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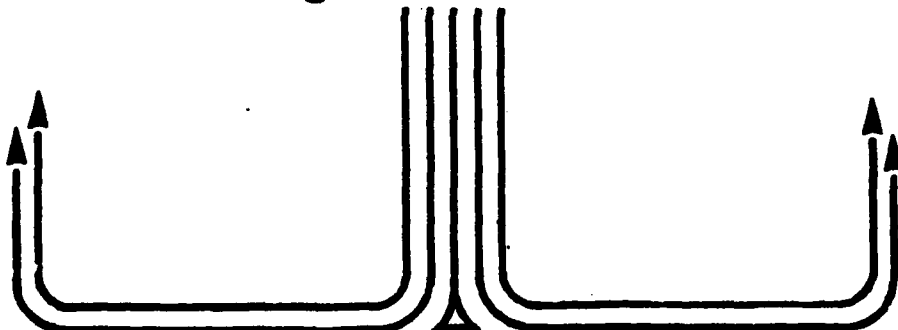
## STUDENT REPORT

COMPARISON OF INVENTORY ADJUSTMENT  
POLICIES

BETWEEN AFLC AND PRIVATE INDUSTRY

MAJOR RONNE G. MERCER 88-1820

*"insights into tomorrow"*



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**REPORT NUMBER** 88-1820

**TITLE** COMPARISON OF INVENTORY ADJUSTMENT POLICIES BETWEEN  
AFLC AND PRIVATE INDUSTRY

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Submitted to the faculty in partial fulfillment of  
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## PREFACE

A major concern at any Air Logistics Center operated by the Air Force Logistics Command is inventory accuracy. To insure accuracy is maintained requires the actions of numerous people who are responsible for receiving, storing, issuing, and maintaining the inventory, as well as those who are responsible for insuring the accountable records are updated. A key component of inventory accuracy is the inventory adjustment process which is designed to insure the record balances and the warehouse balances agree. Due to current AFLC policies, however, this is not always accomplished.

This report reviews current inventory adjustment policies in AFLC, as well as recent comments and criticisms levied by various governmental investigation agencies. Also reviewed are inventory policies from private industrial companies which responded to a solicitation for assistance. AFLC and private industry policies are compared and subsequent recommendations are provided that may help the AFLC supply community achieve a higher degree of inventory accuracy.

This study could not have been accomplished without the invaluable assistance provided by Mr. Fred Bible, HQ AFLC/DSS and the timely responses received from the Pratt and Whitney, General Electric, and Caterpillar Tractor companies. Further assistance provided by Major Charles Holsen helped round out this final product.

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## ABOUT THE AUTHOR

Major Ronne G. Mercer enlisted in the Air Force in 1966 serving as an inventory management specialist at bases in California, Texas, and Turkey. In 1973 Major Mercer was selected for the Airman Education and Commissioning Program (AECP), receiving a Bachelor Degree in Business Administration from Southwest Texas State University in 1974. Upon commissioning as a Distinguished Graduate from Officers Training School in 1975, Major Mercer completed Titan II missile launch officer training, receiving Honor Graduate awards at both Sheppard AFB, Texas, and Vandenberg AFB, California. He served for nearly four years as a Deputy Missile Combat Crew Commander (DMCCC), squadron and wing instructor DMCCC, Missile Combat Crew Commander, and Chief, Scheduling Branch. Selected for an Air Force Institute of Technology masters degree program in 1979 Major Mercer graduated in 1980 with a Master of Science Degree in Logistics Management. He then returned to the supply career field with assignments to California, Saudi Arabia, and Texas where he participated in numerous activities which have had significant impacts on the functions in which he has been involved. His most recent job was in the Directorate of Distribution at the San Antonio Air Logistics Center where he was selected as the 1987 AFLC Senior Supply Manager of the Year. Upon completion of his assignment in the 1988 ACSC class, Major Mercer will be assigned as the supply squadron commander at Malmstrom AFB, Montana

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## EXECUTIVE SUMMARY

Part of our College mission is distribution of the students' problem solving products to DoD sponsors and other interested agencies to enhance insight into contemporary, defense related issues. While the College has accepted this product as meeting academic requirements for graduation, the views and opinions expressed or implied are solely those of the author and should not be construed as carrying official sanction.

