay procurement obligations by about \$115.4 million and reduce inventory holding costs by about \$21 million. This can be done by using depot requirements only once in the requirements determinations process. We also believe the allocation process can be improved by correcting the baseline data used to compute depot supply levels. Additionally, invalid backorders, such as those caused by robacks, need to be eliminated.

#### RECOMMENDATIONS

We recommend that the Secretary of the Air Force direct the Commander, Air Force Logistics Command, to take the following actions to insure that inventory investment is limited to the level needed to support mission requirements.

- Correct the logic in the interface of the D033 and D062 systems to prevent the duplication of depot requirements.
- Reduce the overstated depot supply levels by:
  - Excluding atypical data, which unduly impacts order and shipping time quantities, from actual time required to allocate assets from one depot account to another.
  - Eliminating unwarranted safety levels in estimating depot supply level requirements.
  - Eliminating the practice of using backorders to document roback actions.

#### AGENCY COMMENTS AND OUR EVALUATION

On August 2, 1984, we discussed a draft of this report with Department of Defense officials to obtain their official oral comments. These officials agreed that depot level maintenance requirements were counted twice; however, they did not agree that this practice overstated requirements and, therefore,

resulted in excessive inventories. They contend that the Air Force system precludes this by automatically applying depot assets as an offset against requirements and that our analysis did not consider this offset. Based on this position, they also stated that Oklahoma City's manual adjustments were improper.

Our analysis did recognize this offset. Proper supply management practices require assets to be offset against requirements when determining the need for procurement actions. Within the Air Force, this occurs when the logic in the D062 system compares the asset level with the reorder level. If assets are equal to or less than the reorder level, the system tells the item manager to buy more assets. As noted on page 5, however, by computing the same requirements in two separate systems and then adding these requirements together, the Air Force has unduly increased both the reorder level and the inventory level. In our opinion, the practice of offsetting overstated requirements with assets acquired to support those requirements does not remedy an excessive inventory position. Assets are bought and carried in inventory merely to cover a higher reorder level. Therefore, we find no basis for revising our recommendation to prevent duplication of depot requirements.

With regard to overstated depot supply levels, Defense officials took exception to our draft proposals to limit order and shipping times to 1 or 2 days and to eliminate safety levels in estimating depot requirements. We have revised the report, based on their comments, to clarify our position and recommendation; however, we still believe these factors are overstated and result in excessive inventories.

DOD believes our draft proposal to limit order and shipping times in the D033 system to 1 or 2 days is arbitrary and that using actual experience to derive order and shipping times is more realistic. We agree that using actual experience is appropriate, but we maintain that atypical data that unduly impacts order and shipping time quantities should not be used to compute average order and shipping times. Our proposal was based on the fact that 1 or 2 days represents the time required to complete the accounting transaction that allocates assets from one depot account to another. We have revised our recommendation to emphasize our view that atypical data be excluded from order and shipping time computations.

In commenting on our proposal to eliminate safety levels in estimating depot supply levels, DOD stated that the safety level in D033 applies to retail stock, and the safety level in D062 applies to wholesale stock. Therefore, they said the separate safety levels are necessary.

We recognize that the Air Force operates under a two-echelon system and that safety levels are authorized for each under DOD instructions. However, this structure should not be

the determining factor for two safety levels unless it involves physical movement of assets. Rather, safety levels within the Air Force's system should be established to consider depot user requirements only once. As stated earlier, the allocation of assets to the depot supply account involves no physical movement of assets, only an accounting entry in the computer systems. Also, safety levels exist in the D062 system which should be sufficient to keep requirements and inventory levels at a minimum. In this context, stocking an additional safety level quantity in the D033 system appears unwarranted. We have clarified our recommendation to point out that the Air Force should eliminate safety levels where they appear unwarranted.

DOD agreed with our position that invalid backorders cause inflated depot supply levels. DOD stated that the problem had also been noted by the Air Force Audit Agency and that the Air Force has initiated a system change to correct the problem. Pending implementation of the change, manual actions are being taken to monitor the situation and effect corrective action where appropriate.

DUPLICATIVE DEPOT SUPPLY LEVELS  
INCLUDED IN WHOLESALE REQUIREMENTS

<u>Centers</u>	<u>Value</u>	<u>Holding costs</u>	
		<u>Factor</u> (percent)	<u>Value</u>
Oklahoma City	\$ 45,663,998 <sup>a</sup>	16	\$ 7,306,240
San Antonio	28,327,898 <sup>b</sup>	18	5,099,022
Sacramento	7,691,185	23	1,768,973
Ogden	11,152,760 <sup>c</sup>	19	2,119,024
Warner Robins	<u>26,177,289</u>	20	<u>5,235,458</u>
	<u>\$119,013,130</u>		<u>\$21,528,717</u>

<sup>a</sup>Includes \$2.4 million in duplications for non-demand-based depot requirements. This figure excludes the \$7.9 million in duplications manually removed from requirements.

<sup>b</sup>Includes \$62,900 in duplications for non-demand-based requirements.

<sup>c</sup>Includes \$1.2 million in duplications for non-demand-based requirements.

ESTIMATED EFFECT OF USING  
OVERSTATED DEPOT SUPPLY LEVELS  
AT OKLAHOMA CITY AIR LOGISTICS CENTER

<u>Type of effect</u>	<u>Sample</u>	<u>Projected to universe</u>	<u>Estimated range at 95-percent confidence level</u>	
			<u>Low</u>	<u>High</u>
Excessive order and shipping times	\$2,722,709	\$11,392,798	\$6,208,005	\$16,577,591
Unwarranted safety levels	<u>630,435</u>	<u>4,359,001</u>	<u>2,485,402</u>	<u>8,718,002</u>
Total	<u>\$3,353,144</u>	<u>\$15,751,799</u>	<u>\$8,693,407</u>	<u>\$25,295,593</u>

Stratification used in sample

Total consumable items in EOQ requirements computation system

85,243

GAO universe (depot supply levels exceeding \$2,499)

3,777

GAO sample strata:

Depot supply level of \$2,500 to \$24,999

Universe

3,279

Sample

70

Depot supply level of \$25,000 to \$249,999

478

60

Depot supply level of \$250,000 and over

20

20

Total

3,777

150



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