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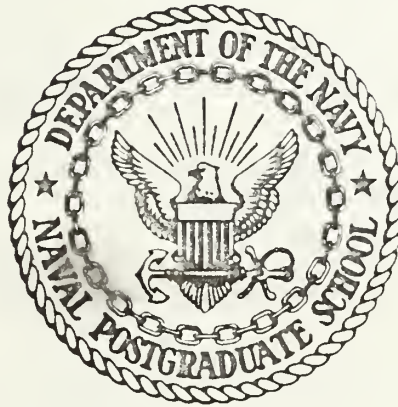
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THESIS

EARLY DELIVERY OF PURCHASED MATERIAL:
A DOD PROBLEM

Gerald A. Burleigh

December 1986

Thesis Advisor:

Thomas P. Moore

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In summary, early deliveries do occur. There are no shelf-life problems associated with the early receipt of material. There are opportunity costs incurred in the holding and paying for material delivered early.

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Early Delivery of Purchased Material:
A DOD Problem

by

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Submitted in partial fulfillment of the
requirements for the degree of

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ABSTRACT

The issue of early deliveries and their consequences for the Navy are new concepts which depart rather significantly from customary government thinking, where late delivery is the primary concern. The government normally accepts supplies when they are delivered, even if earlier than required. This thesis investigated whether or not early deliveries do in fact occur, and if so, whether they are a significant problem for the government.

The objective of the research effort, once it was established that early deliveries do in fact occur, was to explore those factors and costs associated with receipt of material prior to the required delivery date. Emphasis was placed on the factors of holding costs and production lead time as they relate to the costs and consequences of early deliveries.

In summary, early deliveries do occur. There are no shelf-life problems associated with the early receipt of material. There are opportunity costs incurred in the holding and paying for material delivered early.

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I. INTRODUCTION

A. RESEARCH OBJECTIVES

What costs are associated with the early deliveries of material before the Required Delivery Date (RDD)? The Department of Defense (DOD) presently accepts supplies when they are delivered, even if earlier than required. This early acceptance may be costly, when the early delivery is not desired. Civilian industry is moving to embrace various management concepts of minimum inventory levels with the most extreme of these views being "just in time". Under these concepts early delivery of procured material is a foreign concept. Early deliveries are not free. But what is the cost to the government, and how significant is it?

The issue of early deliveries and their consequences for the Navy was first raised by Naval Sea Systems Command (NAVSEA). The early delivery of shelf-life material was a primary concern and the subsequent deterioration of the material before it could be issue. This led to NAVSEA's recommendation that the Federal Acquisition Regulations (FAR) be amended to include clauses prohibiting the early delivery of material and services unless specifically allowed in the contract. For the specific language proposed by NAVSEA see Appendix A. This concept departs significantly from customary government practice, where late delivery is the

primary concern. Having no information available to support or refute this hypothesis, the Office of Naval Acquisition Support (ONAS), prior to its disestablishment and absorption into the Assistant Secretary of the Navy for Shipbuilding and Logistics, requested that the issue be investigated to see if there was merit in bringing it before the Defense Acquisition Regulations (DAR) Council. If this issue proves to be a significant problem, the DAR Council will need to take action. If there is no demonstrated evidence that early deliveries are a burden, NAVSEA's recommendation for amending the FAR can be returned with evidence that there is no problem.

B. RESEARCH QUESTIONS

The primary research question, which was the focus for this research is:

What effect does the early delivery of material have on managements ability to control expenditures?

From this basic question, three subsidiary questions were developed:

1. Are early deliveries an extensive problem with certain industries or products?
2. What are the positive and negative affects of DOD's ability to manage inventories?
3. Would contract clauses specifying window delivery schedules be an effective means of dealing with early delivery?

C. RESEARCH QUESTIONS

This research concentrates on the area of acquisition of spare parts for inventory replenishment. The logical choice for a source of information when dealing with any issue concerning the procurement of spare parts for the Navy is one of the Navy's two Inventory Control Points. The source selected for this research was the Navy Ships Parts Control Center (SPCC), Mechanicsburg, Pennsylvania. The scope of this research effort has been limited to SPCC managed items and to "C" type spare contracts. It is relatively easy to identify whether material is delivered for production type contracts for the routine acquisition of spare parts early, on time, or late, because of the very nature of the material purchased.

Information has been gathered from various sources at SPCC including the procurement community and the item manager community. Some of the information was strictly the opinion of the various individuals and backed-up or amplified the data provided. SPCC's Contracts Completed File was the source of data for this research. This database contains approximately 14,000 records of procurement actions completed before RDD. The database consists of purchase orders, delivery orders, and "C" type contracts. Purchase orders are small purchases. Delivery orders may be for stock, but all are negotiated (normally sole source)

actions. "C" type contracts are for inventory replenishment and are awarded for either competitive or negotiated (sole source) solicitations. Since the research effort concentrated on replenishment of inventories, the data base was queried for all "C" type contracts completed before RDD. A computer printout of 545 "C" type contracts was generated. Appendix B contains the listing.

D. RESEARCH METHODOLOGY

The primary research methodologies employed were a combination of analysis of empirical data and telephone interviews.

The empirical data for this research was a computer listing of 5454 "C" type contracts completed before RDD. Contracts delivered within 60 days of the RDD were not considered to be significantly early. Of the 545 contracts delivered early 246 (45%) were completed more than 60 days early. Of the 14,000 contracts completed early, 6530 (46%) were completed more than 60 days early. The early contracts were broken down into 30 days periods. A total cost-to-hold was derived by applying the holding cost rate to the total contract values per period. The data provided the number of contractors and inventory managers involved in early deliveries as well as the types of material that are delivered early.

The structure of the interviews was established from a series of questions identified during an extensive review of the current literature. While the data on contracts delivered early was readily made available, no direct contact was possible with the individual inventory managers. The program Support Office of the Weapons Systems Support Group (O5 Staff) did not want the daily routine of the IMs interrupted by telephone calls and questions from the researcher. Thus the scope of the interviews was limited by the O5 Staff who acted as the filter between the researcher and the inventory managers. The O5 staff personnel investigated selected contracts upon request and provided specified information. Upon completion of the review of the data from SPCC, interviews were conducted with a number of contractors who were found to have delivered material early.

The secondary research methodology employed was an extensive review of relevant literature. The review was conducted to obtain an historical perspective on delivery schedules and their formulation. Various sources such as the Naval Postgraduate School Library, the Defense Logistics Studies Information Exchange (DLSIE), the Defense Systems Management College were used. Various current publications proved helpful in the formulation of

perceptions. These useful sources of information are contained in the reference and bibliography sections of this paper.

The information thus obtained was analyzed, compared, and contracted in order to obtain a picture of the various institutional forces, effects and considerations relevant to the problems of early delivery in the management of wholesale spare parts.

E. ORGANIZATION

Chapter Two describes the legal and regulatory framework of the procurement process within which the early delivery problem operates, as well as the real and perceived affects of early deliveries on DOD. The role and responsibilities of SPCC as a Navy Inventory Control Point are described. A description is given in the characteristics of the work performed by inventory managers and a summary of how the environment effects the way they respond.

Chapter III gives a detailed examination of the prime cause of early deliveries: required delivery dates which are based on over-estimates of production lead times.

Chapter IV discusses the specific costs that can be directly associated with early deliveries. This chapter specifically concentrates on holding costs and its various elements. This chapter also describes the relationship of holding costs to reorder quantities and reorder points.

Chapter V presents an analysis and description of the data obtained from SPCC. The estimated extent of the delivery problem is assessed. The causes of the problem are identified and categorized. Considerations for further actions are given. This chapter presents the availability and effectiveness of remedies and controls are described.

Chapter VI is a summary of the researcher's findings and conclusions with proposed recommendations for action future research.

II. BACKGROUND

A. GOAL-ON-TIME DELIVERY

DOD's inventory management mission is to provide material where and when needed to support a given unit mission within financial constraints. The inventory managers (IMs) and procurement personnel in the various DOD inventory control systems must acquire the correct materials in correct quantities, from appropriate sources, at the right time to support DOD's numerous missions. [1:7]

In industry, companies are aware of and can substantially influence any one or more of the variables in the acquisition cycle: getting the right quality, quantity, and prices, from the right source at a specified time. Within DOD, acquisition personnel are governed by the provisions of the Federal Acquisition Regulations (FAR) and its supplement, the Defense Acquisition Regulations (DAR). The FAR specifies the types of procurement actions which may occur. In addition, there are numerous laws, policies, and regulations imposed by Congress and the Office of the Secretary of Defense to protect the public interest. These socio-economic considerations result in procedural limitations which serve to limit acquisition personnel in their ability to control the variables that their counter-parts in industry can control.

There is no portion of the FAR that deals explicitly with early deliveries. Parts 12 and 52 of the FAR address, in generic terms, the delivery of material. Appendix C contains the appropriate clauses from the FAR dealing with delivery of material. According to the FAR Part 12:

The time of delivery of performance is an essential contract element and shall be clearly stated in solicitations. Contracting officers shall ensure that delivery of performance schedules are realistic and meet the requirements of the acquisition. [2:12.101]

Part 52:212 of the FAR provides those clauses that the contracting officer may insert in solicitations and contracts for supplies or services. Thus the FAR Part 12 and 52 pertain to the delivery and performance aspects the contract, but do not address early delivery explicitly.

The Services within DOD manage highly complex, widely dispersed inventories of spares and repair parts. The value of these inventories is over \$50 billion. This inventory provides the material support needed to ensure that weapon systems' readiness and military operational capability are maintained to fulfill US commitments and tactical goals. The Services have traditionally relied upon semi-mathematical inventory models, sophisticated information systems, and complex logistics support procedures to ensure that inventory costs are minimized, consistent with assigned readiness goals and desired logistics support capabilities within financial constraints. [3:1-1]

Ensuring that required materials is delivered at the right time is one of the most critical of the variables. Spare parts must be identified and procured in such a manner as to allow sufficient time for delivery to the end user, with consideration given for production, inspection and shipment. As noted by Lee [1:8] material should be delivered at the time desired by the requester. It should neither be earlier nor latter than the required delivery date (RDD). The material, allowing for anticipated contractor lead times, should be procured such that it is available to the requester at the point in time considered necessary to meet the customer's requirements. DOD has found this to be an elusive goal: trying to ensure that supplies arrive at their designated sites on time, whether it is 1958 or 1986. It has been estimated that throughout DOD, one contract in four has not met its delivery schedule. [1:8] There is nothing new or startling in this discovery, for as early as 1958 Harbridge House Inc., in a study for DOD, reported that:

46% of the total lead times were longer than predicted by an average of 3.3 months late. Thus nearly half of the procurements were delivered late and the average tardiness (3.3 months) amounted to 43% of the predicted lead time. On the other hand, 31% of the procurements were delivered early, by an average of 2.7 months early. While these early deliveries cannot hurt performance, needlessly long predicted lead times do cause unnecessary investment in pipeline investment because of the higher reorder levels.

In studying predicted versus actual ALT's and PLT's, 57% of the ALT's were greater than predicted (by an average of 3.4 months), while only 18% of the PLT's were greater than predicted (by an average of 2.6 months).

Conversely 17% of the ALT's were less than predicted (by an average of 1.2 months) and 57% of the PLT's were less than predicted (by an average of 2.3 months). ALT has been underestimated and PLT has been overestimated. [4:21]

In a similar vein a GAO study of DOD component's use of differing methods for projecting PLT resulted in a GAO contention:

Inaccurate PLT information is being use . . . to determine secondary item requirements. While some items had understated requirements, the vast majority of items were overstated. GAO observed that these inaccuracies resulted in a less than optimum use of secondary funding. Follow-up information in 1984 from GAO verifies their original contention. Updated information was obtained on 212 of the original 257 sample items. Of these, the PLT has been changed on 175 items; 142 items reflect decreasing PLT, 33 reflect increases in PLT. [5:7]

While conducting the literature search, the researcher was unable to uncover any specific research directed at early deliveries of material as a problem for DOD. The very thought that early deliveries could be a relevant or serious problem had not been addressed in any research. All research concerning deliveries dealt with the problems associated with delinquent contracts. At most the subject was addressed, as in the Harbridge House study, as a one-liner or as a sidelight in comments on delinquent contracts. However, it should be noted that potential areas of research were indicated concerning the cost-of-holding material and production lead times as they relate to the EOQ inventory models.

B. SPCC - INVENTORY CONTROL POINT

Ships Parts Control Center (SPCC), Mechanicsburg, Pennsylvania is one of two Navy Inventory Control Points (ICP), (the other being the Aviation Supply Office (ASO), in Philadelphia, Pennsylvania). SPCC's mission is to provide cost effective and responsible supply support to the fleet. [1:19] In support its customers, SPCC provides enhanced combat readiness to the fleet.

SPCC manages an inventory of over 500,000 line items. This material ranges from valves, pumps and seals to complex electrical components for missile systems. SPCC also has the central management responsibility for conventional ammunition. [6:3-4] While SPCC manages many line items, few of these items are physically stocked at SPCC. Rather, these items are distributed world wide at various Naval Supply Centers (NSC), Naval Supply Depots (NSD) and aboard numerous Fleet Stores Ships located where they are accessible to the fleet. Through these stockpoints, SPCC monitors the material transactions of these items world-wide and can directly control the issue of critical items. Thus the Navy wholesale supply system is a complex operation involving numerous interfaces world-wide with continuous transactions occurring. The Navy's supply system's customers obtain material using decentralized requisitioning procedures for most of what they require, submitting their

requirements for material to the Navy stock point in their area of operations. Normally, material issues will take place from the stock point closest to the customer with the stock point reporting the issue to SPCC via a Transaction Item Report (TIR). If the stock point cannot fill the request, the requisition document is passed to the applicable ICP via the AUTODIN communications network for action. If SPCC locates the item, the stock point having it will forward it to the customer. If, however, SPCC cannot fill the request, the requirement will either be backordered or a spot buy will be made.

The process of making material available for issue involves requirements determination, material procurement and procurement funding. These functions make up the core of SPCC's Supply Operations Group (SOG). The SOG's five major functions which relate to the deployment/operations phase of weapon systems life cycle support are: requirements determination, material procurement, procurement funding, material issue and repairable's management. The IMs are able to accomplish this by using computers to process multi-variable data which includes procurement lead time (administrative lead time and production lead time), risk, holding cost, and safety levels to determine a reorder point and an economic order quantity (EOQ) for each stocked item. TIRs provide the current input data on what material has

been received and what has been issued. The system of recording TIRs and referrals is the means by which the IM obtains information about what is occurring with their items. SPCC Uniform Inventory Control Programs (UICP) use this information to compare the actual stocked levels of material with projected requirements and monitors the status of each line item. These programs determine whether or not a buy is necessary, based on the current stock level, and the predetermined reorder level. The result is a recommendation to the IM to either buy or repair material to meet the customer's need [6:3-7; 1:21]

To fulfill its customer's needs, SPCC engages in routine stock buys to meet anticipated demand. SPCC will also initiate spot buys for items not carried or for high priority requirements for items not in stock. In FY85, SPCC engaged in over 63,600 acquisition actions at a value in excess of \$1.4 billion. The bulk of these actions, 56,800, were small purchase actions. According to SPCC, historically approximately 90% of their total actions (small purchases) account for 20% of the funds obligated. Spot buys are normally for a quantity of one each to fill an immediate requirement.

Funding for stock procurements come from the Navy Stock Fund (NSF) which is a revolving fund. The fleet users order material carried by (or under) the stock fund, pay for it

out of their assigned operating fund, and SPCC then replenishes (or repairs) its stocks with the fleet provided funds.

As an inventory control points, SPCC is responsible for managing weapon system life cycle support. As such, SPCC decides who, what, when and how the Navy will provide logistic support to a weapon system. At the same time that the hardware systems commands are releasing the first production contracts, SPCC is determining the inventory management responsibilities and the range and depth of spare parts support for the system, as well as building computer and technical files that support the system and preparing and publishing the Allowance Parts List. [1:22]

When the weapon system is actually delivered to the fleet, SPCC's Supply Operations Group must support it. The initially provisioned spare parts are supposed to last until actual demand patterns have been established via usage data to make requirement determinations. Program support and the supply support for weapon systems proceed simultaneously with the inventory manager (SPCC) having prime responsibility to support the system in the fleet. [1:25]

C. INVENTORY MANAGERS (IMs)

The Ims at SPCC are primarily responsible for ensuring that spare parts are available where and when needed to support fleet operations. Their responsibilities in carrying

out this task are complicated by:

- conflicting task objectives;
- pressures from superiors and customers;
- diverse organizational and personnel interfaces required in the complex wholesale supply system environment;
- plus a world-wide disbursed fleet.