REPORT NUMBER 88-1820

AUTHOR MAJOR RONNE G. MERCER, USAF

TITLE COMPARISON OF INVENTORY ADJUSTMENT POLICIES BETWEEN  
AFLC AND PRIVATE INDUSTRY

I. Purpose: To provide a comparison of the inventory adjustment policies used by AFLC to the policies used at selected industrial companies in the private sector.

II. Problem: Due to a recent revision of AFLC's inventory adjustment policy the tendency to overstate its inventory position is increased. Policies employed within private industry doing similar business as AFLC may lend themselves to use by AFLC and thus preclude the problem created by not adjusting all discrepant inventory problems.

III. Data: Current AFLC policy is based on recent reports provided by the General Accounting Office and the Air Force Audit Agency, as well as studies conducted by the Arthur Young Company. The reports and studies focused on inventory accuracy and processes to facilitate the timeliness of adjustments to accountable records. The current AFLC process uses a sample method to ascertain inventory accuracy. Under this method sample inventories which fail to meet a predetermined level of accuracy lead to wall-to-wall inventories of items in the segment sampled.

## CONTINUED

For both sample and wall-to-wall inventories, however, certain items may have discrepancies between the warehouse balance and the record balance and no adjustment action will be taken. This occurs whenever the discrepancy is less than ten percent of the record count and the dollar value of the discrepancy is less than \$5,000. Three of nine private sector companies responded to a solicitation for information about their inventory adjustment policies. Although this limited response reduces the depth of analysis provided, it did reflect differences between the private and military sectors. Private industry and AFLC both inventory all stocks, either through sample or wall-to-wall methods, to insure complete coverage within prescribed time frames. Research into causes for discrepancies was also shared by both sectors. Some differences occur in the determination of level of research. Research within AFLC is predicated upon dollar value of the discrepancy, whereas the prime determinant for research within the private sector is the senior inventory manager. Also, the cost accounting standards followed by the private sector preclude the opportunity to not make adjustments when inventory discrepancies exist. Usually, though, the senior inventory manager makes the final determination as the validity of a presumed discrepancy. A comparison of 1986 inventories conducted by Pratt and Whitney and by AFLC reflect major differences in the number of items inventoried with little difference in the accuracy results.

IV. Conclusions: The size and complexity of an Air Logistics Center operation make it very difficult to achieve a reliable comparison with private sector industrial companies. Most private companies have reduced their on hand inventories tremendously by ordering needed parts from suppliers to be delivered on a staggered or as needed basis. Also, the accounting requirements of a profit-centered firm differ from those of a government funded operation which, in turn, inhibits the opportunities for tradeoffs between accuracy and timeliness.

V. Recommendations: Some elements used in private industry may be applicable to the AFLC environment. Incentive programs which encourage improved accuracy could be implemented. Increased responsibility could be passed to unit and section managers to determine the need for and timeliness of inventory adjustments. Further in-depth studies may be needed to insure the tradeoffs currently practiced are not negatively impacting depot maintenance production schedules or the ability to sustain readiness in the field.

## Chapter One

### INTRODUCTION

#### PURPOSE

This project provides a response to a request from the Air Force Logistics Command (AFLC) and more specifically, the Directorate of Distribution/Material Processing Division at the San Antonio Air Logistics Center (SA-ALC) located at Kelly AFB, Texas. (6:36) The SA-ALC input requested a comparison of inventory management processes between private industries' inventory systems and the Air Force's wholesale inventory system. This project, therefore, will compare inventory practices conducted by various private industrial manufacturing companies to inventory practices conducted by Air Logistics Centers within AFLC as prescribed by Department of Defense, Air Force, and AFLC regulations and policies. A review of inventory processes conducted by profit-oriented operating companies should result in viable suggestions for improvements in the complex inventory system used within AFLC to manage weapon system spare parts and may further lead to correction of past inventory concerns identified in General Accounting Office (GAO) and Air Force Audit Agency (AFAA) reports. A subjective evaluation of private industry practices will result in recommendations to AFLC for consideration for further study or for implementation, whichever may be applicable.

#### SCOPE

Although the SA-ALC request was for a broad comparison of inventory processes, such as inventory counting procedures and inventory accuracy determination, this project will be limited to a comparison of inventory adjustment policies and practices. This limitation is necessary due to project time and length constraints established by the Air Command and Staff College. Other facets of inventory, such as storage, counting, and reporting, will be addressed only for background or clarification purposes. Inventory adjustments were selected for study because a June 1986 change to the AFLC inventory

adjustment policy created a concern about the credibility of inventory accuracy as a result of the change.

#### METHODOLOGY

AFLC regulations are used to describe the current inventory adjustment policies employed by AFLC's Air Logistics Centers. Concerns and potential problems resulting from applying current policies which have been identified by evaluation agencies such as the GAO and the AFAA are also addressed in this project. A total of nine private industrial manufacturing companies were requested to provide information about their inventory practices, specifically concerning their policies on inventory adjustments. These companies were selected based on the similarity of their operations to those performed at an Air Logistics Center. Of the nine companies petitioned, only three responded with the requested information. Their responses were reviewed and compared to current AFLC policies and GAO/AFAA concerns for possible adoption and implementation.

#### LIMITATIONS

This project was dependent upon the cooperation of the private industrial companies petitioned to provide information about their internal operating environment and inventory processes. Due to the lengthy nature of ongoing audits and evaluations conducted by the GAO and the AFAA, some source information is only available in draft form. Additionally, the scope of this project was limited by time and project constraints levied by the Air Command and Staff College, as previously indicated.

#### OVERVIEW

This study will first provide a review of the current AFLC inventory process. This information has been obtained from a review of the most recent command regulations and includes a description of the operating environment, inventory process, and the various categories and criteria for adjustments. Additionally, a review of concerns about the current and past processes provided through Air Force Audit Agency and General Accounting Office investigations will be accomplished. The study will then focus on the inventory processes conducted by the Pratt and Whitney, Caterpillar, and General Electric companies with emphasis on their inventory adjustment policies. Finally, comparisons

will be made between the AFLC and private industry processes. Recommendations which may be derived from the comparison will be provided for AFLC review and possible implementation. To begin, however, a baseline is required. This will be provided by reviewing current policy.

## Chapter Two

### CURRENT INVENTORY PROCESS

#### AFLC INVENTORY ENVIRONMENT

Inventory within AFLC is more than just a periodic measurement of balances with corresponding corrections to insure physical balances agree with accountable record balances. It is also a management tool which helps identify problems with the logistics system processes and procedures to be taken by management to prevent future recurrence of the problems. The objective for the program is to produce a high level of inventory accuracy in terms of units of items and dollar value of the items. (2:4) Once discrepancies are found and noted the inventory adjustment policy comes into play to provide a new inventory point of departure.

The AFLC inventory consists of more than 2 million different consummable and nonconsummable items valued at more than 18 billion dollars. (4:I-4,5) These items are scattered across the United States at five Air Logistics Centers (ALC) which have the responsibility for receiving, storing and distributing the items they maintain to Department of Defense activities worldwide. In many instances weapon systems critical to the defense of the United States may be inoperable pending availability and receipt of an item from one of the ALCs. The timely accuracy of the inventory position could well spell the difference between mission success and mission failure in some of the far reaches of the world. Additionally, inventory inaccuracies cause unnecessary expenditures of government funds to procure replacement items that may or may not be needed.

To maintain an accurate inventory AFLC conducts two types of scheduled inventories. Sample inventories are conducted on a cyclic basis to ensure all items are inventoried at least once every three years. Complete or wall-to-wall inventories are conducted on special category items, such as classified items, on a periodic, recurring basis. (2:11) Additionally, a wall-to-wall inventory is conducted when a sample inventory fails. For example, if a sample inventory of 500 F100 engine parts failed to meet the

minimum AFLC standard for accuracy, then all 5000 F100 engine parts would have to be inventoried. Besides scheduled inventories there are numerous occasions when unscheduled inventories are performed on individual items. This occurs when the computer releases an item for issue and the storage location has an insufficient balance to meet the requirement. This creates a denial which necessitates an unscheduled special inventory condition. This, in turn, must be investigated and adjusted to align the actual warehouse balance and accountable records. (2:12)

### INVENTORY PROCESS

The inventory process involves the actual physical count of items, a comparison of this actual count to the accountable record balance, and the adjustment of the records as necessary so that the actual warehouse balance and the accountable records are in agreement. (2:15) The process involves the concerted effort of the entire Distribution team, consisting of base item managers, warehousemen, and inventory analysts, to insure accurate counts are conducted and verified and that adequate research is performed to resolve discrepancies and make necessary adjustments.