Each IM must determine when and how many unites of repair or buy; where to best position this material to meet demands; how to dispose of excess material; and how to obtain an appropriate procurement budget.

On a daily basis the IM must decide which units to buy or repair and what quantities to procure in order to do well on their measures of support performance. Unfortunate, they must perform well without creating long supply assets or exceeding funding constraints. They are required to have neither too little nor too much. This in an impossible task in an environment where an IM may manage a thousand line items, and where each line item has numerous of pieces of informations that are subject to change. Because of personnel constraints and supply operations, each IM must depend on many people throughout the ICP and the supply system to buy, repair, package, ship and place their material in storage. Similarly, when locating the material for future demands, the IM must decide how much is too much or too little at any site. The disposal of excess material

raises the question of how much stock is truly excess to future demands.[6:71-72]

D. ECONOMIC ORDER QUANTITIES

An inventory is essentially an idle resource which is being temporarily stored for use at some future time. The primarily purpose of storing resources is to separate the supply and demand processes. DOD logistics systems have long used inventories to compensate for or to buffer operating problems and deficiencies in procurement, transportation, warehousing, and maintenance. Because DOD inventory requirements are basically developed under the previously mentioned logistics operating system philosophy, as processing times and leadtimes grow, inventories also grow to accommodate them. [3:4-3]

Because maintaining any type of inventory incurs expenses, the benefits of holding the inventory must equal or exceed the holding and ordering costs. The process of balancing these costs and the benefits is inventory management. Inventory management is a pivotal activity in any logistics organization. It requires tradeoffs in balancing customer service needs with operating costs. This management task is particularly challenging in the military setting where item availability often affects mission readiness. The two fundamental issues in controlling any inventory are when to order and how much to order. When the

demand for an item is uncertain, a level of safety or buffer stock must be carried to meet unpredicted demand when making these decisions. [7:2]

Inventory management attempts to balance the costs and benefits of holding stock. This balance is directly affected by the level of stock held by the organization. Low stock levels result in low customer service and high ordering costs. High stock levels increase the level of customer service while decreasing ordering costs. However, high stock levels can have undesirable effects such as increased storage costs, high capital investment and increased risk of obsolescence. High stock levels will increase holding costs. When stock levels and service levels increase, holding costs will increase and ordering costs decrease. [7:20]

The traditional inventory models used by DOD are based on the cost minimization principles used the commercial enterprises for which the models were originally developed. The Department of Defense (DOD) has adopted the models as a basis for inventory decisions, even though DOD's objectives do not always include cost minimization. Within the services, inventory management decisions are more typically directed towards maximizing the support of the forces, within the budget limits set by the policy makers. [8:1]

For DOD the total variable costs of stockage are composed of numerous elements which can be classified as: (1) cost to order, (2) cost to hold, or shortage costs. Economic inventory policy is an effort to minimize the total variable costs. This is achieved when holding costs for an item equals the cost of ordering over the same time period. The quantity ordered each time the reorder point is reached brings the total stock on hand on delivery date back to a desirable level. The only deviation from an exact balance between holding cost and cost to order is the cost of holding the safety level quantity for its life-span beyond the next delivery date. [9:2]

The wholesale replenishment model used by SPCC is a cost minimization EOQ inventory model. A stock item's order quantity and reorder level are established in large part by the unit price and procurement lead time forecasted for the item. When a replenishment is needed, the order quantity is specified and the procurement officer requests bids from vendors who provide both a unit price and production lead time.

SPCC treats the wholesale level inventory management of an item and the procurement of replenishment stock as separate functions, although they are key elements of the same supply system and share the common goal of maximum fleet support within limited budgets.

The UICP inventory models determine the reorder level and order quantity based on data from recent procurements. When the inventory drops below the computed reorder point, a buy order is generated with an ICP established delivery date. After the order is placed, a new reorder point and reorder quantity is computed for replenishing the inventory.

There is an inventory level at which the total costs of shortages, ordering and holding the inventory are minimized. If the sole objective of inventory management were to minimize these costs and they could be quantified, the inventory level would be found by minimizing the sum of the ordering costs, shortage costs, and the holding costs. This inventory level would determine the level of service. But not all shortages, ordering and holding costs can be quantified. There are two other inventory management objectives in addition to minimizing the quantifiable shortage, ordering and holding costs. One is to provide a certain level of service. The second is to reduce or limit the size of the inventory. For DOD, the level of service is actually a measure of shortage costs, while inventory size is a substitute for the opportunity cost of the inventory investment, which is one of the holding costs. these costs are difficult to measure, and for DOD, it is often not possible to quantify them. Therefore, the basic objective of inventory management for DOD is to minimize the

quantifiable ordering and holding costs, provide a certain level of support to the forces, and limit the size of the inventory due to budgetary constraints. [7:21]

Inventories with stochastic demands and procurement leadtimes require that safety stocks be maintained to absorb the variations in demand and lead time. Safety stocks also reduce the possibility of stockouts caused by leadtime and demand forecast errors. At SPCC safety stocks must be carried because both the demand and lead time are stochastic. Safety stocks are the difference between the expected demand for a period and the level of stocks held to meet the demand for the period. Under the continuous review situations, spare parts are ordered when the inventory level reaches the reorder point. The difference between the reorder point and the safety stock level is the expected or mean demand during the procurement leadtime. The safety stock will (hopefully) fulfill the demands in excess of the expected demand. The excess demand represents the demand forecast error demand variability during the leadtime period. If the demand forecast error and variability exceeds the level of safety stocks held, stock-outs may occur and backorders accumulate. Conversely if such a large demand fails to occur, there will be excess stock on hand. Spare parts will become excess material or long supply. [7:24]

There is no single universal model of successful inventory management due to the wide variety of production requirements and the differences in shortage, ordering and holding costs within and between industries. Near-term and long-term fluctuations in market conditions demand different material management strategies.

Holding costs and production lead times (PLT) play major roles in the determination of safety levels and thus reorder points in the EOQ models. An erroneous PLT forecast can lead to excessive delivery dates (material delivered early) or too short delivery dates (material delinquent). This issue will be addressed in detail in Chapter III.

III. PRODUCTION LEAD TIME

A. BACKGROUND

For each item managed by the ICP, the UCIP EOQ model used by SPCC computes the value of the reorder point and the order quantity which minimize the average annual variable costs of ordering, holding, and time-weighted backorders for the item manager. These models are based on the traditional steady-state continuous review lot size reorder point models for stochastic demands. They operate under the assumption that there is a constant price and a constant procurement lead time for each item. With the assumption of a constant price, the average annual total procurement costs is a constant value independent of the decision variables, order quantity and reorder point. As a consequence, this cost term can be ignored in computing the reorder level. However, both procurement cost and production lead time (a portion of procurement lead time) can vary depending on which vendor is chosen. The impact of lead time on the optimization is concentrated in the determination of the reorder point. However, the determination of the reorder point influences not only the service level (shortages) but also the expected inventory holding costs. [6:3-A-15; 10:9]

The UICP inventory management models at SPCC determine the optimum order quantity and reorder level for an item

based on that item's forecasted quarterly demand rate, procurement lead time and unit price. Therefore, leadtime forecasts are one of the factors that must be considered in the planning and budgeting process for new weapons systems, spare parts support of operational systems, and all ICP inventory requirements determinations. As long as material and component leadtimes are following historical patterns, the leadtimes can be assumed by be fairly reliable for future planning. However, if actual leadtimes are significantly different from forecasted leadtimes errors are introduced into the inventory management process. For example, the timing of replenishment of spare parts has been based on the leadtimes actually experienced on the last order for each particular part. If the leadtime has increased greatly, the probability of not maintaining adequate support of operational systems increases greatly. A crisis management situation will evolve as the IM tries to support the forces. Conversely, if leadtime has decreased considerable, the parts are ordered in advance of the actual need--at the potential expense of other needs (opportunity costs) and with an increased risk of obsolescence or having excess material in inventory requiring disposal. [11:2-3]

Thus the accurate forecast of leadtimes is an essential ingredient in the ability of planners and managers to accurately forecast their resource requirements and provide

additional insight into necessary modifications to inventory holdings. It is crucial for military planners to more accurately determine their true needs as the competition for scarce resources increases.

Leadtimes vary from item to item within companies. They can also vary markedly for the same item from company to company. The exploration of the numerous reasons for this variability would entail a substantial research effort. However, some of these reasons are the result of various buying policies, inventory practices, relationships with vendors, the product being procured, and its particular specifications, imagination of purchasing staff and adequacy of planning [11:24]

B. PRODUCTION LEAD TIME (PLT)

The forecast of procurement lead time is one of the most significant factors in the inventory management process because it helps determine when an order will be placed.

Procurement lead time consists of:

- a. Administrative Lead Time (ALT) - The time from when the requirements document is generated to the date when the contract is signed.
- b. Production Lead Time (PLT) - The time from the date of the contract to the date of receipt of the first significant contract delivery. [12:1]

The wholesale replenishment model is a cost minimization inventory model.

$$\text{EOQ Model: } Q = \sqrt{8 \times A \times D / I \times C}$$

Where: A = Administrative Ordering cost per order.
 D = Quantity demanded per calendar quarter.
 I = Holding cost per year.
 C = Replacement cost per year.

The Economic Order Quantity is the square root of 8 times the cost to order times the quarterly demand divided by the holding cost rate times the unit price.

The Reorder Level (RL) is computed:

$$RL = D \times L + SL$$

Where: L = Procurement Lead Time in quarters
 SL = Safety level, a function of demand and leadtime availability and the desired level of service.
 D = Demand per quarter.

The variable operating costs of the wholesale system are assumed to be:

Ordering Costs x Holding costs + Shortage costs

Where Ordering costs are the ICP internal administrative costs of placing orders The holding costs are those costs associated with maintaining on hand inventories - storage, obsolescence and opportunity costs. The shortage costs are those costs representing the cost to the system of incurring backorders. The objective is to find the order quantity, reorder level, repair quantity and repair level for each item that minimizes these variable costs. [6:3-24; 3-A-15]

If an item is ordered too early, scarce resources are tied up in unnecessary inventories. If stock is ordered too late, there will be backorders before new deliveries are received with the possibility that a spot buy will be required.

Under current procedures at SPCC, it is assumed that the ALT and PLT on the next buy will be the same as the ones on the most recent buy. Thus a stocked item's order quantity and reorder level are established in large part by the unit price and procurement lead time forecasted for it. The potential for under- or over- stating lead time is significant, as noted by Harbridge House Inc. and GAO in Chapter II, resulting in management problems due to spares either going into long-supply or developing shortages and backorders.

C. PLT AND RDD

A March 1984 DOD study of secondary item procurement leadtimes concluded that for FY83 PLT for all secondary items within DOD exceed \$15 billion. The study stated that one day of leadtime equates to approximately \$30 million-- inaccurate and unrealistic estimates of leadtime can be quite costly. Overestimates of leadtime ties up funding that could be better utilized elsewhere, and increases the likelihood of long supply conditions and excess material that will have to be disposed of. Underestimated lead times result in stock-outs and a degradation of material and operational readiness [5:1]

The DOD study of secondary item procurement further concluded that all DOD components end administrative lead

time and begin production lead time at the contract award date. Defense contractors consider that the estimated delivery date specified in the contract is their lead time of record that that the ICPs should use that date to update PLTs. Since the contractor is legally obligated to meet the EDD, its use in PLT computation is valid. Most Defense contractors use lead time quotes from their vendors and subcontractors to develop lead time data. These contractors believe that valid quotes are far superior to historical data because quotes reflect current market conditions, whereas historical based projections of PLT tend to dilute the fluctuations in the economy. [5:7-13]

The soliciting of contractor quotes of lead time can be very useful in the inventory control process to establish an RDD. The contractors can be a valuable source of lead time information. If contractor information is considered valid, their leadtime estimates should be used whether they represent increases or decreases in the PLT used in their requirements computations.

However, the IMs can not totally ignore historical data. For example, there are several examples where a major contractor quoted leadtimes which the ICPs used in their requirements computation only to have that contractor consistently deliver much earlier than quoted. A PLT quote of 14 months was used by an ICP for requirements computation

purposes even though each of the last 3 procurements were delivered in under 5 months. The IM must be aware of the possibility that the contractor will try to beat the system. The leadtime quoted not only affects the quantity ordered but also affects the required delivery data specified in the procurement contract. [5:48]

Nevertheless, with proper monitoring, using estimates of leadtimes from contractors to determine the delivery schedule in the solicitation document, the probability of more realistic RDD's is increased. The more realistic the RDD the less likely it is that the material will be delivered earlier than required or that the contract will become delinquent.

Early delivery as well as delinquent contracts are associated with unrealistic RDD's in government solicitations. These RDD's are the consequence of using inaccurate estimates of PLT in the inventory management models.

In order to remain eligible to receive the contract, a contractor's bid must be responsive to the solicitation. If an unrealistic RDD is incorporated in the solicitation the contractor may bid unrealistically and hope that everything will fall into place in order to meet the RDD. This system feeds upon itself. If there were a reduction in the use of unrealistic RDDs the government would be

receiving material on time more often, rather than earlier or later than requested.

The Navy's ICPs treat the wholesale level inventory management of an item and the procurement of replenishment stocks for that item as separate functions. But both of these functions are key elements of the same supply system and share the goal of maximum fleet support within annual budget constraints. The UICP inventory models determine the reorder level and order quantity based on historical data from the most recent procurements. When the inventory position of an item drops below the computed reorder point, an order is sent to the procurement department to buy the computed reorder quantity. The procurement department then solicits bids from potential vendors. The vendor selected is usually the one who has bid the lowest unit price and can deliver within the ICP estimated desired delivery date. Sometime later the UICP inventory models receive the new price and production lead time values of the vendor winning the contract. A new reorder point and order quantity are computed and form the basis for the next procurement replenishment stock and the cycle begins all over again.

[10:8]

D. PLT: GOVERNMENT VS INDUSTRY

Private industries have come to realize that inventories are not only costly but can also be used to hide inefficient

operating practices. In response to this recognition private companies are finding new and innovative means to reduce inventories without degrading customer support.[3:iii]

The available data clearly show that the private sector has reduced inventories relative to sales since 1980. In contrast the DOD has experienced a significant growth in inventories relative to customer demands for the same period. About one-half of this growth in DOD peacetime inventories is the consequence of force structure expansion and modernization and to long-needed enhancements to support operational readiness of the forces. The remainder of the growth in DOD inventories is the consequences of the specific management policies of DOD inventory managers and acquisition personnel. The major difference in inventory control procedures between the private sector and DOD is that private industries can more effectively control procurement leadtime thus reducing on-order requirements. They can also order smaller quantities on a more frequent basis to minimize on-hand inventories. This is accomplished through practices not currently found in DOD, such as the negotiation of both price and leadtimes, consolidated procurements, time-phased deliveries, multi-year procurement, and sharing of requirements data with major suppliers.

[3:iii]

In DOD, procurement leadtime at \$15 billion is the largest single element of inventory requirements. Leadtimes have continued to grow since 1980 and are now 3 to 4 times longer than those experienced by private firms for the same or similar material. [3:iii] The other two elements of inventory management, safety levels and operating levels, are also much higher in the DOD than in the private sector. DOD safety levels and operating levels are higher than the private sector because of the increased lengthening of lead times. Inventories on-hand and the quantities on-order are generated by the DOD inventory requirements determination system, which is based on demand, costs, leadtime, and performance goals. Because DOD accepts the existing inventory management determination process, there is a failure to recognize that existing requirements may be high because the basic process of determining requirements results in overstated or excessive quantities. Thus overstated leadtimes can lead to IMs ordering excessive quantities ahead of true needs. [3:1-1]

The actual inventories on-hand and on-order are the result of several factors in the EOQ model used by SPCC. Among the most important of these factors are (a) the inventory requirements, or computed inventory levels, which determine how much inventory is desired, and (b) the accuracy in demand and leadtime forecasts. Inventories in

support of demand of a stochastic nature such as DOD's demand-based requirements determination process are composed of three elements: operating levels based on order quantities, leadtimes-levels based on projected demand during leadtime, and safety levels generated to reduce the probability of a zero balance or not-in-stock position during leadtime. While all have experience growth in constant dollars since 1980, leadtime - the largest single component of the total demand based requirement has grown most rapidly in absolute terms. [3:3-1]

There is great similarity in the actual computational methods used by DOD and private industry for setting operating level and safety level inventories. Differences that do exist arise from the efforts of private industries to control those costs associated with leadtimes. This allows them to reduce both safety level and operating level inventories. The standard economic order quantity methods, coupled with variable safety level computations common to the DOD are found in private sector firms with only minor differences in the customer inventories between DOD and private firms. [3:4-2]

In private industry, leadtimes are not accepted as a fact of life but rather are an integral part of the procurement negotiation process, and material requirements are adjusted to reflect the results of the leadtime negotiation.