Research is performed by the base inventory managers to determine the cause of discrepancies between accountable record balances and actual warehouse balances. Two types of research are performed. Validation research is primarily used to determine if the discrepancy was caused by transactions occurring between the date the record was frozen for inventory and the date the balances were compared. A cursory check of transactions usually will be sufficient for an adequate determination of cause. Causative research is an in-depth research process in which accountable transactions for the previous twelve months are reviewed. (2:27; 8:9) In many instances physical recounts and reviews of manually maintained registers and logs identify errors in posting or counting. The type of research to be performed is a function of the unit and dollar variances discovered in the discrepant record. Base inventory managers are allowed a standard fourteen days to resolve the discrepancy regardless of the dollar value or unit variance. The inventory manager then releases the record for further transaction processing.

### ADJUSTMENT CATEGORIES/CRITERIA

Three major categories of adjustment can be determined

from reviewing applicable regulations and reports. (2:27) First, a category of discrepancies which calls for no research and no adjustment. The basic criteria for this category is for the individual discrepancy to be less than or equal to ten percent of the total units on accountable records and have a dollar variance threshold of less than \$5,000. Prior to 1986 items that had a dollar discrepancy of less than \$800 were automatically adjusted with no research. A study conducted by the Arthur Young Company concluded that automatic adjustments without research should not be accomplished. They concluded that "if the variance is not significant enough to initiate research into the cause of the discrepancy, then the discrepancy isn't of enough significance to merit changes to the accountable record." (4:III-23) Following the Young report AFLC conducted tests to determine the soundness of the report's recommendations. Upon successful completion of the tests AFLC implemented recommendations espoused by the Young report.

A second major category of adjustment involves the use of validation research only. As described earlier this is a cursory review of transactions occurring between the record freeze date and the balance comparison date. All noncontrolled items with a unit variance of less than or equal to ten percent and a dollar discrepancy falling between \$5,000 and \$16,000 meet this criteria. Also within this category are those items which were below \$5,000 but exceeded the ten percent unit variance criteria thereby eliminating them from the no research/no adjustment category.

The third major category of adjustment is for items requiring causative research or research to determine the reason why the discrepancy exists. The in-depth research required within this category is for all items exceeding \$16,000 in discrepancies regardless of unit variance. (2:27) Also, all special case items such as classified or sensitive items fall within this category and, whenever circumstances such as fraud or theft are suspected, causative research may be requested for any inventory discrepancy. Since each type of research requires different amounts of time involvement and numbers of personnel involved to resolve the discrepancy, the categories have been established to maximize benefits versus costs. In all cases, however, samples are performed within each category to substantiate continuation of these arbitrarily assigned categories. (2:28)

## AFAA/GAO CONCERNS

The tremendous dollar value of the services' inventories, estimated to exceed \$68 billion, make any inventory problem one of more than casual interest to the major watchdogs of public interest. (8:4) Both the Air Force Audit Agency (AFAA) and the General Accounting Office (GAO) have, within the past five years, conducted investigations into the inventory practices of the Air Force. The GAO has also reviewed inventory practices conducted by our sister services, the Army, Navy, and Marines, as well as the Department of Defense inventory function, the Defense Logistics Agency (DLA). Their concerns address many of the facets of the inventory process and, although positive trends have been noted in overcoming deficiencies, a continued emphasis has been shown as evidenced by the ongoing efforts of the GAO to address the inventory situation within the Air Force. A brief review of both AFAA and GAO concerns is provided.

An AFAA report released in September, 1984, indicated that although efforts to update directives, improve inventory methods, and establish appropriate working groups had been initiated, problems still existed in the accuracy of inventory records and that effective inventory management was still being impaired. (1:2) Among the problems cited by the AFAA were inaccurate reporting of inventory value, inventory adjustments, and the rate of inventory count accuracy. In conjunction with these problems were errors associated with reconciliation of interservice assets, poor research into causes for variances, lack of adequate quality reviews, and less than adequate guidance from higher headquarters. (1:2) Of particular concern was the lack of quality reviews for inventory variances where no inventory adjustment was required or when the adjustment was less than \$10,000. (1:4) A current audit is ongoing to evaluate the progress made to alleviate these concerns, however, the results were not available for this report. (14:--)

As part of a review of the Navy's progress in improving its inventory problems, the GAO also looked into inventory inaccuracies in the Army, Air Force, and Defense Logistics Agency systems. As released in their November, 1983, report, over one-third of the dollar value of inventoried material reflected variances between the record balance and the on-hand warehouse balance. What was surprising, however, was that only eight percent of the items with variances required record adjustments. The GAO review indicated that reconciliations were being made between actual warehouse balances and accountable record balances without the corresponding inventory adjustment transactions.

being processed. (5:8-10) One result of the inventory problems highlighted by the GAO was recognition of the relationship of inventory losses and subsequent adjustments to the designation of critical parts shortages which had a direct impact on the readiness of Air Force weapon systems. (5:9,10)

#### OTHER CONCERNS

Through experience in the Air Logistics Center environment and after numerous discussions with supply and maintenance personnel at the ALC at Kelly AFB, Texas, the author developed a concern for the policy of not making an adjustment to the accountable record balance when advised that a discrepancy might exist between that balance and the warehouse balance. Two potential problems with the policy were discerned.

First, by not making the appropriate adjustment the record balance will either understate or overstate the true stock position of a given item. This may result in buying parts that really are not needed thus using limited funds that could be used to obtain other badly needed items. Or, by not reflecting an increased balance we may be preventing the automatic redistribution of required items to another installation.

Secondly, in the ALC, maintenance planners use availability of spare parts as one factor to determine their repair schedule for unserviceable major components. If the accountable record balance indicates a sufficient quantity of bits and pieces to effect necessary repairs and all other factors are met, a quarterly production schedule is established, major reparable components are withdrawn from holding areas, and highly skilled maintenance personnel are programmed for the job. If the supply of bits and pieces later fails to be sufficient to meet the requirement, it essentially becomes a work stoppage situation not unlike a production line shutting down in the civilian environment. The highly skilled maintenance personnel become idle and output of required major components stops, again potentially affecting readiness of various Air Force weapon systems.

The private sector faces some of the same problems as an Air Logistics Center. The next chapter will describe the inventory processes performed by the three companies in the private sector which responded to the solicitation for inventory information.

## Chapter Three

### PRIVATE INDUSTRY PROCESSES

#### OVERVIEW

Adequate inventory management is not just a problem for the Air Force and the Department of Defense. Private industry must also insure availability of parts to keep their production lines flowing and to provide replacement parts to a variety of customers. To determine how private industrial firms (which might have inventory concerns similar to an Air Logistics Center) handled their inventory processes, nine companies were surveyed by soliciting information about their operations.

Solicitations were sent to the Boeing Commercial Airplane Co.; Boeing Georgia, Inc.; Caterpillar Tractor Co.; General Dynamics; General Electric Engine Operations; Lockheed Aircraft Service Co.; Lockheed Georgia, Inc.; McDonnell Douglas Corp.; and Pratt and Whitney Aircraft Co. The information requested related to the type and frequency of inventories conducted, the process used to reconcile discrepancies between record and warehouse balances, the research methodology used, and the policies which affected their final inventory adjustment. This chapter will describe the inventory processes used by the three firms which responded positively to the solicitation.

#### PRATT AND WHITNEY'S INVENTORY PROCESS

The Pratt and Whitney Aircraft Company provided the most comprehensive material concerning their inventory practices. In addition to some general inventory instructions, they also provided detailed work instructions for both cyclic and annual inventory programs. Their work instructions provide the necessary guidance on the procedure for conducting the inventory count, recording the count and comparing it to the record balance, and adjusting any variances that may have been encountered between the warehouse balance and the record balance.

The process begins with a request for the various forms necessary to perform and document the inventory as well as specific information such as item dollar value and locations in the warehouse to be counted. Of particular attention is a report which tracks all incoming and outgoing items during the period the inventory is being conducted. Two days prior to the inventory a list is provided to warehouse managers reflecting the items which will be "frozen" for inventory. Parts are only "frozen" for twenty-four hours. During the inventory, identifying information such as part number, price, material group, and item location are confirmed to be accurate. Additionally, the quantity counted, date counted, and identification number of the individual conducting the count are recorded. If a discrepancy between the warehouse balance and the inventory count is apparent then a second and even a third count is conducted. (12:B1-B8)

Extreme care must be exercised to prevent various problems from skewing the inventory results. Items which have been issued but not yet pulled from the warehouse location, items which have been received but not yet posted to records, and items which are issued during the freeze period all have the potential to create inventory count problems if sufficient care is not taken while conducting the count. Special forms are accomplished to insure analysts are aware of the discrepancies noted. (12:B7)