The private sector forces production lead times to be as short as possible, and seeks the lowest material cost (not the lowest unit price) in procurement decisions. DOD, on the other hand, accepts long production leadtimes as a fact of life and buys accordingly. As leadtimes grow, the inventory requirements determination process adjusts to accommodate them by increasing the size of the inventory.

[3:4-5; 4-14]

In the DOD inventory management process, the production leadtime is used to determine the amount to buy. The procurement leadtime for routine stock replenishment is seldom an issue as long as it is possible to locate a vendor that will accept the government's required delivery date, which is based on the leadtime forecast. Leadtimes are observed, measured and normally funded in the budget process but not managed. There is no attempt by DOD to reduce leadtimes, they are accepted as a given.

The ever growing administrative leadtimes and production leadtimes represent real costs to DOD and the Services:

- safety levels grow to accommodate the longer production leadtimes to provide protection against the risks of stock-out;
- demand forecasts, made months or years before the requirement is needed become increasingly inaccurate and lead to the acquiring of inappropriate material in the wrong quantities;
- long ALT and PLT create long inventory pipelines and increase the likelihood of over shipments, early shipments and errors in material receiving and storage;

- when material prices are based on time of delivery rather than on time of receipt of an order, lengthy production leadtimes in periods of inflations result in higher costs;
- the existence of extremely long ALT and PLT leadtimes creates a DOD outlay liability of significant proportions especially if actual leadtimes are shorter than estimated leadtimes. [13:5-5] With the coming reductions in budgets more realistic leadtimes are required to ensure that scarce DOD dollars are invested in the correct inventories. In the future DOD will have to maintain operational readiness with ever fewer dollars.

IV. HOLDING-COSTS: A COST OF EARLY DELIVERY

A. GENERAL

Holding Cost, carrying cost, and the cost-to-hold are synonyms for the costs of holding an inventory to meet future demand. In light of the billions of dollars held in inventory throughout DOD it's clear that the inventory carrying costs can be significant. Holding costs may be considered the monetary penalty incurred for retaining inventory to fill future requirements.

The holding cost rate is derived from:

- a. Investment charge: charge for funds invested. This is considered an interest rate. Also, the cost of postponed benefits.
- b. Forecast error and obsolescence: losses due to generation of excess, advancements in technology, etc.
- c. Inventory losses: Adjustments to inventory caused by accounting or physical losses and deterioration.
- d. Storage cost: costs related to storage of material.

Thus holding costs include such factors as obsolescence, interest on capital, losses, handling and storage facilities. [13:8; 14:3; 15:1; 12]

The EOQ calculations used for the centrally managed supply items of the various ICPs within the Services result from the policies established by DODI 4140.39. These policies affect not only the total inventory on hand, but also the total carrying costs incurred as well as the

backorders experienced by the customers. The EOQ equation is the tool used by SPCC IMs to compute their reorder points and reorder quantities. The quantity derived from the EOQ equation provides the most economical quantity to order at one time [14:3]

The primary use of cost-to-order and cost-to-hold is in the calculation of the optimum order size--one which will result in the least total supply cost. The size of such an order is known as an economic order quantity, or EOQ. If the order size is either less than or greater than the EOQ, actual total holding and ordering costs will be greater than the minimum attainable total cost. [16:3]

Under the EOQ model, the order quantity is selected such that the ordering costs are about equal to the holding costs. If the order size is larger than the optimum, fewer orders will be submitted, resulting in lower ordering costs. But the larger order size will produce larger inventory levels, and the increase in holding costs will exceed the savings in ordering costs. Conversely, if the order size is smaller than the optimum, the increase in ordering costs will exceed the savings in holding costs. [16:3]

Item management is done at SPCC and ASO for the Navy. transaction information about an item is provided to the UICP computer each time a transaction involving that item occurs. UICP then determines the status of the inventory. When the

stock level of the item reaches a designated minimum value, a buy quantity is calculated, using the EOQ equation discussed in Chapter III, and the desired quantity is ordered. The basic EOQ computation is similar to the Wilson Lot-Size formula; however derivation of the factors that make-up the formula does vary.

A noticeable difference exists in the calculation of the holding cost between the government and the private sector. Industry normally computes holding cost as a set percentage of the cost of the on-hand inventory for each item in their inventory, while the Navy computes it as a percentage of the total cost of the inventory system. The holding cost and the factors that make up the holding cost are expressed as a percentage of the total cost of the items. The holding cost is a consolidation of the various cost factors required to maintain a certain stock level of items.

DOD has presently established constant rates for opportunity cost (interest rate) and storage cost of 10% and 1% respectively. The factors of obsolescence and loss are costs calculated separately by each Service. The obsolescence factor is included in the computation of EOQ as a damper to decrease the order quantity on items that are becoming obsolete before they can be issued for use. [6:3-24; 14:5]

B. HOLDING COST COMPONENTS

Circa 1959 Harbridge House developed the holding and ordering cost used to calculate order frequency and the reorder points under EOQ. The holding cost thus developed is a yearly rate which is applied to the dollar value of items stocked. The higher the holding cost rate, the lower the quantity of stock desired to have in inventory. [16:3]

The current Navy holding cost rates are (consumables - 23% and repairables - 21%):

	<u>Consumables</u>	<u>Repairables</u>
Investment Charge/ Discount rate	10%	10%
Obsolescence	5%	5%
Deterioration-Storage	5%	5%
Inventory Loss	2%	1%
Storage Cost	1%	1%
	<hr/> 23%	<hr/> 21%

These holding cost rates are currently used by the IMs and SPCC in the determination of economic order quantities. But holding costs rates are only estimates which are based upon separate cost components - general storage cost, deterioration, obsolescence, losses in storage, and interest. DOD has specified the rates themselves or techniques to determine the rates at the wholesale level for each component of the holding cost rate. [15:6-7; 8:5]

C. HOLDING COSTS ELEMENTS

Within DOD's various economic order systems, holding costs represent all variable costs which can be directly attributed to maintaining a given average dollar value of inventory against requirements at any distribution point over a fixed period of time, normally a year. Holding costs therefore consist of the following major elements; (1) storage, (2) interest, (3) losses, and (4) obsolescence.

1. Storage

Under DODI 4140.39, storage costs have been assessed at one percent (1%) of an item's purchase price. Storage costs represent the out-of-pocket costs incurred by the keeping of an inventory and the amortized cost of the storage facilities. DOD arrives at this rate by identifying the various storage operations and obtaining cost estimates for them. The total annual operating cost is divided by the average inventory to yield the 1% holding cost rate decreed by DOD. [17:10]

Storage operations at NSCs and NSDs include activities conducted by the Stock Control Division, the Storage Division, the Inspection Office, and the Transportation Office. Storage operations include all those activities involved in the storage of and issue of supplies from the time the material is placed in storage until it is picked

for issue to consumes. The following can be classified as storage operations:

- a. initial preparation and processing of supplies for storage;
- b. repackaging or reprocessing of items received (when necessary due to improper or defective packaging);
- c. cyclical inspection of supplies in storage;
- d. periodic movement or manipulation of items to prevent deterioration;
- e. preparation for inventory and the maintenance of the stock record accounts;
- f. periodic physical inventorying if stocks;
- g. miscellaneous activities, such as rewarehousing and cleaning and repair of storage facilities. [18:44-46; 79]

The following three elements are relevant to the costing of storage operations:

- direct labor and materials, the costs of civilian and military labor, support supplies and materials, travel and other contractual expenses;
- direct overhead, which consists of administrative and other expenses which are not allocated directly to using activities (accrued leave, government contributions to retirement funds, and group life insurance);
- equipment amortization, repairs, utilities, and depreciation of the physical plant (material handling equipment (ME), office equipment). [18:46]

2. Interest

DODI 4140.11 lists interest as a portion of the holding cost rate. Currently the annual interest costs related to the funds committed to inventories have been assessed at ten percent (10%) of an item's purchase price.

Each dollar of public funds which is invested in DOD inventory represents a dollar of investment in the private sector which is foregone. The interest cost included as a component of holding cost represents the opportunity cost of investment in inventory assets. interest costs are therefore an important consideration when inventory is to be acquired since a measure of opportunity cost should be included in the decision to purchase this inventory.

3. Physical Inventory Adjustments

While price changes are used in private industry as part of holding costs, they are not part of the computation of DOD holding costs. When inventory losses or gains are found to exist at the time of physical inventory, the inventory losses are a legitimate cost of holding stocks provided they are set off against the inventory increases resulting from the gains discovered during the physical inventory. The new losses computed in this manner represent the costs of deterioration, breakage and spoilage, pilferage and other losses to inventory in storage. [18:83]

4. Obsolescence

The costs attributable to obsolescence are the sum of the loss of the original value of the inventory, plus its allocable share of the cost of disposal operations, less

any return realized from disposal action. This total cost constitutes the obsolescence element of the holding cost rate.

The decision to carry stock at a given inventory level is based on the belief that repetitive demand will be sufficient to exhaust stocks currently being held. However, if the item becomes obsolete because a better item has been procured, or if the item becomes obsolete because a better item has been procured, or if force levels or end items densities decrease, then part or all of the inventory stocked in anticipation of future demand will become excess to the current demand. Thus the money invested in the excess stock, together with the cost of removing it from the supply system, is chargeable as a cost of holding stock. The obsolescent portion of holding cost is based on the actual costs of generating and disposing of excess quantities of stock material against given inventory levels. [18:48]

D. EXCESS MATERIAL

The decision to carry stocks at a given inventory level is generally based on the assumption that future demands will continue at a given rate. However, if the demand drops off unexpectedly much of the stock carried in anticipation of a continued high level of demand will become excess or long-supply material.

One of the major factors to be considered in analyzing the retention of material in long-supply or excess is the cost to hold the item. DOD activities review requirements and on-hand assets periodically to determine if they have excess assets. Assets above requirements are reported to the inventory manager as either total or partial excess in accordance with levels described in DOD Directive 4100.37 [19:7]

Upon receiving a excess report from a reporting activity, the IM compares wholesale requirements and may authorize a return to wholesale stock to fill deficiencies. disposition instructions are made authorizing return for credit; return without credit, or disposal. Upon receipt of disposition instruction the reporting activity either returns the material to a wholesale depot, or turns the material over to property disposal. [19:78] However, within the Navy material is returned to wholesale supply depots before the IM can issue disposition instruction. The usual procedure is to place the material in stock and then report the receipt to the IM. Although the IM may not have any forecasted demands, the receipt and storage expenses have already been incurred by the time the IM receives the report. The item manager's decision, whether to retain or

dispose of the excess material, is thus complicated by the fact that funds have already been expended in bringing the item back into inventory.

The net cost of disposal must be ascertained as a basis for reaching a decision about disposal. Two factors are required to determine the net cost of disposal; the disposal cost per line item and the potential benefit (item usable at a future date) plus the sale proceeds of the remaining material. Each of these factors is affected by the number and value of line items processed for disposal, and these factors are further influenced by the disposal process itself which converts excess supply material into disposal line items. [19:79]

Typically the holding costs of the available units are compared with the costs of repurchasing new items at a later date. If holding costs are higher than repurchase costs for units that would be used at some future date, these units are considered disposable, if not, they are considered to be economically retainable.

Inventory control models such as the Economic Order Quantity (EOQ) model indicate the minimum quantity of an item to be acquired. They do not provide information concerning item quantities to maintain in inventory in the face of changing demands or technological obsolescence, or deleted requirements. Economic retention quantities are defined in

DODI 4140-37 as those quantities of material which it is more economical to retain for future use than to transfer to disposal activities. [17:2]

Thus the purpose of economic retention is to determine which is more economical: to retain or to dispose and reprocur at a later date. The components of the holding cost rate--storage costs, interest costs, and obsolescence costs (which include inventory depletion due to losses and deterioration) need to be considered.

In a retention situation, storage costs assessed at 1% are incurred if an item is retained in inventory and therefore is included as part of inventory holding costs of retention. [17:10]

The annual interest costs related to the funds committed to inventories are assessed at ten percent (10%) of an item's purchase price. A decision to retain an item in inventory does not require additional investments of public funds for purchase of inventory assets. However, the decision to retain an item in inventory precludes the salvage of that item and represents an opportunity cost associated with the salvage value of the item. [17:11]

Obsolescence costs include losses due to technological obsolescence, over-forecasting of requirements, deterioration beyond the point of use, and other causes. The obsolescence cost rate is arrived at by dividing the actual

dollar value of disposed material by the total dollar value of on-hand inventory assets. In a retention situation, the decision involves retaining inventory items that have already been purchased rather than purchasing new items. However, the salvage value which can be obtained from an item may be lost if the item is retained and subsequently becomes obsolete. [17:12]

If a quantify of items above the computed requirements is retained, inventory holding costs are incurred:

Cost to Hold = Storage cost + obsolescence cost of the items to replace those lost to obsolescence + opportunity cost of salvage value foregone by retaining the items.

Under the economic retention level model, when the cost to order is greater than the cost to hold - retain the material in inventory to meet future demand. When the cost to order is less than the cost to hold - dispose of the material. The economic retention level model is designed only to serve as an aid to management decision making. It is not designed to make inventory management decision. Rather the item manager must decide, aided by the model, the feasibility of maintaining items in inventory for future demand or disposing of those items and reprocurring at a future date.

[17:21]

E. SUMMARY

The varied categories which combine the holding cost rate are:

1. Interest on dollars invested
2. Applicable Stock Control and Financial Control elements at the ICPs
3. Care and Preservation
4. Storage
5. Physical Inventory
6. Deterioration and Shrinkage (Physical inventory adjustment and excess)
7. Obsolescence.

The holding cost rate or the cost-to-hold is applied to on-hand inventory. Errors in lead time estimation lead to errors of overestimation which will result in an excess of on-hand inventory that must be retained or disposed of, to which holding costs are applied. Errors of underestimation result in a deficiency of on-hand assets and can have a damaging effect on operational readiness. [20:43]

V. DATA PRESENTATION AND ANALYSIS

A. STOCK REPLENISHMENT

SPCC's Contracts Completed File was used as a source of data for this thesis. This database contains approximately 14,000 records of procurement actions which were completed before the required delivery date (RDD). The RDD is the contract completion date. In the Contracts Completed File records of completed contracts are kept for three years before they are purged from the data base. A listing of 2,500 early deliveries was generated from the data for the most recent year. This listing contained purchase orders, delivery orders, and "C" type contracts. Since the research effort concentrated on replenishment of inventories, the database was queried for all "C" type contracts completed before RDD. A computer listing with a cut-off of 25 August 1986 (Appendix B) with 545 contracts was generated. These contracts accounted for 3.84% of all contracts contained within the database. This computer listing was then used as source data for the thesis.

The database showed no concentration within any particular group of inventory managers. The IMs ranged across some 200 difference codes distributed throughout the Weapon Systems Support Group: Ships Systems, Combat Systems, and Electronic Systems Departments. The material ranged from

headsets, seals, pumps and valves, to circuit cards and antenna. The material delivered early covered the full range of material managed by SPCC.

Of the 545 contracts delivered early, 246 were completed more than 60 days early. Contracts delivered within 60 days of the RDD were not considered to be significantly early. The 246 contracts had a total value of \$22,865,636. They were broken out as follows:

<u># OF CONTRACTS</u>	<u>DAYS EARLY</u>	<u>VALUE</u>	<u>COST TO HOLD*</u>
1	522	\$ 228,981	\$ 76,365
7	400-521	\$ 2,069,459	\$ 600,512
2	365-399	\$ 21,098	\$ 5,079
2	330-364	\$ 718,530	\$ 156,206
6	300-329	\$ 83,459	\$ 16,556
6	270-299	\$ 444,730	\$ 79,869
7	240-269	\$ 928,200	\$ 149,148
10	210-239	\$ 270,000	\$ 38,281
27	180-209	\$ 2,680,587	\$ 329,382
26	150-179	\$ 1,522,176	\$ 158,265
36	120-149	\$ 2,352,807	\$ 200,150
51	90-119	\$ 6,091,313	\$ 403,028
65	60-89	\$ 5,455,296	\$ 257,819
Sub- total	246	\$22,865,636	\$2,470,660
	122	\$10,937,843	\$ 310,155
	177	\$ 9,594,783	\$ 90,690
Total	545	\$43,398,262	\$2,871,505

*Cost to hold is determined by using the center value of Days Early divided by 365 days times the holding rate (23%) times the Value (i.e., $15/365 \times .23 \times 9,594,783 = 90,690$).

The data shows that there are early deliveries, but they must be placed in perspective to the total number of procurement actions and dollars processed at SPCC.

<u>FY</u>	<u>TOTAL</u>	<u>\$ "C" CONTRACTS</u>	<u>"C" CONTRACTS</u>
FY 84	\$1.3 Billion	\$330 Million	2,270
FY 85	\$1.4 Billion	\$373.7 Million	2,969
FY 86	\$1.47 Billion	\$385.2 Million	2,793
TOTAL	\$4.17 Billion	\$1,088.9 Million	8,032

For the fiscal years of 1984, 1985 and 1986 there were a total of 8,032 "C" type contracts worth \$1.09 billion issued. Of this total, 545 contracts worth \$43,398,262 were completed before RDD, with 246 contracts worth \$22,865,636 completed more than 60 days prior to the required delivery date. When a holding cost rate of 23% is applied to the early deliveries a sum of \$2.47 million is generated for the deliveries earlier than 60 days, and a sum of \$2.87 million for all 545 contracts. Consequently, the opportunity cost of early deliveries is approximately \$2.47 million. This sum was spent on inventories that were not required in the amount originally requested because of faulty leadtimes in their requirements computation. These funds could have been better used elsewhere. Thus the opportunity cost lies between \$2.47 and \$2.87 million. They could have been used to procure material not funded, or they could have been used to procure an increased number of critical items. Since the database represents a 3 year period, the \$2.47

million represents .227% of the "C" type contract procurement dollars spent for stock replenishment at SPCC. Early deliveries account for $(246 / 8032 = .0306)$ 3.06% of the total "C" type procurement actions for the same period. Total "C" type contracts valued at \$1,089 million represent $(1089 / 4010 = .27)$ 27% of the total dollars spent by SPCC.

Shelf-life materials are an area of primary concern when considering the consequences of the early delivery of material. None of the 246 contracts delivered early were for the procurement of shelf-life items. Only two contracts for shelf-life material appeared on the listing, and they were delivered 2 days and 48 days ahead of the RDD.

The data revealed no specific pattern of companies or industries which delivered their products consistently early. There were 167 different contractors who delivered 246 contracts early, and the total collection of 545 contracts involved 341 contractors.

From the 246 contracts delivered early at SPCC, the staff code 0502 Weapon System Program Support performed an in-depth review of 27 selected contracts which were delivered 100 days before RDD and valued at over \$100 K each.

Initially, of the 27 items reviewed, four (4) were identified as candidates for long supply. They were "due-in" long supply as opposed to on-hand long supply. However,

upon review by the IMs only one was due-in long supply. The remaining three items were not due-in long supply once the IMs had properly loaded all requirements into UICP. There were no excess inventories created by the early deliveries. Additionally, all items were non-deteriorative in nature (not shelf-life limited). The 27 line items were managed by 24 item managers scattered throughout three departments in the Weapon Systems Support Group: Ships Systems Department, Combat Systems Department and Electronic Systems Department. There were no unusual concentrations in any one department. The contracts were with 27 different companies.

The 27 items were all true early deliveries. The item managers had taken no action to expedite the delivery of any of the material. As far as the IMs were concerned they would be just as happy to have everything come in ahead of RDD. They were all routine replenishment requirements requiring no special attention by the IMs.

Whether an item is awarded competitively or through negotiation has little bearing on early delivery. Of the 27 items: 12 were awarded competitively and 15 were the result of negotiations. Procurement personnel for routine stock replenishment do not normally negotiate the delivery schedule. The normal practice is to use the UICP generated leadtime to compute a required delivery date which is placed in the solicitation that is sent to prospective offerors.

There is little or no incentive for the contractor to agree to a shortened delivery schedule.

B. ITEM MANAGERS

No item manager perceived the early delivery or receipt of supplies/material before the required delivery date as a problem. Early deliveries have a positive connotation to them. IM's believe that contractors who deliver early are good, while late delivering contractors are bad even though in some instances they are the same contractor. If material is delivered early the IM won't have to worry about the inventory position of the item. The IM will not have to expedite an order for the material at some future date. Since none of the material had generated on-hand long supplies, they also didn't have to face the problem of having to decide if excess material existed and whether it should be disposed of or kept. the IM faces more significant daily problems and is therefore not worried about material received before RDD.

The item managers could not identify any instance where the early delivery of material had caused them a problem. They had had unexpected deliveries that had caused problems, but not early deliveries. Unexpected deliveries occur when the stock point is unaware of material due in to their activity because they did not receive a preposition material card. They had had no long supply or excess problems caused

by early deliveries. They had no limited shelf-life material delivered ahead of schedule that had caused problems.

According to the IMs, under normal circumstances the early delivery of material should not cause excess or long-supply. When the system computes requirements it considers total assets, both on-hand and due-in. Therefore, an item would have to have been in due-in long supply prior to going into on-hand long supply. And the item managers do not view due-in long supply as a serious problem.

C. THE COMPANY WHO DELIVERS EARLY

Unrealistically long required delivery dates (RDD) are the primary reason that companies deliver material ahead of RDD. In competitive situations companies normally bid to the RDD. However if the solicitation does present the opportunity to offer an earlier date, some prospective contractors will propose an earlier delivery schedule. But those the researcher interviewed stated that few solicitations provide a desired and a required delivery date format. Rather most solicitations provide a desired and a required delivery date format. Rather most solicitations normally have only a required delivery date. Some contractors stated that they simply respond to the RDD to be competitive, whether it is realistic or not and then produce the items as

best they can, attempting to satisfy the delivery schedule but not feeling undue pressure to meet it. This results in some early and some delinquent contracts.

Negotiated (sole source) and competitive solicitations are handled differently by the prospective contractors. In negotiated contracts the contractors stated that they would inform the contracting officer if they felt the RDD was unrealistic and that they may propose an alternative delivery schedule. Many companies are following a conservative approach in quoting delivery schedules so that they will not end up being labeled a delinquent contractor. Under normal circumstances the delivery schedule for routine stock procurements are not directly addressed during negotiations. Cost is the prime concern in negotiations.

The fear of being declared non-responsive prevents many contractors from taking exception to the proposed delivery schedules. In order to get the business the prospective contractors will make an offer based upon the schedule even if it is shorter than their normal leadtimes and then attempt to meet the delivery date. Most companies who deal on a routine basis with the military have developed their own standard leadtimes which they use when responding to government solicitations. These have grown longer and become more conservative as increasing pressure has been brought by DOD on companies who deliver late.

Those companies with high debt and low cash flow have a strong incentive to deliver whatever they can as soon as possible. One company stated that they were is just that position.

Another company stated that because of their conservative quoting policy they estimated they deliver about 10% of their contracts early and about 50% on time. The rest, even with conservative leadtimes, were being delivered late because of the need to make offers on solicitations which contain unrealistic required delivery dates as computed by the UICP models.

VI. CONCLUSIONS AND RECOMMENDATIONS

A. CONCLUSIONS

Conclusion--The early delivery of material to the government does not cause a serious problem. There is a cost associated with early deliveries. It is costing SPCC at least \$2.47 million for the early delivery of "C" type contracts over a period of three years. However, in perspective this is only .227% of the total value of "C" type contracts awarded (\$1.09 billion).

The Item Managers and Procurement Personnel at SPCC have not considered early deliveries to be a problem. They are so enmeshed in the problems associated with delinquent contracts that the idea that receiving something early is or could be bad is not a consideration. The IMs don't have to worry about expediting the material for some future emergency if a contract is delivered early. As contract management is often in a reactive mode, no attention is directed at early deliveries since they have not caused the customer to complain thus focusing attention on the issue.

Conclusion--Excessive PLT causes early delivery. The true culprit in early delivery and delinquent contracts is the inappropriate procurement leadtimes used by UICP to compute RDDs for stock replenishment. The use of inappropriate procurement leadtimes by UICP generates an ever

higher safety stock level, reorder point and reorder quantities for material which needlessly tie up inventory funds. The IMs and procurement personnel normally accept the computer generated RDDs, and the contractor prices to the RDD and then produces the material in his best interest.

Conclusion--Shelf-life material is not being delivered early. Only two contracts for shelf-life material appeared on the computer listing used for this thesis, and they were delivered 2 and 48 days ahead of RDD.

Conclusion--No company or industry delivers their products consistently early. There were 341 contractors who completed the 545 contracts early.

Conclusion--The contracting method employed, negotiated (sole source) or competitive, has no bearing on early delivery. Of 27 contracts over \$100 K researched indepth: 12 were awarded competitively and 15 were the result of negotiations.

B. RECOMMENDATIONS

Recommendation--Do not amend the FAR to forbid the early delivery of material by contractors. Contract Administrators should not have another set of rules requiring them to monitor yet more contracts as proposed by NAVSEA in Appendix C. They are hard pressed to manage delinquent contracts and manage them mainly by exception. Presently contract administrators must decide where to place their emphasis and which contracts will receive attention. While

early contracts have a cost attached, they do not have a directly negative impact on fleet readiness. While they do use scarce resources that may be better employed elsewhere, delinquent contracts have an immediate adverse affect on fleet/operational readiness.

The forbidding of early deliveries would send the wrong type of message to private business. All too often we are trying to expedite material ahead of schedule because of changing requirements, and to now come out and say we don't want it until the RDD would be counterproductive. This could become another factor which further lengthens lead-times and which would increase the size of the inventory, raise reorder points and reorder quantities even higher.

Recommendation--Amend the FAR to create a window of delivery and a delivery clause for inventory replenishment. The ultimate aim of the Navy's ICPs is to get the appropriate material delivered to the right destination on time. This can be accomplished by establishing realistic delivery schedules. the government must put an end to the unrealistic required delivery schedules generated by the UICP models for the routine replenishment of inventory stocks. The government must also encourage prospective contractors to submit delivery schedules that they can realistically meet, whether

they are earlier than or later than the proposed (desired) delivery date.

Therefore those portions of the FAR (Part 12 and 52) which deal with delivery schedules must be modified. The first step would be the creation of a 60-day window around the RDD - contracts completed within 60 days of the RDD were not considered to have delivered on time if he delivers within this window. The second step would be the development of a delivery clause for routine stock replenishment of inventories similar to that proposed in Appendix D. This will encourage offerors to propose realistic delivery schedules with phased or incremental deliveries to meet a desired delivery schedule.

In most cases the RDD established for routine stock replenishment is not really a required delivery date generated by a specific need, but rather it is a delivery date based on historical data in the computer which may or may not reflect the current situation. Changing the lead-times will change the safety level, the reorder point and reorder quantities thus freeing scarce funds for items which have true long leadtimes.

Recommendation--Delivery schedules should be negotiated. DOD should follow the example of private industry and actively negotiate the delivery schedule as well as the price with prospective contractors. SPCC currently has a

pilot study underway to see if the negotiation of RDD and price are feasible in today's procurement environment.

C. ANSWERS TO RESEARCH QUESTIONS

What effect does the early delivery of material have on managements ability to control expenditures? There is no effect on managements ability to control expenditures. The costs involved accounted for only .227% of total funds expended.

Are early deliveries an extensive problem with certain industries or products? There is no industry or company which consistently delivers early. There are no particular products which are delivered consistently early.

What are the positive and negative affects on DOD's ability to manage inventories? The early delivery of material does not affect DOD's ability to manage inventories. The early deliveries account for only 3.06% of the total "C" type contracts issued.

Would contract clauses specifying window delivery schedules be an effective means of dealing with early delivery? The creation of window delivery schedules is one means of dealing with early deliveries.

D. AREAS FOR FURTHER RESEARCH

Further research in the area of early deliveries should be directed towards the Defense Logistic Agencies and

General Administrative Services. Their material may be more susceptible to early deliveries than Navy managed materials.

Further research should be conducted in the area of the early delivery of sole source negotiated materials.

Further research should be conducted in the relationship between early delivery and procurement leadtimes.

E. SUMMARY

In summary, early deliveries do occur. There are no shelf-life problems at SPCC associated with early delivery. There are opportunity costs incurred in the holding and paying for material delivered early. The true culprit in early deliveries are inappropriate procurement leadtimes used by the ICPs in computing in RDDs for stock replenishment leading to larger inventories and higher reorder points and quantities.

APPENDIX A

NAVSEA PROPOSED CHANGES TO THE FAR

This appendix contains NAVSEA's recommendations for amending the FAR Part 12 and 52 to prohibit the early delivery of material and services specifically allowed in the contract.

12.104 is amended by adding the following:

(4) The contracting officer shall insert in solicitations and contracts for supplies or services a clause substantially the same as the clause at 52.212-xx, Accelerated Deliveries of Supplies and Services. The clause permits accelerated deliveries under the contract for only those supplies or services specifically enumerated within the clause.

Part 52 - SOLICITATION PROVISIONS and CONTRACT CLAUSES

52.212 is amended by adding the following:

52.212-xx Accelerated Deliveries of Supplies and Services.

As prescribed by FAR 12.104(4), the contracting officer shall complete and insert a clause substantially as follows in solicitations and contracts for supplies or services. The clause invokes certain prohibitions against the early delivery of supplies or services.

ACCELERATED DELIVERIES
OF SUPPLIES OR SERVICES

(a) Supplies/Services tendered for acceptance fifteen calendar days or more prior to the contract delivery date will be processed at the discretion of the contracting officer using one of the procedures provided below, except for those supplies/services enumerated in (b) which may be delivered at any time prior to the delivery date.

1. Supplies/Services will not be accepted if tendered at origin or if acceptance is at destination they may be returned by the government at contractors expense.

2. Supplies/Services will be accepted but invoices will not be processed for payment until after the contract delivery date. The government will still be entitled to any prompt payment terms offered by the contractor for those supplies/services accepted early. The prompt payment term period shall begin from the contract delivery date or receipt of an acceptable invoice which ever is later.

3. Supplies/Services will be accepted and the government will deduct from the contractors invoice, in addition to any other terms offered, the Current Treasury Interest Rate for 6 month bills. The contract will be modified to reflect these deductions.

(b) Accelerated deliveries under this contract may be made only for those items listed below.

Item	Qty	Delivery Date	Snip To	Mark For
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APPENDIX B

CONTRACTS COMPLETED BEFORE RDD

The 545 contracts contained in this appendix form the database for this thesis. It is a computer listing of 'C' type contracts from the Contracts Completed File at SPCC that were completed before RDD. The following information is contained in the listings:

1. PIIN: The contract number.
2. NIIN: Last nine digits of the National Stock Number purchased under the contract.
3. PURCH DATE: Date (year and number of days) of the award of the contract.
4. RDD: Required Delivery Date.
5. CONT. COMP: Date (year and number of days) contract completed.
6. EXT DOL: Dollar value of the contract.
7. FSCM: Manufactures code of the contractor.
8. LRC: Inventory managers code at SPCC.