Analysis of inventory discrepancies is performed by inventory analysts with the senior inventory analyst responsible for the decision to adjust a record or not. If the warehouse count and the record balances don't agree and the unit price is less than \$10.00 there is a one percent tolerance for those items counted by scale weight. Items in this category require no adjustment. For all other items no tolerance is allowed and an adjustment is made if so warranted by the senior analyst. (12:B8) In nearly all cases if the cause of the discrepancy cannot be determined an adjustment will be made to correct the records because inventory accuracy is of paramount importance to the financial managers. (16:--)

Research accomplished by the inventory analysts is primarily focused on confirming the accuracy of the postings for issues and receipts. Additionally, they check for changes to part numbers that may account for overages in one location offsetting shortages in another location. (16:--)

The annual inventory work instructions were mainly applicable to the inventory of work-in-process for which we have no equivalent process at an ALC. Suffice to say the major difference between the cycle and the annual inventory

processes appears to be the level required to approve adjustments. For work-in-process adjustments the general supervisor of inventory control must be the approving authority. (12:CB)

### CATERPILLAR'S INVENTORY PROCESS

The Caterpillar Tractor Company was extremely helpful providing information and narrowing the scope of involvement with their inventory process. They identified four main types of inventories which they perform, those being production stores, prime products, indirect material, and parts stores. Production stores and indirect material are inventoried using a sampling system, however, since they are primarily related to the manufacturing side of business they cannot be compared to the Air Force system and will not be discussed. Prime products are major end items, such as tractors, which are inventoried using a cycle count program with each class of product being totally counted at least once every five years. (10:1) Again, this is beyond the scope of this report. The focus, then, will be on the way Caterpillar accomplishes its inventory of parts stores items.

Two kinds of counts are used to inventory the parts stores items. A Discrepancy Count Program is initiated whenever apparent discrepancies are noted between quantities of material on-hand and quantities shown on stock records. This program is designed to be an adjustment mechanism in the overall control system which allows for correction of stock records. This assures the availability of material to meet planned requirements. Count adjustments are made based on complete or partial counts of warehouse material and are approved by the appropriate facility materials manager. Research prior to these adjustments is accomplished by Materials Distribution clerks to determine precisely why there is a discrepancy with recounts accomplished as needed. A partial or "short" count is allowed if the dollar value of the variance is less than \$2,000 and adjustments are then made immediately. (15:--)

Normally a sampling technique known as the Statistical Test Count Program is used to inventory parts stores items. Items selected for sampling are those which have not recently been included in the Discrepancy Count Program. The Statistical Test Count Program provides a calculation of the probable total value of all differences between the warehouse balance and record balance. This provides a measurement of the company's valuation of their overall inventory. Count discrepancies will be recorded and

research conducted to determine the cause of the inventory error. Again, as with the Discrepancy Count Program, the decision to adjust the record is the responsibility of the facility materials manager. (10:A1-A3) A key motivator to ensure record accuracy occurs when the inventory accuracy rate exceeds the company standard. Then the sample size for the following year is reduced which in turn requires less work. If the corporate standards are not met, however, then the sample size is increased, resulting in a heavier workload. (10:1)

#### GENERAL ELECTRIC'S INVENTORY PROCESS

Limited information was provided by the General Electric Company, Aircraft Engine Group because they maintain small stocks of parts. For the most part they order their requirements to be delivered just prior to their need; therefore, stocks are not maintained in a warehouse for lengthy periods of time. They do inventory all their production hardware on an annual basis and, in the event that an inventory imbalance occurs, they take appropriate action to recount, further investigate the discrepancy, or accept the inventory count. The action they take is dependent upon the value and quantity of the discrepancy and is not a standard but is based on the existing company policy and the experience of the inventory staff. (11:1)

#### OTHER RESPONSES

Of the remaining industries contacted only the Lockheed Aircraft Services Company and General Dynamics responded. Lockheed indicated that they were a defense contractor and therefore, required to comply with Federal Acquisition Regulations and Cost Accounting Standards. These requirements did not always allow them to operate in the most efficient manner because they were intended to maximize accountability regardless of the cost of doing so. (13:1) Since no meaningful information was provided by Lockheed and it appeared no efficiencies would be gained from reviewing the regulations and standards cited, no further investigation into Lockheed's inventory process was accomplished. General Dynamics cited a heavy corporate backlog and therefore was unable to respond to the request. (9:1)

Additional information of a generic nature was obtained from a study done by Arthur Young and Co. (4:IV-10 - IV-12) This information cannot be attributed to any particular industry or company but is a synopsis of inventory practices

based on research and interviews conducted by Arthur Young employees. Of importance here are areas relating to inventory adjustments. In the private sector the determination of what constitutes a "major variance" is difficult to define. Essentially, it is a variance which causes a significant misstatement of the companies' financial statements or one which causes a production stoppage. The time devoted to research is minimal with a review of only the preceding few weeks' transactions being accomplished. Most research is conducted prior to any adjustment being made and usually takes no more than one day to complete. The private sector provides various incentives to workers and managers to help insure inventory accuracy. (4:IV-11,12)

These responses provide a framework for comparison which may result in viable actions for future employment in the AFLC environment. The following analysis will compare AFLC's inventory adjustment activities with those presented by respondent private sector companies.

## Chapter Four

### ANALYSIS

#### COMPARISON OF AFLC AND PRIVATE INDUSTRY PROCESSES

With the description of the AFLC wholesale inventory system and various private sector inventory processes complete it is time now to compare and contrast some of the more important aspects of inventory management and accountability. Specifically, the comparison will look at frequency, research methodology, and adjustment policies.

It appears the private sector and AFLC both desire to achieve a complete inventory of all items within prescribed time frames. Pratt and Whitney and General Electric both try to insure inventory of all items is accomplished each year. (11:1;16:--) Caterpillar appears to be working within a two year time frame as indicated by their verification of stock records on a two year cycle. (10:2) AFLC insures that all of its items are inventoried within three years. (2:11) A major advantage to more frequent inventories is the ability to more easily determine the cause for discrepancies between inventories; however, the cost tradeoffs may not warrant this advantage.

All private sector activities shared with AFLC the process of research to determine the specific cause for discrepancies or variances. Within AFLC the amount of research conducted is dependent upon the amount of variance and the dollar value associated with the variance with the criteria specifically laid out in regulations. Within the private sector, while these are important considerations, the degree of research is usually determined by senior inventory managers who use their experience and judgement to assess the relative worth of expensive in-depth research. In the private sector research is primarily confined to insuring recent postings of issues and receipts were accomplished correctly. Within AFLC an entire year of transactions are reviewed, documents checked, and recounts initiated. Recounts are also used extensively within the private sector.

Within AFLC specific dollar value and units of variance criteria are also used to determine if an adjustment to the accountable records will be made. As the dollar value of the variance increases, so does the responsible level of supervision for approving adjustments. Pratt and Whitney levies the responsibility for making the adjustment decision to the senior inventory analyst. Usually the only case where discrepancies are not adjusted occurs when a scale is used to weigh hardware to determine quantity. In this case if the items are relatively inexpensive (less than \$10.00 unit cost) and the variance is less than one percent, then no adjustment is made at all. (12:BB) In AFLC for all items which have a variance less than ten percent and a dollar value less than \$5,000, no adjustment is made. The cost accounting standards followed by private industry preclude this option to ignore variances since inventory accuracy is a key component of the company's financial statements.

Both AFLC and private sector firms have the capability to identify and correct out-of-cycle discrepancies. The Caterpillar Company uses the Discrepancy Count Program. Like similar programs in AFLC, General Electric, and Pratt and Whitney, it is designed to initiate inventory action when needed on apparent discrepancies in the inventory. These discrepancies are usually identified by out-of-stock conditions or denial situations where the quantity available doesn't support the requirement. The more frequently this occurs the less effective is the periodic inventory system.

Although not specifically addressed in this report, the issue of inventory accuracy has an impact on determining inventory adjustment policy. A brief comparison is provided of an April 1986 stockroom inventory conducted by Pratt and Whitney and the results of a 1986 sample inventory conducted by AFLC. Pratt and Whitney inventoried 1086 items consisting of 2,009,586 units valued at \$11,269,190. They adjusted 112 records consisting of 8,470 units valued at \$40,853. This reflects a record accuracy of 89.3 percent with a dollar accuracy of 99.6 percent. (12:B24) To contrast, AFLC inventoried 2500 items consisting of 293,336 units valued at \$42,362,894. They adjusted 305 records valued at \$1,414,315. This reflects a record accuracy of 87.9 percent with a dollar accuracy of 96.7 percent. (3:67,68) From this comparison it can be seen that although there are major differences in the amount of items, units, and dollar value of inventories maintained by the private sector and AFLC, the accuracy figures are very similar.