PIIN	NIIN	PURCH_DATE	RDD	CONT_COMP	EXT_DOL	FSCM	LRG
DAAB0764CE471	010909439	84148	85282	85283	64500.00	73293	PB5TN
F4160884CC383	003900887	84348	85151	85139	50822.88	5T808	GUHSE
F4250084C0967	010533121	84172	85293	85223	228893.00	78214	
MDA90484C8026	010488158	84157	85273	85329	1851.35	24384	LCITY
NO010484C8359	010904713	83303	85210	84178	34733.00	52808	EX4SN
NO010484C8373	010515449	83285	85155	84282	32780.00	89790	GS5SE
NO010484C80121	011113270	83342	85341	84302	499999.98	70508	GNCSU
NO010484C82892	000894270	84011	85334	84224	18144.00	2X441	GETSV
NO010484C80285	004380468	84199	85131	85179	28971.00	55110	HVFS6
NO010484C85755	010548208	83342	85243	84166	31848.00	89790	GS5SE
NO010484C7004	LLTRS8051	83319	85385	86052	4300.00	95892	
NO010484C8026	000782179	84072	85310	84302	521.72	02004	CY4SZ
NO010484C8029	010753165	84075	84233	84224	1358.00	95892	CY4SZ
NO010484C8094	010248288	84259	85073	85082	492.80	34280	CY4SZ
NO010484C0013	010824331	83333	85288	84241	40270.82	47498	GNCSU
NO010484C0025	002092024	83365	86274	85172	1714510.82	84104	GNBSF
NO010484C0033	000240306	84019	85319	85138	28900.00	55211	GNFSU
NO010484C0034	002212448	84047	85297	85201	20487.00	19272	GXASF
NO010484C0042	010838373	84129	84240	84237	33325.00	04337	GNBSU
NO010484C0052	001418859	84258	84363	84353	34780.00	59747	GPESU
NO010484C0057	007200872	84087	85081	84282	20738.00	38271	GPESU
NO010484C0052	010267823	84130	85130	85122	35900.00	59180	GPESU
NO010484C0065	011838708	84138	84333	84289	848.50	41820	CVCS4
NO010484C0068	004932013	84098	84388	84276	107885.00	52081	GPCSH
NO010484C0069	LLTRS3904	84208	86031	86017	33801.00	77081	
	LLTRS3906	84208	86031	86017	33801.00	77081	
	LLTRS3910	84208	86031	86017	33801.00	77081	
	FNJUL5199	84208	86031	86017	33801.00	77081	
NO010484C0077	LLHONR446	84167	84349	84323	76000.00	8K281	
	LLHONR447	84167	84349	84323	76000.00	8K281	
NO010484C0123	010858297	84228	85041	85014	228138.32	33433	GWASF
NO010484C0136	010888938	84242	85241	85233	83924.40	97578	GXASF
NO010484C0137	010299189	84249	85189	85091	45815.00	53288	HFASH
NO010484C0235	001024071	84012	85188	85027	11888.00	34889	CVCS4
NO010484C0273	004134329	84023	84323	84282	28188.00	03870	
NO010484C0290	009038883	84031	85110	85060	182238.08	99657	GLFSB
NO010484C0318	002432367	84048	85217	84293	83038.00	17988	GBBSA
NO010484C0328	011034402	84053	85213	85149	34800.00	2X411	HSBSU
NO010484C0341	008028383	84078	85292	85238	23038.00	54287	
NO010484C0344	007804442	84088	85308	85201	37873.00	59180	HHASH
NO010484C0364	003720839	84093	85039	84323	32000.00	3N183	GNDSU
NO010484C0367	001331428	84098	84310	84224	31902.00	81100	GBCSA
NO010484C0440	008028383	84188	85083	85048	37508.00	81988	
NO010484C0459	002787885	84197	85131	85115	188458.99	28223	GLFSB
NO010484C0485	007690949	84202	85018	85004	101414.40	9N885	
NO010484C0474	008010988	84197	85018	85238	31739.70	00912	
NO010484C0531	01J847844	84233	85133	85134	113928.90	93238	GLDSB
NO010484C0586	009805082	84333	85247	85201	134800.00	37412	GJASF
NO010484C0609	009100997	84285	86020	85183	24178.00	58881	GAESA
	009100998	84285	86020	85183	24178.00	58881	GAESA
NO010484C0616	008314084	84288	85112	85003	113243.00	1M142	GBBSA
NO010484C0628	009029783	84273	86027	85233	481874.00	33280	GNBSH

PIIN	NIIN	PURCH_DATE	ROU	CONT_COMP	EXT_DOL	FSCM	LRC
NO010484C0860	002158813	04244	05149	05091	43184.00	95335	HFASH
NO010484C0870	007939301	04031	05085	04221	74170.00	12497	HCASJ
NO010484C0880	010320611	04041	04302	04290	11306.54	20210	GLESO
NO010484C0903	007301723	04080	05290	05214	37932.00	22057	HEGSH
NO010484C0906	008497868	04097	06150	05349	28350.00	95402	HEFSO
NO010484C0907	009771107	04005	05005	04241	75210.00	00032	HEGSH
NO010484C0923	002352193	04091	04353	04233	35905.80	05991	HEGSO
NO010484C0934	011081088	04259	05173	05154	29422.19	51302	HRSSJ
NO010484C0951	010924400	04138	05227	05201	07857.00	03857	HEGSO
NO010484C0963	000830303	04170	06000	05201	228091.00	03057	HEGSH
NO010484C0971	009142241	04222	05097	05077	35373.00	71871	HSBSJ
NO010484C0983	010694577	04181	05270	05195	445049.00	03857	HFASH
NO010484C0900	005310030	04104	05050	05035	10044.50	20003	HCBSJ
NO010484C0909	010247308	05007	05232	05201	32055.00	53110	HCBSG
	010247474	05007	05232	05201	32055.00	53110	HCBSG
	010247844	05007	05232	05201	32055.00	53110	HCBSG
	010247849	05007	05232	05201	32055.00	53110	HCBSG
	010247852	05007	05232	05201	32055.00	53110	HCBSG
NO010484C1012	009245466	04200	05325	05243	29322.00	72737	HCBSJ
NO010484C1024	010235682	04214	05000	05077	73200.00	59100	HFASH
NO010484C1030	012272952	04209	05000	05074	73200.00	22501	HFASH
NO010484C1077	010881377	04254	05109	05105	238920.00	00047	HCSOJ
NO010484C1091	011700992	04250	05340	05272	20010.00	03057	HFASH
NO010484C1094	009906108	04240	05273	05223	104194.91	94218	HSBSJ
NO010484C1124	009771107	04350	05154	05120	106725.00	00032	HEGSH
NO010484C1145	011408808	04259	05304	05100	92800.00	01551	GBSSA
NO010484C1150	010501220	04259	05259	05201	03220.00	03057	HFASH
NO010484C1179	011045000	04272	06259	06002	27000.34	94805	CVBS4
NO010484C1200	000528903	04273	06152	05272	17500.00	34270	HEBSG
NO010484C1310	010934800	03340	04251	04248	1075.00	54422	HVCSO
NO010484C1387	004316709	04044	04355	04340	30800.00	02059	HVCSO
NO010484C1411	000349719	04097	05310	05017	17500.14	90441	HVCSO
NO010484C1443	004710875	04151	06031	05105	19300.31	00047	HQSO0
NO010484C1491	010948208	04105	06104	06000	3075.00	00047	WF4W9
NO010484C1490	005738293	04188	05023	05017	10000.00	71905	HVCSO
NO010484C1521	000510181	04199	05000	05027	22059.00	01270	HVCSO
NO010484C1555	011000414	04227	05172	05092	278000.00	02005	HVCSO
NO010484C1562	000102000	04220	05072	05071	34007.00	53154	GFBSO
NO010484C1580	010003530	04250	05172	05109	37055.03	90004	HVCSO
NO010484C1594	010392681	04254	06104	06070	33030.00	00047	HVCSO
NO010484C1617	010942935	04259	06044	05201	108020.00	00540	HVCSO
NO010484C1625	000508700	04259	05343	05139	47820.00	00540	HVCSO
NO010484C1639	011192407	04259	06241	06100	31230.00	00047	HVCSO
NO010484C1641	001225059	04200	05304	05300	30800.00	90441	HVCSO
NO010484C1670	004041141	04273	05248	05223	23404.00	52059	HVCSO
NO010484C1684	011222557	04273	05003	05002	11430.00	52200	HVCSO
NO010484C1805	011002803	03332	06049	06027	28550.00	00041	AASSS
NO010484C1817	010317900	03330	05205	05230	35040.00	03900	CVBSZ
NO010484C1827	010292572	03347	05054	04302	0909.00	54475	AK1SU
NO010484C1836	007047170	04200	05000	05010	190542.92	01250	OYZSY
NO010484C1861	000120061	04031	06211	05291	294700.00	70670	AT4SK
NO010484C1905	009143724	04100	05134	05139	400.00	00032	BDSSK

PIIN	NIIN	PURCH_DATE	RUC	CONT_COMP	EXT_DOL	FSCM	LRG
N0010484C1912	004080655	84197	85251	85055	1088.00	59475	AC1SS
N0010484C1927	009431059	84257	85206	85196	1230.00	67806	AS4SR
N0010484C1949	007783032	84185	85129	85062	5190.40	32872	AA4SS
N0010484C1955	005022028	84177	85071	85042	23504.00	50293	AH3ST
N0010484C1960	001868283	84258	85177	85180	1551.00	59475	AD4SS
N0010484C1965	010529077	84192	85247	85223	145507.20	14462	LAASZ
N0010484C1967	010942492	84273	85207	85077	40500.00	25634	WJ4WS
N0010484C1977	004383269	84257	85271	85105	1992.00	59475	AD1SS
N0010484C1981	001725866	85082	86137	86062	3650.00	59475	AC1SS
N0010484C1984	010225890	84214	85204	86168	24800.00	95892	AA2SS
N0010484C1995	001563282	84366	85300	85243	3752.00	59475	AD4SS
N0010484C2013	010596221	84270	85340	85280	3560.00	59475	ACLSS
N0010484C2029	010292576	84331	85355	85321	6726.00	59475	AK1SU
N0010484C2046	008531920	84232	85323	85216	31043.00	23199	EXJ3N
N0010484C2062	001851423	84291	85288	85260	4788.00	59475	AD4SS
N0010484C2074	002486846	84353	85320	85314	754.00	59475	ATCSR
N0010484C2076	010409362	84356	86065	86068	2860.00	20284	AK1SU
N0010484C2077	010047169	84243	85313	85280	15390.00	59475	ATCSR
N0010484C2091	010666166	84237	85350	85238	104614.00	96341	AJ1ST
N0010484C2113	006248293	83547	84222	84201	38375.00	30223	CP6SX
N0010484C2157	010395285	84061	85155	84352	8996.40	32372	CF6SV
N0010484C2162	010628317	84107	85141	85128	1400.00	33362	CF6SV
N0010484C2169	010517488	84107	85171	84289	3133.60	12186	CF6SV
N0010484C2230	010292356	84259	86188	86146	2124.00	32904	CF6SV
N0010484C2260	010317537	84237	85344	85132	2539.30	36805	CF1SV
N0010484C2263	011062817	84209	85319	85303	7800.00	00641	
N0010484C2312	011497132	84258	85196	85145	54720.00	01456	858SU
N0010484C2504	003203062	84259	85239	85254	122861.49	14058	DEZSW
N0010484C2537	012030887	85073	85313	85263	1660672.00	29456	ETZSM
N0010484C2656	011038044	84068	84286	84270	26141.40	33362	KAASW
N0010484C2740	004214357	84194	86005	85349	37751.61	36549	DS4SY
N0010484C2767	008975412	84216	85290	85133	6022.80	20723	DEZSW
N0010484C2776	010759973	84244	85328	85272	736400.00	16786	WRZWS
N0010484C2794	011137623	84256	85356	85201	19992.00	17453	ETHSM
N0010484C2797	011581232	84271	87059	86176	820571.96	71483	KAA91
N0010484C2853	010742393	84145	85209	85201	554.18	59475	PQ4TQ
N0010484C2854	000750525	84255	85180	85123	43825.00	31143	EE3SP
N0010484C2866	011575180	84171	85168	85097	20709.00	31210	LUBTC
N0010484C2927	007756102	84222	85222	85196	21825.00	27594	PY5TR
N0010484C2930	007314404	84226	85270	85223	20905.00	24746	EE1SP
N0010484C2938	010373297	84244	85237	85201	11900.00	03594	
N0010484C3028	010394751	84200	84350	84302	27434.00	56742	PV5TQ
N0010484C3103	010958860	84116	84266	84241	31192.00	04971	PW4TQ
N0010484C3110	009373289	84311	85336	85272	30810.00	59244	PDATN
N0010484C3112	011909844	84159	84300	84291	663290.14	80009	PYATR
	012021388	84159	84300	84291	663290.14	80009	PYATR
N0010484C3142	011021444	84255	85091	85077	173328.75	14031	PY5TR
N0010484C3152	LLHHH0880	84259	86074	85300	108300.00	16379	P5FTN
	LLHHH0881	84259	86074	85300	108300.00	16379	P5FTN
N0010484C3153	002890249	84259	85133	85035	7168.56	96696	PZ4TK
N0010484C3165	001516741	84256	85072	85042	36000.00	02040	PR4TL
N0010484C3171	010183204	84179	85240	85214	401549.20	80009	PY5TR

PIIN	NIIN	PURCH_DATE	ROD	CONT_COMP	EXT_DOL	FSCM	LRG
NOU10484C3220	011015841	84271	85355	85197	53523.99	58034	LE6TL
NOU10484C3254	000432593	85010	85280	85196	2021.85	57188	PDATN
NOU10484C3272	004501494	84236	85230	85238	74133.00	58014	PCSTN
NOU10484C3273	010329126	84271	87142	88162	837952.00	12050	PR4TW
NOU10484C3304	000532798	83362	85015	85014	9890.00	00641	RHSTV
NOU10484C3311	008808989	84032	85162	85097	1330.00	33362	RF2TU
NOU10484C3332	012111910	84191	85259	85201	48309.00	57761	RU6TW
	012111911	84191	85259	85201	48309.00	57761	RU6TW
	012111912	84191	85259	85201	48309.00	57761	RU6TW
	012111913	84191	85259	85201	48309.00	57761	RU6TW
	012111914	84191	85259	85201	48309.00	57761	RU6TW
	012111915	84191	85259	85201	48309.00	57761	RU6TW
	012111916	84191	85259	85201	48309.00	57761	RU6TW
	012116390	84191	85259	85201	48309.00	57761	RU6TW
NOU10484C3350	010928987	84177	85357	85035	13471.68	18565	RL2TV
NOU10484C3361	010975252	84200	85105	85083	40808.00	04839	RA2TU
NOU10484C3364	011253355	84209	85128	85118	7403.00	29078	RL2TV
NOU10484C3365	012062671	84209	85204	85196	24804.00	98341	RB2TU
	012128765	84209	85204	85196	24804.00	98341	RB2TU
NOU10484C3388	010282995	84259	85173	85091	52780.00	98341	RB2TU
NOU10484C3396	011213122	85178	86113	86039	34794.20	78752	RL3TV
NOU10484C3711	010634910	83349	84268	84139	57200.00	20019	HR6SJ
NOU10484C3779	LLHE40198	84326	85231	85163	42280.00	08748	GXASF
NOU10484C3928	004535764	84268	86099	85231	18812.00	88657	HFJSH
NOU10484C3936	010336669	84229	85365	85263	96203.43	28034	CWASZ
	010658175	84229	85365	85263	96203.43	28034	CWASZ
NOU10484C4127	010138025	84013	84313	84241	47939.64	52367	JXE73
NOU10484C4132	011129799	84220	86112	86105	33936.00	31143	JXV73
NOU10484C4143	008773120	84041	85217	85035	19720.00	29464	JXU73
NOU10484C4167	011036335	84233	86162	86084	27744.00	11859	JAB73
NOU10484C4196	011590467	84298	85344	85329	32905.00	30086	JXF73
NOU10484C4207	011580510	84361	85206	85196	67995.30	93181	JXM73
NOU10484C4221	010655605	84187	85319	85175	224754.00	21950	JXV73
NOU10484C4224	004061089	84194	85171	85132	52752.00	00062	JXE73
NOU10484C4225	011633692	84201	85152	85050	36630.00	18012	JX573
NOU10484C4242	001816850	84215	85179	85105	62048.48	40912	JXF73
NOU10484C4298	002345989	84258	86082	86035	173339.00	99517	JXG73
NOU10484C4300	011110790	84268	85287	85209	32400.00	29464	JXF73
NOU10484C4304	005312219	84264	85319	85300	25762.16	62951	JXF73
NOU10484C4400	010963741	84256	85151	85094	77879.00	02750	EXCSJ
NOU10484C4422	010293962	84258	86067	86062	20855.00	89269	AA4SS
NOU10484C4428	010292597	85073	86138	86019	547.00	59475	AK1SU
NOU10484C4432	010292557	84334	85266	85201	1305.90	98616	AK1SU
NOU10484C4433	001776266	84333	85333	85314	2115.00	59475	AC1SS
NOU10484C4502	002252389	84333	85338	85243	1575.00	57188	PDATN
NOU10484C4528	004696997	84283	85248	85196	17661.36	19156	PQ4TW
NOU10484C8013	007665114	86162	86282	86215	10359.77	6A433	CY4SZ
	007665821	86162	86282	86215	10359.77	6A433	CY4SZ
NOU10485C8054	011275143	85162	86104	86049	1794.50	84027	CY4SZ
NOU10485C8088	010714413	85311	86306	86216	411.40	33362	CY4SZ
NOU10485C8093	007665789	86006	86216	86203	5370.00	51828	CY4SZ
NOU10485C8101	009378006	86010	86365	86124	2304.86	76691	CY4SZ

PIIN	NIIN	PURCH_DATE	RDD	CONT_COMP	EXT_DOL	FSCM	LRG
N0010485C3115	010714579	85273	86183	86108	996.99	88805	CY4SZ
N0010485C3116	010878142	86010	86395	86199	875.16	88805	CY4SZ
N0010485C0032	011013890	85276	85386	85349	32094.00	32770	HR3SJ
N0010485C0010	010578641	84354	85350	85201	98800.00	12511	GR3SE
N0010485C0031	010395751	84353	86013	85363	50859.00	58380	GRHSE
N0010485C0101	011071170	85106	86226	86009	39242.00	31361	GRUSF
N0010485C0109	001321115	85121	86236	86204	35416.00	10171	HR3SH
N0010485C0112	010483966	85121	86245	86099	20196.00	89512	GK3SE
N0010485C0196	003775867	85240	86219	86120	98875.00	8X074	GP3SU
N0010485C0199	006658362	85241	86236	86188	2619.70	01212	GP3SD
N0010485C0231	008051620	85273	86206	86049	69429.38	83445	HR3SA
N0010485C0240	LLMOP4110	85296	86296	86124	174210.00	62854	GKFSU
	011769814	85296	86296	86124	174210.00	62854	GNFSU
	011773228	85296	86296	86124	174210.00	62854	GNFSU
	011778721	85296	86296	86124	174210.00	62854	GNFSU
	011778723	85296	86296	86124	174210.00	62854	GNFSU
	011788724	85296	86296	86124	174210.00	62854	GNFSU
	011788725	85296	86296	86124	174210.00	62854	GNFSU
N0010485C0305	004064766	84283	85138	85097	23265.25	6M339	KAASU
N0010485C0310	010714364	84283	85268	85232	98586.50	02750	HQ3SJ
N0010485C0312	009524779	84292	85146	85139	7222.00	91343	GLFSB
N0010485C0316	011728934	84297	86273	86215	41914.00	52374	GLFSB
N0010485C0339	004642300	84339	86008	85322	45046.80	34494	
N0010485C0352	011599377	84352	86076	85118	14731.20	20200	GLESB
N0010485C0355	007677209	84354	85230	85226	35700.00	93591	GN3SD
N0010485C0357	010253354	85025	86030	85201	403454.20	95802	GNCSH
N0010485C0359	002867811	84356	85271	85263	22296.00	65130	GLESB
N0010485C0370	005719005	85007	85227	85201	21303.97	78730	GN3SD
N0010485C0375	005594655	85017	86133	86005	77937.00	89135	GBBSA
N0010485C0388	010337238	85031	86040	85252	41760.00	13646	GLESB
N0010485C0395	012335807	85032	85272	85160	64000.00	60529	GPCSD
N0010485C0431	010882152	85053	85333	85322	99443.00	11023	GBBSA
N0010485C0435	002644513	85071	86061	85342	18900.00	89990	KAASA
	002644517	85071	86061	85342	18900.00	89990	KAASA
N0010485C0462	008028314	85079	86014	85329	64260.00	50188	GBBSA
N0010485C0503	009531407	85102	86013	85300	31819.64	86293	GLFSB
N0010485C0590	000864483	85281	86129	86068	68238.36	06442	PZ4TK
N0010485C0605	001611749	85158	86053	86014	7877.10	56861	GAASA
N0010485C0613	002673037	85169	86314	86131	66096.00	64537	GLESB
N0010485C0628	010529357	85178	86103	86089	65680.00	13646	GLESB
N0010485C0636	000726983	85294	86229	86213	30567.00	16712	GP3SU
N0010485C0681	010216093	85317	86363	86183	28500.03	07309	GXASF
N0010485C0713	011088966	85253	86269	86210	21582.00	34409	GLESB
N0010485C0744	011442822	85280	86218	86103	48578.00	05991	HQASU
N0010485C0917	011192350	85037	86239	86089	61950.00	59536	KAASF
N0010485C0955	003512228	84325	86065	86062	21916.09	26003	HQ3SJ
N0010485C0965	011349332	84340	85235	85180	21445.20	51725	HFFSF
N0010485C0968	011381403	84340	85225	85218	39142.92	95520	HFHSH
N0010485C0977	003466677	84356	85235	85207	29970.00	7A680	HFB3H
N0010485C0987	003961692	84361	86271	86099	27112.50	97537	HFB3H
N0010485C1006	010509214	85004	86004	85252	35700.00	63657	HEGSH
N0010485C1022	010511812	85016	86016	85272	31740.00	63857	HEGSH

PIIN	NIIN	PURCH_DATE	RDD	CUNT_COMP	EXT_DOL	FSCM	LRC
NOU10485C1040	U11700994	85032	85213	85089	15780.00	63657	HFBSH
NOU10485C1050	008139582	85057	85337	85306	72912.00	04579	HEGSH
NOU10485C1055	U11442032	85056	86146	86029	79575.00	63657	HFBSH
NOU10485C1127	U10976472	85115	85305	85272	35477.64	53058	HSBSJ
NOU10485C1139	U11548586	85135	86010	85363	26360.00	30793	HFBSA
NOU10485C1140	011442033	85136	85135	86027	40140.00	63657	HFBSH
NOU10485C1145	U10870473	85123	86117	86105	31365.00	00062	HSASJ
NOU10485C1153	004322729	85156	86044	86027	38163.00	14506	HEGSO
NOU10485C1155	U11442033	86023	86270	86216	53120.00	63857	HFBSH
NOU10485C1159	007732786	85140	86035	86015	29327.13	12497	HQBSJ
NOU10485C1173	009090467	85280	86065	86049	35990.64	15167	HFBSH
NOU10485C1186	U10740989	85151	86146	86075	58324.00	00062	HSASJ
NOU10485C1199	007825153	85165	85365	85294	170097.00	35793	HEGSO
NOU10485C1220	006262420	85183	86098	85305	21373.29	23308	HQBSA
NOU10485C1223	U10845336	85210	86085	86009	94022.40	15309	GRBSJ
NOU10485C1229	U07717209	85239	86234	86034	151370.65	15309	HSASJ
NOU10485C1233	004360836	85214	86209	86133	99300.00	28199	HSASJ
NOU10485C1256	006472777	85281	86276	86191	62607.00	30066	HQBSJ
NOU10485C1259	U02158613	85232	86167	85363	45134.00	95335	HFBSH
NOU10485C1283	U10509780	85248	86246	86124	77135.00	63857	HEGSH
NOU10485C1292	U11136975	85239	86348	86181	37167.00	56425	HSASJ
NOU10485C1298	010881377	85262	86257	86202	137577.00	60047	HSCSJ
NOU10485C1320	U11083138	85255	86230	86133	26392.00	56425	HSASJ
NOU10485C1336	006262420	85257	86102	85322	62705.96	22308	HQBSA
NOU10485C1341	U09142241	85261	86096	86075	38291.00	71871	HSBSJ
NOU10485C1359	011110221	85364	86210	86168	26250.00	5H654	HSCSJ
NOU10485C1371	U04827191	85264	86179	86120	40660.00	07652	HSASJ
NOU10485C1386	U11047587	86005	87006	86196	46242.00	63657	HEGSO
NOU10485C1391	U10673353	85273	86108	86064	71040.00	56374	HEGSH
NOU10485C1399	U11333078	85273	86356	86176	231075.00	13520	HFBSH
NOU10485C1403	U00435436	84296	85160	85118	3390.00	9R663	GFCSO
NOU10485C1414	U11704371	84305	86141	86013	36157.00	26300	HVJSO
NOU10485C1416	U10343642	84311	86274	86088	25530.00	4Y069	HVCSO
NOU10485C1435	PNMAR5087	85063	85233	85216	4650.00	17062	
NOU10485C1443	U09044736	85053	85263	85196	3045.00	4Y069	GFCSO
NOU10485C1450	U11300118	85067	85247	85201	42370.00	1Y025	HVESO
NOU10485C1461	U10391875	85363	85213	85175	3300.00	4Y069	GFCSO
NOU10485C1464	U10166028	85007	86192	85300	13645.44	28553	HVJSO
NOU10485C1471	009292746	85017	85299	85277	28860.00	17062	HVDSO
NOU10485C1477	U10362205	85025	85243	85196	69258.00	4Y069	HFBSO
NOU10485C1496	U10433493	85030	86031	86027	37915.00	37574	HVKS0
NOU10485C1508	U03670768	85036	85278	85238	4392.80	27424	GFBSO
NOU10485C1512	U06000845	85044	85212	85203	73760.00	4Y069	GFCSO
NOU10485C1520	U00435752	85056	86365	86124	26600.00	52659	HVCSO
NOU10485C1545	U03931710	85122	85332	85321	26400.00	53159	HVASO
NOU10485C1630	U07605883	85134	86039	85321	14151.00	11659	HVDSO
NOU10485C1718	U00332066	85171	86046	86035	46771.43	7V760	GFCSO
NOU10485C1771	U04335994	85333	86178	86120	44389.30	13669	HVESO
NOU10485C1872	U10624573	85281	87193	86215	31571.64	9U064	HVCSO
NOU10485C1880	U10474854	85256	86161	86146	4739.28	2K305	HVKS0
NOU10485C1889	U11521251	85256	86132	86120	16732.50	9U064	HVJSO
NOU10485C1903	U04213143	85011	86096	86076	3202.32	2U284	AC155

PIIN	NIIN	PURCH_DATE	RDD	CONT_COMP	EXT_DOL	FSCM	LRC
N0010485C1906	008160492	84339	85294	85201	552.60	33362	AS4SR
N0010485C1912	008052831	84339	85303	85280	1088.00	59475	AD1SS
N0010485C1931	009189139	84305	86031	85363	5906.00	60479	AA6SS
N0010485C1937	010292593	85063	85363	85231	644.07	9N616	AK1SU
N0010485C1943	010226799	85045	86080	86035	3816.00	59475	AC1SS
N0010485C1960	011135079	84347	86157	86073	41291.25	85497	AALSS
N0010485C1962	007090764	85037	85217	85201	5346.00	29078	AA4SS
N0010485C1964	010543055	84363	86067	86009	25680.00	53756	ATCSR
N0010485C1967	001182443	84352	85266	85238	58910.00	30223	
N0010485C1971	001868423	85073	86088	85329	5350.00	59475	AD4SS
N0010485C1987	010293966	85030	86255	85349	47173.92	9N616	AA4SS
N0010485C1995	010392794	85102	85327	85263	37678.00	56875	KA4SQ
N0010485C2023	000706200	85079	86003	85321	68092.20	3F272	AC1SS
N0010485C2029	010066394	85079	86149	86068	28725.00	59475	ATCSR
N0010485C2035	002937817	85115	86080	86062	5754.00	53260	AC1SS
N0010485C2040	001395007	85082	86343	86131	40200.00	60479	6M6SN
N0010485C2044	010066304	85037	86267	86073	37905.00	09448	AMMST
N0010485C2046	000079723	85092	85352	85252	78030.00	12593	AC1SS
N0010485C2074	005963781	85135	85363	85287	53760.00	00641	AA2SS
N0010485C2081	010292597	85200	86195	86160	2100.34	9N616	AK1SU
N0010485C2107	010268369	85163	86246	86019	9063.00	32872	KA4ST
N0010485C2132	010292577	85303	85298	86169	4732.00	59475	AK1SU
N0010485C2136	001851418	85296	86281	86189	53760.00	59475	AA4SS
N0010485C2142	010989038	85196	86102	86091	60173.63	60479	BRASN
N0010485C2153	005132373	85212	86311	85301	6118.00	9N416	AM1ST
N0010485C2164	005384307	85221	86120	86087	74120.67	82939	AA2SS
N0010485C2176	002203679	85232	86197	86124	43420.00	04454	AD2SS
N0010485C2186	010885247	86016	86226	86118	32745.00	01220	WJ4W3
N0010485C2193	010799301	85337	87272	86216	2634.89	9N616	ATCSR
N0010485C2206	010292483	84293	86123	86103	26376.00	29078	CF6SV
N0010485C2209	004002893	84292	85138	85128	26920.82	32872	CXESZ
N0010485C2221	010291368	85066	85306	85300	367.20	29078	CF6SV
N0010485C2238	005495663	84354	86232	86089	229592.00	98089	BUTSL
N0010485C2261	010291850	84333	85208	85203	353587.10	9L365	CF1SV
N0010485C2272	003847861	84332	85327	85209	12403.50	3X694	KAASK
N0010485C2273	001867749	84356	86046	85349	35464.00	54027	BU4SL
N0010485C2286	003512692	85058	85364	85363	1323.92	60479	CR8SX
N0010485C2305	010400311	85192	86097	86019	1639.14	60479	CF6SV
N0010485C2319	010741910	84362	86239	85314	8519.10	22210	WR2WS
N0010485C2381	012074753	85099	86034	86040	39909.00	1A489	BF6SK
N0010485C2383	010300136	85052	86019	85363	20463.75	54267	CF6SV
N0010485C2438	000424437	85212	85207	86203	7301.70	21530	CR8SX
N0010485C2481	000616740	85207	86137	86068	7900.00	9L761	CRLSX
N0010485C2538	007661793	85256	86321	86120	8774.24	32872	CETSV
N0010485C2573	009286516	85263	87041	86203	1320.00	17935	CR8SX
N0010485C2578	LLHDQX361	85177	85337	85349	18669.40	6T564	
N0010485C2625	011228960	85053	85329	85272	1485.00	07806	CS6SX
N0010485C2627	010761710	85036	85319	85300	3700.00	16786	WR2WS
N0010485C2630	004946331	85044	85004	85272	4313.00	12166	CS6SX
N0010485C2641	011346538	84362	86202	86193	33768.00	06481	CADTG
N0010485C2633	011663878	85363	86290	85241	176613.00	97933	ESSTK
N0010485C2660	004409112	85067	86002	85321	5738.00	59475	