## COMPARISON OF PRIVATE INDUSTRY AND AUDIT AGENCY CONCERNS

One of the prevailing concerns expressed by the Air Force Audit Agency was the issue of adequate guidance on inventory policy. As was seen in the information provided by both Pratt and Whitney and Caterpillar, the companies provided detailed guidance concerning the conduct of the inventory and specified that all affected individuals be as familiar with its provisions as possible prior to initiation of an inventory. Also, however, they provided broad latitude to managers to determine such issues as adjustment policy. In all fairness, however, the private sector is also able to provide incentives or inflict punishment (unemployment) if corporate goals are not met.

The other overriding concern of the investigators focused on inventory accuracy. As we saw earlier there appears to be no substantial difference between the accuracy rates of the private sector and AFLC based on that one comparison. This may result from significant improvements AFLC has been able to make in their operations since the 1983/1984 reports. Also, it appears AFLC has incorporated lessons learned from investigations by various audit activities. A factor (addressed by the GAO and a major element of the private sector's research methodology) which could be applied is the length of past transaction reviews researched for posting errors. Both the GAO and private industry encourage a shorter span of time versus the one year time frame that AFLC now uses in its research review.

Although there appear to be substantial differences in some areas of the inventory adjustment process between AFLC and private industry, the resultant inventory accuracy rates do not appear to be dissimilar. The following conclusions and recommendations, while drawn from a very small sample of industry practices, may lead to continued improvements in the AFLC environment.

## Chapter Five

### CONCLUSION/RECOMMENDATIONS

#### CONCLUSION

Many of the inventory processes and subsequent actions to reconcile variances are shared by both the private sector and the wholesale logistics environment of AFLC. Both the military and their civilian counterparts have programs designed to accommodate periodic or cyclical inventories as well as the means to handle perturbations in the operations of their particular inventory system. Two ideas from private industry stand out which may be applied to the AFLC process. One is the idea of developing incentives to improve the quality of the inventory process from the count on through to research and adjustments. The other idea focuses on moving the decision process for determining the need and timeliness of adjustment action to lower supervisory levels. Unit level management can direct local efforts to items which may be critical need items, thus more urgently in need of timely adjustments. Research and adjustments for slower moving items could be delayed until more urgent discrepancies are resolved.

Comparison of inventory systems between the private sector and AFLC to determine specific inventory applications was very difficult. This was due to the immense size of the AFLC operation when compared to private industrial concerns. Also, the cost of maintaining an extremely accurate inventory can be passed on to the customers of private companies while the government sector must live within the confines of an established budget. Contributing to this difficulty was the pronounced trend of private industry toward minimizing their warehouse and inventory operations by shifting to a process whereby parts are ordered for delivery by master schedules. In this situation, large quantities of stock are no longer maintained in warehouses until needed but are ordered based on projected requirements and are scheduled for delivery at some future day. Usually the delivery schedule is staggered to insure no more stock than is currently needed will be delivered and subsequently require warehousing.

Numerous initiatives have been started since the most recent AFAA and GAO reports were finalized. The advent of new technology in the AFLC environment such as the Wholesale Inventory Audit System and the Automated Warehouse System are helping AFLC achieve major improvements in inventory accuracy as evidenced by the 1986 sample inventory. The most current audit reports were not yet available to determine where inventory problems still exist for AFLC. Nevertheless, there are a few recommendations that may help AFLC achieve even better results in the future.

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### RECOMMENDATIONS

Private industry relied heavily on incentive programs to help spur inventory accuracy. To improve the quality of the AFLC inventory process including research and adjustments recommend an incentive program be established which will recognize the Air Logistics Center and the item management and warehouse functions achieving the highest inventory accuracy rates.

A strong reliance on inventory managers to determine which research and adjustments should be made was typical of the private concerns reviewed. Recommend increased responsibility be passed to the unit and section chief level to determine the need and timeliness for inventory adjustments. This should allow concentration on items most critical to the support of the mission while little used items are held until research time becomes available.

The current adjustment policy provides that no adjustment will be made if the discrepancy is less than ten percent and less than \$5,000. This policy can result in the inventory record balance reflecting more or less than is actually available. Recommend an in-depth study be undertaken to determine if the current adjustment policy has had any negative impact on the following areas:

1. The ability of maintenance to achieve its quarterly negotiated production quota.
2. The impact on the stock fund as a result of a suspected understatement or overstatement of the inventory.
3. Stock-outs which may have affected worldwide weapon system readiness.

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