PIIN	NIIN	PURCH_DATE	ROO	CONT_COMP	EXT_DCL	FSCM	LRC
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N0010485C2681	004594347	84356	65334	85306	33003.00	83002	DS4SY
N0010485C2681	000742039	84363	66156	86141	9693.00	31979	ERQSQ
N0010485C2683	010760417	85003	66193	85349	23980.00	16786	C2LSZ
N0010485C2700	004041171	85017	85227	85223	49440.00	97188	DEZSW
N0010485C2711	007939373	85025	66105	66009	24712.00	28009	CS6SX
N0010485C2726	006737611	85039	66114	86052	39863.54	62748	CS6SX
N0010485C2731	010267697	85039	65219	65196	24103.00	55163	DP3SY
N0010485C2747	010576343	85086	65326	65178	301050.00	05464	DC1SW
N0010485C2773	003132364	85076	66043	65287	162477.90	15678	ETZSM
N0010485C2796	009284260	85116	66036	85363	5400.00	29489	CS6SX
N0010485C2797	008786723	85116	66116	85349	5061.60	29489	CS6SX
N0010485C2820	006737788	85178	66063	66050	4166.40	97165	CS6SX
N0010485C2826	003512681	85204	86197	86099	14352.00	29078	CS6SX
N0010485C2826	012519873	85112	66352	85233	1234055.20	56341	ETZSM
	012050695	85112	65352	85233	1234055.20	56341	ETZSM
	012050664	85112	65352	85233	1234055.20	56341	ETZSM
N0010485C2841	011566829	85236	66111	86063	769500.00	96467	ESSTK
N0010485C2846	010759978	85234	66259	66119	6327.65	54267	WR2W3
N0010485C2861	009801333	85214	66179	86140	3125.00	59475	DT3SY
N0010485C2900	011694356	84292	66095	85323	150590.60	07145	LU3TC
	011694360	84292	66095	85323	150590.60	07145	LU3TC
N0010485C2908	011459164	84292	85168	85151	119814.36	14028	LK4TH
N0010485C2922	010640265	84345	85249	85196	236094.00	50245	LL3TH
	010640266	84345	85249	85196	236094.00	50245	LL3TH
N0010485C2925	010457861	84334	85149	85128	23100.00	34355	LU3TC
N0010485C2931	011632846	84347	85305	85287	36300.00	91161	LU3TC
N0010485C2934	010103309	85004	86184	86120	601640.44	14028	LK4TH
N0010485C2936	011359861	84356	86264	65201	32230.00	96247	EC3SQ
N0010485C2937	010640301	84356	85350	85287	66816.00	14028	LK4TH
N0010485C2960	010775935	85029	85263	85252	6048.00	15870	ECMSQ
N0010485C2975	011637617	85234	66099	86079	48278.70	95266	LU3TC
N0010485C2983	011007373	85120	66060	86036	32134.00	55337	EG3SQ
N0010485C2985	011933592	85063	66236	86019	9384.00	57761	LSATC
N0010485C2998	010285225	85059	85354	85261	252172.20	91196	EBLSP
N0010485C3005	011740292	85070	86005	85329	53400.00	91161	LU3TC
N0010485C3008	011228721	85078	86195	86062	27243.20	78732	LSATT
N0010485C3025	01081232	85096	85316	85287	43200.00	09446	EA4SP
N0010485C3032	008478005	85107	85317	85280	2190.00	30842	EB1SP
N0010485C3040	011570333	85112	86232	85291	25760.00	14345	LU3TC
N0010485C3047	011575256	85130	86033	85349	630.54	57605	LU3TC
N0010485C3053	011510029	85136	86041	85349	47120.00	11556	LU3TC
N0010485C3059	010628557	85132	86312	86166	38291.00	14923	ERTSQ
N0010485C3065	010400208	85163	86038	86027	36151.19	04034	EA4SP
N0010485C3068	010602272	85169	86169	86027	65364.97	33472	LM3TH
N0010485C3090	011678695	85218	86093	86040	80444.00	22978	LU3TC
N0010485C3098	006304635	85234	86079	85295	20996.30	22308	GBCSA
N0010485C3106	011547016	84286	85221	85216	42311.67	15760	PR4TW
N0010485C3115	011638731	84290	85151	85063	5928.00	62005	WH2W3
N0010485C3134	011267239	84335	85212	85201	41500.00	14344	MS1TP
N0010485C3178	010706321	85007	86127	86071	75460.00	55595	EZ6TK
N0010485C3191	010648065	85025	85100	85306	10000.00	00997	WH2W3
N0010485C3201	011452801	85071	85291	85233	79101.72	60009	PT3TR

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N0010485C3238	010636957	85156	86067	85255	66230.00	56742	PV5TW
N0010485C3250	010166158	85080	86165	86116	1244766.70	89536	PT5TR
N0010485C3264	000761600	85205	87020	86176	4500.00	00641	PYATR
N0010485C3275	001316741	85101	86170	86139	64800.00	06040	PR4TW
N0010485C3286	012139354	85116	86171	86102	1019013.75	89536	PY5TR
N0010485C3332	004839713	85231	86226	86111	49468.32	19156	PW4TW
N0010485C3333	010848078	85226	86161	86075	795.00	00997	WZ2WS
N0010485C3344	011359907	85294	86359	86215	2480.80	22306	PDATN
N0010485C3346	010937139	85241	86256	86199	6125.00	00997	WZ2WS
N0010485C3402	011411748	85206	86315	86210	13934.79	22306	PDATN
N0010485C3413	010305401	85281	86156	86139	183031.50	30009	PY5TR
N0010485C3419	011980048	85044	86194	86149	32982.18	80009	PY5TR
N0010485C3432	011690864	85225	86060	86027	54280.00	62991	PDATN
N0010485C3437	011726913	85231	86301	86114	15560.00	82005	PDATN
N0010485C3479	011603045	85364	86039	86064	35135.00	62849	PY4TR
N0010485C3489	011429024	85261	86196	86114	24442.00	96758	PM1TP
N0010485C3530	011281360	85063	86353	85280	38373.80	05464	WZ2WS
N0010485C3553	010790631	85052	85322	85263	9548.83	20710	RD2TU
N0010485C3567	011099342	85070	86187	86151	46025.00	94033	EG5SW
N0010485C3572	008793306	85081	86077	86062	98415.00	26199	EXRSN
N0010485C3577	010292138	85068	86153	86066	11356.11	55641	RE7TU
N0010485C3588	004764748	85102	86007	85263	28080.00	53236	RR6TW
N0010485C3612	011198606	85148	86143	85291	29760.00	2N220	RM6TV
N0010485C3622	010790632	85176	86247	86124	4694.50	20710	RD2TU
N0010485C3632	010283352	85189	86227	86215	11655.00	06554	RE7TU
N0010485C3646	006792154	85224	86208	86075	154970.00	26199	EXRSN
N0010485C3647	007591289	85211	86206	86199	40800.00	00929	ELLSQ
N0010485C3649	004829230	86007	86227	86121	42935.83	05464	F5191
	004829231	86007	86227	86121	42935.83	05464	F5A91
N0010485C3650	011136731	85264	86175	86151	92202.00	07342	EZ6TK
N0010485C3653	010782659	85224	86181	86168	15020.50	53767	RD2TU
N0010485C3675	011162113	85240	86143	86040	80230.00	02101	RD2TU
N0010485C3700	009603760	85273	86180	86168	74003.90	05464	FCA91
N0010485C3900	011874962	85050	86170	85139	32320.00	62874	BS6SU
N0010485C3914	001044862	85063	85363	85360	62520.00	02131	DD3SW
N0010485C3915	LLCF26146	85064	85124	85122	29941.12	9R715	
N0010485C3940	011657561	85162	85343	85298	34917.00	8X641	LU8TC
N0010485C3950	009284769	85059	86059	85233	5383.30	40541	RA2TU
	009607819	85059	86059	85233	5383.30	40541	RA2TU
N0010485C3968	005354872	85093	86008	85238	15156.18	26300	FK991
N0010485C3976	006298896	85123	86062	85338	1410.00	36271	CS6SX
N0010485C3979	009667381	85267	86062	86062	53009.04	29732	DP3SY
N0010485C4006	010292594	85302	86277	86153	2565.00	59475	AK1SU
N0010485C4010	011477319	85206	86206	86195	95522.00	20079	E8LSP
N0010485C4012	LLNE35384	85226	86013	85334	34353.90	34345	KAA34
N0010485C4013	009284032	85213	86156	86094	1406.25	02004	RD2TU
N0010485C4021	LLCF38790	85323	86048	86023	96000.00	55380	
N0010485C4023	006616033	85365	86130	86143	27892.00	52202	PN5TP
N0010485C4226	000517599	86007	86363	86181	31600.00	5W260	HSASJ
N0010485C4237	000799625	84257	86354	84289	122040.00	14304	PPGTS
	000799627	84257	86354	84289	122040.00	14304	PPGTS
N0010485C4439	011667356	85009	85364	85252	144866.06	6L608	JX673

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N0010485C4448	011665074	05029	00205	00170	91517.00	34494	JXV73
N0010485C4404	002731889	05052	00274	00174	43200.00	1E012	JXU73
N0010485C4515	005071377	05127	00135	00062	12012.00	2P404	JXF73
N0010485C4534	010753030	05209	00144	00133	16170.00	1V059	JX873
N0010485C4539	011157045	05151	00060	00064	53502.00	0M031	JXU73
N0010485C4540	002415247	05140	00130	00120	47100.00	17001	JXF73
N0010485C4543	004022400	05102	00344	00133	19247.70	11059	JX973
N0010485C4549	010000011	05170	00237	00210	41530.00	02750	JXE73
N0010485C4501	012004405	05143	00300	00294	45000.44	34217	JXF73
N0010485C4503	004409112	05270	00235	00135	5247.00	54729	
N0010485C4508	000500147	05259	00074	00057	13771.35	9N010	CP85X
N0010485C4002	011730037	05199	00104	00004	00552.55	33302	KAASW
N0010485C4015	011202509	00000	00220	00203	49999.30	05404	DC15W
N0010485C4035	010055605	05220	00101	00102	20400.00	21930	JXV73
N0010485C4047	003020371	05235	00111	00075	7320.00	22237	JXE73
N0010485C4050	010009707	05238	00090	00003	47075.00	17794	JXE73
N0010485C4064	010199337	05241	00241	00027	45948.00	00502	JXF73
N0010485C4707	010292359	05270	00103	00120	15000.00	27594	CF65V
N0010485C4717	002252248	05211	00000	00077	19890.00	9N010	EU4SL
N0010485C4720	000131098	05211	00100	00002	23000.50	00000	EU4SL
N0010485C4740	001734833	00009	00220	00190	27400.10	20029	EU0SL
N0010485C4765	011231927	05301	00220	00190	14000.00	75305	CR85X
N0010485C4953	010317520	05339	00104	00151	4902.90	10096	CF15V
N0010485C4970	005434205	05259	00109	00124	0225.72	03042	BU3SL
N0010485C4973	010291440	05305	00200	00215	450.79	00019	CZ4S2
N0010485C4992	011002901	05270	00105	00108	77500.00	10591	CETSX
N0010485C4994	007457058	05271	00258	00215	0000.00	51046	CR85X
N0010485C5090	011013044	05259	00190	00009	24990.00	00009	ET2SM
N0010485C5123	010474948	05273	07053	00215	30413.00	59475	DC15W
N0010485C5304	010391404	05240	00121	00099	30520.74	14020	LK4TH
N0010485C5305	010775935	05053	00100	00107	20704.00	10070	ECMSQ
N0010485C5314	002523390	05257	00202	00127	75300.00	20940	EHMSP
N0010485C5315	000033210	05004	00209	00202	23402.00	20204	EGLSQ
N0010485C5419	010292509	05202	07042	00215	5902.00	59475	AK15U
N0010485C5432	010292591	05209	00294	00202	5302.00	59475	AK15U
N0010485C5439	004508294	05200	00295	00170	44000.00	01574	EX0SM
N0010485C5450	002001202	05273	07173	00212	17545.00	59475	AT0SR
N0010485C5707	001139895	05201	00100	00151	47000.00	53154	GF350
N0010485C5714	010291457	00027	00207	00190	2257.20	62212	CZ4S2
N0010485C5780	010293191	05273	00170	00077	35072.00	00700	CU2SX
N0010485C5050	000321517	05273	00100	00115	33471.52	10009	MFAS0
N0010485C5060	010497174	05273	00135	00002	00900.00	52001	MFASH
N0010480C0004	011703401	00010	00100	00007	1100.00	03939	CZ4S2
N0010480C0010	009379304	00010	00322	00120	1305.03	3T302	CY4S2
	009379300	00010	00322	00120	1305.03	3T302	CY4S2
N0010480C0024	000250734	00010	00305	00210	40.00	5M254	CY4S2
N0010480C0012	005730075	00017	00240	00151	71075.00	00047	MFASH
N0010480CX004	010323505	05343	00190	00105	23290.00	4V724	
	011320060	05343	00190	00105	23290.00	4V724	JX273
	011320072	05343	00190	00105	23290.00	4V724	JX273
	011320074	05343	00190	00105	23290.00	4V724	JX273
	011320000	05343	00190	00105	23290.00	4V724	JX273

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N0010486CX004	011342906	05343	06193	06105	23290.00	4V724	JXZ73
N0010486C0001	006907552	05301	06140	06099	21075.75	10972	GNFSG
N0010486C0015	002043093	05301	06146	06113	30010.00	3N123	GGESB
N0010486C0019	010100317	06010	06193	06139	20020.00	07332	GPBSU
N0010486C0037	010000134	05304	06240	06209	33032.10	75333	GPESU
N0010486C0063	008773157	06037	06217	06181	103205.95	08071	GNFSD
N0010486C0069	011212545	05329	06120	06113	20440.00	99517	GLFSB
N0010486C0074	012244578	05331	06320	06196	14700.00	17062	GLFSB
N0010486C0070	00077352	06010	06196	06177	32475.00	30359	GBCS4
N0010486C0109	011773298	06015	06193	06103	35262.25	13859	GNFSD
N0010486C0111	011903094	06015	06325	06210	47575.00	24047	GAESA
N0010486C0144	011409913	06051	06231	06103	70440.00	00054	GCASU
N0010486C0205	011041492	06034	06324	06210	53000.00	17839	GLFSB
N0010486C0297	011175307	06155	07001	06216	31200.00	12489	GBCSA
N0010486C0925	010003507	05304	06304	06124	104315.00	03057	HEGSM
N0010486C0936	010992871	05320	06171	06120	65504.00	90911	HSAJH
N0010486C0940	010001303	05326	06141	06097	49401.00	90911	HSCSJ
N0010486C0947	010931198	05357	06305	06108	1293462.00	01122	HEGSG
N0010486C0977	011406705	06085	06205	06202	31142.75	15309	HSBSJ
N0010486C0906	010920903	06029	06239	06215	27679.20	04349	HEFSJ
N0010486C0991	LLHDPF313	06030	06092	06102	153000.00	22501	GFASH
N0010486C1411	010934206	06014	06104	06136	15249.00	4Y009	HVCS6
N0010486C1425	010511912	05312	06227	06202	103050.00	53074	HVKS0
N0010486C1514	008485324	06029	06209	06196	24005.70	53159	HVAS0
N0010486C1516	010909403	06253	06233	06216	1190.00	17062	HVCS0
N0010486C1535	001053161	06044	06234	06210	10000.00	17062	GFCS0
N0010486C1552	012105908	06056	06236	06210	6530.00	06546	HVCS0
N0010486C1561	011235815	06058	06148	06112	7200.00	52230	HVES0
N0010486C2105	000274839	06008	06318	06108	2722.50	27594	BDSK
N0010486C2138	010000106	05324	06239	06151	39296.00	96341	AJ1ST
N0010486C2141	002101936	05311	06210	06108	17145.16	32372	
N0010486C2500	007090959	06009	06099	06050	131264.00	9N865	CF1SV
N0010486C2503	011547033	06024	06249	06211	80560.00	20019	BUBSL
N0010486C2541	150560307	05308	06193	06097	3534.00	07310	BFSK
N0010486C2574	010905983	06007	06247	06098	2308.00	53260	CR3SX
N0010486C2577	011733201	05338	06234	06215	22350.00	06742	BUBSL
N0010486C2589	010570453	05339	05134	06181	74507.80	06768	CR3SX
N0010486C2698	011594341	06009	06219	06210	35700.20	23902	
N0010486C3403	005300652	05234	06129	06105	22950.00	4K539	CHASV
N0010486C3443	010700200	05320	06200	06104	79500.00	05007	EZ0TK
N0010486C3462	000772340	05331	06216	06192	46307.40	43990	CS0SX
N0010486C3508	000708710	06002	06242	06202	5250.00	29489	CS0SX
N0010486C3906	010178409	06008	06188	06181	39720.00	03947	EAUSP
N0010486C3915	001341457	06029	05239	06210	5550.00	27905	LKBTH
N0010486C3930	011584922	06028	06208	06202	91005.00	14844	LL3TH
N0010486C4312	010171059	05291	07012	06035	41584.00	40541	W3W3
N0010486C4329	010000704	06015	06155	06099	35038.56	34280	PY4TK
N0010486C4341	010937008	05330	06202	06133	20090.00	59475	PN3TP
N0010486C4353	010937587	06002	06212	06108	7700.00	02005	WH2W3
N0010486C4387	010742021	06023	06233	06215	25240.00	14139	PDATN
N0010486C4424	004900097	06108	07013	06196	1052.50	50097	PM1TP
N0010486C4920	004332839	05333	06143	06139	15200.00	97150	RE0TU

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N0010486C4943	LL2010349	86044	86244	86216	22470.00	1A489	WM1W4
N0010486C4953	LLX950237	86034	86214	86120	50414.10	13859	FW8Y1
N0010486C4960	U11657302	86043	86323	86217	4138.64	76793	RF3TU
N0010486C5049	U09693613	86149	86329	86202	14262.52	06313	FEAY1
N0010486C5707	U09549486	85294	86164	86033	112096.00	04803	JX=73
N0010486C5719	U11761469	85365	86230	86173	1586.76	3X694	JXD73
N0022185CX035	U11313422	84345	85246	85243	8557.50	53139	JXP73
N0022185CX139	U10166407	85176	86133	86120	4878.00	07107	JXP73
N0022185CX144	U10291122	85184	86136	86124	2374.00	72423	JXP73
N0040685C0335	U12165132	85252	85342	85334	600000.00	20386	LE2TY
N0061285CT160	U00221147	84238	86300	85300	14976.00	34779	JXS73
N0061285CT161	U01280942	84303	86300	86166	33098.00	20644	JXS73
	U01572105	84303	86230	86166	33098.00	20644	JXS73

PART 12
CONTRACT DELIVERY OR
PERFORMANCE

12.000 Scope of part.

This part prescribes policies and procedures relating to delivery or performance under contracts for supplies, services, and construction.

SUBPART 12.1—DELIVERY OR PERFORMANCE
SCHEDULES

12.101 General.

(a) The time of delivery or performance is an essential contract element and shall be clearly stated in solicitations. Contracting officers shall ensure that delivery or performance schedules are realistic and meet the requirements of the acquisition. Schedules that are unreasonably tight or difficult of attainment (1) tend to restrict competition, (2) are inconsistent with small business policies, and (3) may result in higher contract prices.

(b) Solicitations shall, except when clearly unnecessary, inform bidders or offerors of the basis on which their bids or proposals will be evaluated with respect to time of delivery or performance.

(c) If timely delivery or performance is unusually important to the Government, liquidated damages clauses may be used (see Subpart 12.2).

12.102 Factors to consider in establishing schedules.

(a) *Supplies or services.* When establishing a contract delivery or performance schedule, consideration shall be given to applicable factors such as the—

- (1) Urgency of need;
- (2) Production time;
- (3) Market conditions;
- (4) Transportation time;
- (5) Industry practices;
- (6) Capabilities of small business concerns;
- (7) Administrative time for obtaining and evaluating offers and for awarding contracts;
- (8) Time for contractors to comply with any conditions precedent to contract performance; and
- (9) Time for the Government to perform its obligations under the contract; e.g., furnishing Government property.

(b) *Construction.* When scheduling the time for completion of a construction contract, the contracting officer shall consider applicable factors such as the—

- (1) Nature and complexity of the project;

(2) Construction seasons involved;

(3) Required completion date;

(4) Availability of materials and equipment;

(5) Capacity of the contractor to perform; and

(6) Use of multiple completion dates. (In any given contract, separate completion dates may be established for separable items of work. When multiple completion dates are used, requests for extension of time must be evaluated with respect to each item, and the affected completion dates modified when appropriate.)

12.103 Supplies or services.

(a) The contracting officer may express contract delivery or performance schedules in terms of—

(1) Specific calendar dates;

(2) Specific periods from the date of the contract; i.e., from the date of award or acceptance by the Government, or from the date shown as the effective date of the contract;

(3) Specific periods from the date of receipt by the contractor of the notice of award or acceptance by the Government (including notice by receipt of contract document executed by the Government); or

(4) Specific time for delivery after receipt by the contractor of each individual order issued under the contract, as in indefinite delivery type contracts and GSA schedules.

(b) The time specified for contract performance should not be curtailed to the prejudice of the contractor because of delay by the Government in giving notice of award.

(c) If the delivery schedule is based on the date of the contract, the contracting officer shall mail or otherwise furnish to the contractor the contract, notice of award, acceptance of proposal, or other contract document not later than the date of the contract.

(d) If the delivery schedule is based on the date the contractor receives the notice of award, or if the delivery schedule is expressed in terms of specific calendar dates on the assumption that the notice of award will be received by a specified date, the contracting officer shall send the contract, notice of award, acceptance of proposal, or other contract document by certified mail, return receipt requested, or by any other method that will provide evidence of the date of receipt.

(e) In invitations for bids, if the delivery schedule is based on the date of the contract, and a bid offers delivery based on the date the contractor receives the contract or notice of award, the contracting officer

shall evaluate the bid by adding 5 days (as representing the normal time for arrival through ordinary mail). If the offered delivery date computed with mailing time is later than the delivery date required by the invitation for bids, the bid shall be considered nonresponsive and rejected. If award is made, the delivery date will be the number of days offered in the bid after the contractor actually receives the notice of award.

12.104 Contract clauses.

(a) *Supplies or services.* (1) The contracting officer may use a time of delivery clause to set forth a required delivery schedule and to allow an offeror to propose an alternative delivery schedule. The clauses and their alternates may be used in solicitations and contracts substantially as shown, they may be changed, or new clauses may be written.

(2) The contracting officer may insert in solicitations and contracts for supplies or services a clause substantially the same as the clause at 52.212-1. Time of Delivery, if the Government requires delivery by a particular time and the delivery schedule is to be based on the date of the contract. If the delivery schedule is expressed in terms of specific calendar dates or specific periods and is based on an assumed date of award, the contracting officer may use the clause with its Alternate I. If the delivery schedule is expressed in terms of specific calendar dates or specific periods and is based on an assumed date the contractor will receive notice of award, the contracting officer may use the clause with its Alternate II. If the delivery schedule is to be based on the actual date the contractor receives a written notice of award, the contracting officer may use the clause with its Alternate III.

(3) The contracting officer may insert in solicitations and contracts for supplies or services a clause substantially the same as the clause at 52.212-2. Desired and Required Time of Delivery, if the Government desires delivery by a certain time but requires delivery by a specified later time, and the delivery schedule is to be based on the date of the contract. If the delivery schedule is expressed in terms of specific calendar dates or specific periods and is based on an assumed date of award, the contracting officer may use the clause with its Alternate I. If the delivery schedule is expressed in terms of specific calendar dates or specific periods and is based on an assumed date the contractor will receive notice of award, the contracting officer may use the clause with its Alternate II. If the delivery schedule is to be based on the actual date the contractor receives a written notice of award, the contracting officer may use the clause with its Alternate III.

(b) *Construction.* The contracting officer shall insert the clause at 52.212-3. Commencement, Prosecution, and Completion of Work, in solicitations and contracts when a fixed-price construction contract is contemplat-

ed. The clause may be changed to accommodate the issuance of orders under indefinite-delivery contracts. If the completion date is expressed as a specific calendar date, computed on the basis of the contractor receiving the notice to proceed by a certain day, the contracting officer may use the clause with its Alternate I.

52.212-1 Time of Delivery.

As prescribed in 12.104(a)(2), the contracting officer may insert a clause substantially as follows in solicitations and contracts for supplies or services if the Government requires delivery by a particular time and the delivery schedule is to be based on the date of the contract:

TIME OF DELIVERY (APR 1984)

(a) The Government requires delivery to be made according to the following schedule:

REQUIRED DELIVERY SCHEDULE

{Contracting Officer insert specific details}

ITEM NO	QUANTITY	WITHIN DAYS AFTER DATE OF CONTRACT
-----	-----	-----
-----	-----	-----
-----	-----	-----

The Government will evaluate equally, as regards time of delivery, offers that propose delivery of each quantity within the applicable delivery period specified above. Offers that propose delivery that will not clearly fall within the applicable required delivery period specified above, will be considered nonresponsive and rejected. The Government reserves the right to award under either the required delivery schedule or the proposed delivery schedule, when an offeror offers an earlier delivery schedule than required above. If the offeror proposes no other delivery schedule, the required delivery schedule above will apply.

OFFEROR'S PROPOSED DELIVERY SCHEDULE

ITEM NO.	QUANTITY	WITHIN DAYS AFTER DATE OF CONTRACT
_____	_____	_____
_____	_____	_____
_____	_____	_____

(b) Attention is directed to the Contract Award provision of the solicitation that provides that a written award or acceptance of offer mailed, or otherwise furnished to the successful offeror, results in a binding contract. The Government will mail or otherwise furnish to the offeror an award or notice of award not later than the day award is dated. Therefore, the offeror should compute the time available for performance beginning with the actual date of award, rather than the date the written notice of award is received from the Contracting Officer through the ordinary mails. However, the Government will evaluate an offer that proposes delivery based on the Contractor's date of receipt of the contract or notice of award by adding five days for delivery of the award through the ordinary mails. If, as so computed, the offered delivery date is later than the required delivery date, the offer will be considered nonresponsive and rejected.

(End of clause)
 (R 7-104.92(b) 1974 APR)
 (R 1-1.316-5)
 (R 1-1.316-4(c))

Alternate I (APR 1984). If the delivery schedule is expressed in terms of specific calendar dates or specific periods and is based on an assumed date of award, the contracting officer may substitute the following paragraph (b) for paragraph (b) of the basic clause. The time may be expressed by substituting "on or before"; "during the months ..."; or "not sooner than ... or later than ..." as headings for the third column of paragraph (a) the basic clause.

(b) The delivery dates or specific periods above are based on the assumption that the Government will make award by[Contracting Officer insert date]. Each delivery date in the delivery schedule above will be extended by the number of calendar days after the above date that the contract is in fact awarded. Attention is directed to the Contract Award provision of the solicitation that provides that a written award or acceptance of offer mailed or otherwise furnished to the successful offeror results in a binding contract. Therefore, the offeror should compute the time available for performance beginning with the actual date of award, rather than the date the written notice of award is received from the Contracting Officer through the ordinary mails.

(R 7-104.92(e) 1974 APR)
 (R 1-1.316-4(b)(1))

Alternate II (APR 1984). If the delivery schedule is expressed in terms of specific calendar dates or specific periods and is based on an assumed date the contractor will receive notice of award, the contracting officer may substitute the following paragraph (b) for paragraph (b) of the basic clause. The time may be expressed by substituting "within days after the date of receipt of a written notice of award" as the heading for the third column of paragraph (a) of the basic clause.

(b) The delivery dates or specific periods above are based on the assumption that the successful offeror will receive notice of award by[Contracting Officer insert date]. Each delivery date in the delivery schedule above will be extended by the number of calendar days after the above date that the Contractor receives notice of award; *provided*, that the Contractor promptly acknowledges receipt of notice of award.

(R 7-104.92(e)(2) 1974 APR)
 (R 1-1.316-4(b)(2))

Alternate III (APR 1984). If the delivery schedule is to be based on the actual date the contractor receives a written notice of award, the contracting officer may delete paragraph (b) of the basic clause. The time may be expressed by substituting "within days after the date of receipt of a written notice of award" as the heading for the third column of paragraph (a) of the basic clause.

52.212-2 Desired and Required Time of Delivery.

As prescribed in 12.104(a)(3), the contracting officer may insert a clause substantially as follows in solicitations and contracts for supplies or services if the Government desires delivery by a certain time, but requires delivery by a specified later time, and the delivery schedule is to be based on the date of the contract:

DESIRED AND REQUIRED TIME OF DELIVERY (APR 1984)

(a) The Government desires delivery to be made according to the following schedule:

DESIRED DELIVERY SCHEDULE

[Contracting Officer insert specific details]

ITEM NO	QUANTITY	WITHIN DAYS AFTER DATE OF CONTRACT
_____	_____	_____
_____	_____	_____
_____	_____	_____

If the offeror is unable to meet the desired delivery schedule, it may, without prejudicing evaluation of its offer, propose a delivery schedule below. However, the offeror's proposed delivery schedule must not extend the delivery period beyond the time for delivery in the Government's required delivery schedule as follows:

REQUIRED DELIVERY SCHEDULE

[Contracting Officer insert specific details]

ITEM NO	QUANTITY	WITHIN DAYS AFTER DATE OF CONTRACT
_____	_____	_____
_____	_____	_____
_____	_____	_____

Offers that propose delivery of a quantity under such terms or conditions that delivery will not clearly fall within the applicable required delivery period specified above, will be considered nonresponsive and rejected. If the offeror proposes no other delivery schedule, the desired delivery schedule above will apply.

OFFEROR'S PROPOSED DELIVERY SCHEDULE

ITEM NO.	QUANTITY	WITHIN DAYS AFTER DATE OF CONTRACT
_____	_____	_____
_____	_____	_____
_____	_____	_____

(b) Attention is directed to the Contract Award provision of the solicitation that provides that a written award or acceptance of offer mailed or otherwise furnished to the successful offeror results in a binding contract. The Government will mail or otherwise furnish to the offeror an award or notice of award not later than the day the award is dated. Therefore, the offeror shall compute the time available for performance beginning with the actual date of award, rather than the date the written notice of award is received from the Contracting Officer through the ordinary mails. However, the Government will evaluate an offer that proposes delivery based on the Contractor's date of receipt of the contract or notice of award by adding five days for delivery of the award through the ordinary mails. If, as so computed, the offered delivery date is later than the required delivery date, the offer will be considered nonresponsive and rejected.

(End of clause)

(R 7-104.92(c) 1974 APR)

(R 1-1.316-5(c))

(R 1-1.316-4(c))

Alternate I (APR 1984). If the delivery schedule is expressed in terms of specific calendar dates or specific periods and is based on an assumed date of award, the contracting officer may substitute the following paragraph (b) for paragraph (b) of the basic clause. The time may be expressed by substituting "on or before"; "during the months . . ."; or "not sooner than . . . or later than . . ." as headings for the third column of paragraph (a) of the basic clause.

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(b) The delivery dates or specific periods above are based on the assumption that the Government will make award by[Contracting Officer insert date]. Each delivery date in the delivery schedule above will be extended by the number of calendar days after the above date that the contract is in fact awarded. Attention is directed to the Contract Award provision of the solicitation that provides that a written award or acceptance of offer mailed or otherwise furnished to the successful offeror results in a binding contract. Therefore, the offeror shall compute the time available for performance beginning with the actual date of award, rather than the date the written notice of award is received from the Contracting Officer through the ordinary mails.

(R 7-104.92(e) 1974 APR)

(R 1-1.316-4(b)(1))

Alternate II (APR 1984). If the delivery schedule is expressed in terms of specific calendar dates or specific periods and is based on an assumed date the contractor receives notice of award, the contracting officer may substitute the following paragraph (b) for paragraph (b) of the basic clause. The time may be expressed by substituting "within days after the date of receipt of a written notice of award" as the heading of the third column of paragraph (a) of the basic clause.

(b) The delivery dates or specific periods above are based on the assumption that the successful offeror will receive notice of award by[Contracting Officer insert date]. Each delivery date in the delivery schedule above will be extended by the number of calendar days after the above date that the Contractor receives notice of award; *provided*, that the Contractor promptly acknowledges receipt of notice of award.

(R 7-104.92(e)(2) 1974 APR)

(R 1-1.316-4(b)(2))

Alternate III (APR 1984). If the delivery schedule is to be based on the actual date the contractor receives a written notice of award, the contracting officer may delete paragraph (b) of the basic clause. The time may be expressed by substituting "within days after the date of receipt of a written notice of award" as the heading of the third column of paragraph (a) of the basic clause.

APPENDIX D: RESEARCHER PROPOSED CHANGES TO FAR

FAR PART 12: Delivery or Performance

12.104

(4) The contracting officer may insert in solicitations and contracts for supplies and services a clause substantially the same as the clause at 52.212-xx, Desired Time of Delivery, if the government desires delivery of routine supplies by a certain date, but does not have a required delivery date, and the date is based on the date of the contract.

52.212 is amended by adding the following.

52.212-xx Desired Time of Delivery:

(a) The Government desires delivery to be made according to the following schedule:

DESIRED DELIVERY SCHEDULE

<u>ITEM NO.</u>	<u>QUANTITY</u>	<u>WITHIN DAYS AFTER</u> <u>DATE OF CONTRACT</u>
_____	_____	_____
_____	_____	_____
_____	_____	_____

If the offeror is unable to meet the desired schedule, he may, without prejudicing evaluation of its offer, propose a delivery schedule below.

If the offeror proposes no other delivery schedule, the desired delivery schedule above will apply.

Supplier's Proposed Delivery Schedule

<u>ITEM #</u>	<u>QUANTITY</u>	<u>WANTED 30 DAYS LATER</u>
		<u>DATE OF CONTRACT</u>
_____	_____	_____
_____	_____	_____
_____	_____	_____

(B) Supplies/Services tendered for acceptance 60 calendar days prior to the desired delivery date will be processed as delivered on time.

APPENDIX E

INTERVIEWEES

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Thesis

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c.1 Early delivery of purchased materials: a DOD problem

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